

Information and Communication Technology

Class Eight



National Curriculum and Textbook Board, Bangladesh

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as a textbook for class eight from the academic year 2014**

Information and Communication Technology

Class Eight

Revised for the year 2026

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Preface

The importance of formal education is diversified. The prime goal of modern education is not to impart knowledge only but to build a prosperous nation by developing skilled human resources. At the same time, education is the best means of developing a society free from superstitions and adheres to science and facts. To stand as a developed nation in the science and technology-driven world of the 21st century, we need to ensure quality education. A well-planned education is essential for enabling our new generation to face the challenges of the age and to motivate them with the strength of patriotism, values, and ethics. In this context, the government is determined to ensure education as per the demand of the age.

Education is the backbone of a nation and a curriculum provides the essence of formal education. Again, the most important tool for implementing a curriculum is the textbook. The National Curriculum 2012 has been adopted to achieve the goals of the National Education Policy 2010. In light of this, the National Curriculum and Textbook Board (NCTB) has been persistently working on developing, printing, and distributing quality textbooks. This organization also reviews and revises the curriculum, textbook, and assessment methods according to needs and realities.

Secondary education is a vital stage in our education system. This textbook is catered to the age, aptitude, and endless inquisitiveness of the students at this level, as well as to achieve the aims and objectives of the curriculum. It is believed that the book written and meticulously edited by experienced and skilled teachers and experts will be conducive to a joyful experience for the students. It is hoped that the book will play a significant role in promoting creative and aesthetic spirits among students along with subject knowledge and skills.

The education policy has made Information and Communication Technology compulsory in all streams of the education from grade VI-XII to introduce the concepts as in acquiring literacy in this subject well as to make the students proficient in information and communication technology. The curriculum and textbooks of this subject have been developed in accordance with this. Hopefully, the textbook of **Information and Communication Technology** for class VIII will make students interested in this subject along with acquiring literacy in Information and Communication Technology.

It may be mentioned here that due to the changing situation in 2024 and as per the needs the textbook has been reviewed and revised for the academic year 2026. It is mentionable here that the last version of the textbook developed according to the curriculum 2012 has been taken as the basis. Meticulous attention has been paid to the textbook to make it more learner-friendly and error-free. However, any suggestions for further improvement of this book will be appreciated.

Finally, I would like to thank all of those who have contributed to the book as writers, editors, reviewers, illustrators and graphic designers.

October, 2025

Professor Robiul Kabir Chowdhury

Chairman (Additional Charge)

National Curriculum & Textbook Board, Bangladesh

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Chapter One

The Importance of Information & Communication Technology



At the end of this chapter, we will be able to –

1. describe the job opportunities in the field of information and communication technology;
2. explain the role of information and communication technology in communication;
3. explain the scope of information and communication technology in trade and business;
4. explain the importance of information and communication technology in government activities;
5. explain the contribution of information and communication technology in medical science;
6. explain the role of information and communication technology in the field of research.

Lesson 1:

The Importance of Information and Communication Technology

It is like Eid Day today at Nilima's residence. Her elder brother is coming home from Dhaka after a long time. Nilima and Humayun are the two issues of their parents. They live at Bhurungamari of Kurigram, one of the districts of northern Bangladesh. Their home is near the upazilla headquarter. Zainal Mia, their father, is working in one of the countries of the Middle East. Nilima has been promoted to class eight this year. Previously she obtained scholarship in the Primary School Certificate Examination. Everyone in the village admires Nilima for her academic attainment as a good student. Her brother Humayun is a good student too. The year he got admitted to the Bangladesh University of Engineering and Technology (BUET), he was the only one from their Upazila. Now Humayun works for a private software company in Dhaka. Their grandparents stay with Nilima and her mother at their home.

Knowing that Humayun is coming home, his father sent some of money to her mother's mobile phone account. Yesterday, her mother went to the Bazar, drew the money and did the necessary shopping. Her mother and grandmother have been cooking delicious food for him since morning. Nilima's grandfather has read in a newspaper that the circular for BCS exam has been published. He became worried about how Humayun would be able to apply for it if he comes home.



He has been describing to Nilima the story of his submitting his job application since morning. He told her that he walked to the riverbank, travelled by a boat and again walked a long way to reach Kurigram. Getting the application typed, he posted it to the concerned authority. It was a lengthy process to complete the formalities of applying for the job.

Government of the People's Republic of Bangladesh
Bangladesh Public Service Commission

- Application Form for Public BCS Examination - 2013
- Admission Card for Public BCS Examination
- Admission Card for Special BCS Examination
- Admission Card for Non-Competitive Examination

Nilima was not worried about the situation the same way her grandfather was. She learnt from her brother last night that he would successfully apply for the

job from at home. Nilima reminded her grandfather about the result of the Primary Education Completion Examination which she got on her mother's cell phone. Her grandfather had not needed to sustain the toil of going to Kurigram to collect the result.

Humayun, upon reaching home, assured his grandfather that he would successfully apply for the job by connecting to the internet through his laptop and modem. Not only that, he also did not need to go to the station, and stand in queue to purchase the return train ticket to Dhaka.

After dinner, Humayun connected the modem to his laptop, completed the application submission, and gave everyone a glimpse of a new world in which information and communication technology works to bring about changes everywhere.



Group Activity

Design an attractive poster delineating the importance of Information and Communication Technology in the context of Bangladesh.

Lesson 2: Information and Communication Technology in Creating and Getting Job

Remarkable changes in different levels of the society are noticed because of the enormous advancement of information and communication technology. At the very beginning, it was predicted that the job opportunities would be decreased and the number of unemployed would increase because of automation and the application of technology, but later it was proved that although some conventional job opportunities became obsolete and some trends of working had been changed, thousands of new job opportunities had been created. Research work shows that opportunities for employment have been increased along with internet connectivity.

Dr. Iqbal Kadir, an eminent Bengali educationist and Professor at Massachusetts Institute of Technology (MIT) has defined the growth of productivity for the successful application of information and communication technology in this way: Connectivity is Productivity, that is, productivity increases when people are integrated to technology. It results in new enterprises that create new job opportunities.

A worker becomes more skilled when information technology is applied. So, an organisation can do large volume of work done by employing a small number of workers. We can consider the following relevant instances:

- The risky jobs of different factories can be done either by robots or by automated machines instead of man;
- Employees are required to keep track of arrival times of workers and to keep the accounts of salaries and allowances. The automatic attendance counting machine and accounting software. can successfully do this job;
- It is possible to arrange the products automatically in a ware house;
- No additional manpower is required in the telephone exchange for computer operated digital system;
- It's possible to respond to any queries of the consumers anytime by using automatic interactive voice technology;
- It's possible to draw cash anytime from the ATM of Banks;

The trends of different works are changing everyday due to the application of ICT. The remarkable changes are as follows:

- An employee needs to continuously develop his skills in order cope with the changing trends of the workplace for his survival. As such, innovations are being brought to development progress;
- Many works can be skillfully done from home by using computer. Moreover, certain jobs which previously could not be performed without specialized knowledge, can now be done with the help of computer, such as photograph/ image and video editing.

- Many people are now working from home; so, many organisations have been transformed into virtual ones, and the number of supporting workers in these organisations has been reduced, and their working trend has changed too;
- As automated monitoring is possible, the tendency among employees of neglecting duty has gradually been reduced;

The main inducement behind using information and communication technology is its contribution in creating new job sectors. As a result, large numbers of job opportunities are created.

Expansion of mobile phone sector in Bangladesh and the creation of new types of jobs

The flourishing of mobile phone sectors has not only boosted national revenue but also generated a large number of job opportunities in different sectors in Bangladesh, such as:

- (a) Employment opportunity in mobile phone companies: A large number of job seekers have been provided with lucrative jobs in mobile operating companies. A mobile company is the largest technology related company in the country.
- (b) Selling, marketing and maintenance of mobile phones: A great demand of workers has been created to provide about 12 crore consumers of mobile phones with phone sets, marketing, selling and post-sale servicing;
- (c) Different mobile based service providers: Number of bill pay centres is increasing everyday for payment of bills through of mobile phone. A consumer can receive his required service along with paying the bill at these service centres;
- (d) Creation of new sectors: With the enhancement of mobile technology, numerous job sectors like mobile banking have been created, employing a large number of job seekers.

Internet and Information Technology plays a vital role not only in creating jobs but also providing job opportunities. Previously, the job circulars were usually posted on the notice boards of the concerned office or on the walls of the government organisations. Besides, the circulars of employment opportunity were published in the newspapers. A new kind of service called 'Jobsite' has been opened as a result of the expansion of ICT. The employing authority can publish circulars on that website. They can even publish circulars either on their own websites or on social networking sites like Facebook for free. So, a large section of job seekers can be informed instantly of the opportunity or they can register on websites like that. As a result, the registered person can be informed either through email or through SMS as soon as a new advertisement is published. Such websites have been launched in Bangladesh as well, Like Bdjobs.com, careerjet.com.bd etc.

Earning opportunities by working from home

Now-a-days, the third world countries have the opportunities to provide service to

other countries from home, thanks to the innovation of the Internet. A large number of organisations of different countries get certain jobs like website development, maintenance, monthly salary sheet preparation, updating information on the website, software development, etc. done by the workers of other countries. This is called outsourcing. Anybody can do this kind of work if he has Internet connection. In these cases, job skill and language proficiency are required. Many websites provide these kinds of opportunities. Upwork (www.upwork.com), Freelancer (www.freelancer.com), Elance (www.elance.com) etc. are the popular websites of this kind. Now a days, independent professionals are self-employed in Bangladesh through these websites. The job facilities are expanding at a rapid rate through outsourcing.

Lesson 3: Communication

We can divide the system of communication into two types one way and two way. When a person or an organisation communicates with numerous people, it is called one-way or Broadcast'. Radio and television are the common examples of that system as programmes are broadcast from the stations for the people. The viewers or the listeners can not communicate with the broadcasting station. Nowadays, in some live programmes, the viewers have the opportunity to communicate with the performers, but out of thousands of viewers, only a few become successful. So, in one sense, it's a 'one-way' communication system. Communication can take many forms, including verbal, written, nonverbal, and sometimes through signals.

The entire port of Chittagong quaked terribly with the sound of explosion at 2.15 at night on 15 August 1971. A group of naval commando freedom fighters, evading the tight vigilance of the Pakistan army, succeeded in capsizing a good number of marine vessels by exploding mines. The channel to the entrance of the port was blocked by the sunk-vessels. So, neither home nor foreign vessels could enter the port. It was one of the valiant operations in the liberation war.

Do you know how the group received the command of this daring move? As there was no way to communicate with them, on the freedom fighters' request, on 13th August 'Akashbani' radio played Tagore's song, 'Ami tomay joto suniyechelem gaan,'(The songs that I sang for you) sung by Pankaj Mullick. Listening to the song, which was a signal to the naval commandos, they understood that it was time to hit. After so many years, this incident may seem unbelievable to you.

Information can be sent over long distances via radio or television. The formats of the programmes of radio and television have been changed remarkably due to the epoch-making development of information technology. It has made it possible for

us to watch hundreds of channels instead of a few. It is possible to watch many television channels of the world from Bangladesh. The channels can instantly telecast the recent events occurring at any place of the world.

Other examples of broadcast system are newspaper and magazine. Do you know that with the passage of time, the readership of online newspapers is increasing? It is possible to view not only on computer monitor, but also on smart mobile phone.



The online version of the world famous newspaper The New York Times. At least 3 crore people read this newspaper every month.



Viewing along with talking over telephone is possible.

The supplementary system of one-way broadcast is two-way communication. The best example of this is the telephone. You know that two persons can communicate simultaneously on telephone. In Bangladesh, only the wealthy and influential persons could use telephone just an era ago. Now almost everyone can communicate with people on mobile phone, and it has been made possible for the amazing development of information and communication technology.

A large number of people of our country have been contributing a lot to strengthen the economy of our country by earning wages abroad. Now, their relatives can see and talk to them at the same time whenever they wish. And all these have become possible due to information and communication technology.

Once, the name of a person was their only identity, but now another identity has become essentially important, and it is his email address. An email address is created just by using a few letters and special characters, and people can communicate with anyone living anywhere in the world through email. Perhaps you already know that most of the communication among people is done through email. Another important facet of ICT is social networking. It is one-way broadcast and two-way personal communication as well. Now a days, a person can contact a large number of people by using social network, and by successfully organising them, can participate in development activities.

So you can understand that information technology, by enhancing the

communication among the people world wide, has started creating a new world called virtual world where everyone is reachable through the click of a mouse.

You may already know that, despite being in different geographical locations, it is possible to conduct meetings or conferences, organize seminars, and create virtual classrooms in the virtual world or over the internet. In the business sector, web conferencing technology is widely used for holding meetings among employees of an organization, arranging telemedicine sessions involving doctors, patients, and hospitals, and organizing virtual get-togethers within a community for social interaction. Web conferencing refers to various types of online conferencing services, including webinars, webcasts, and web meetings, using different media (audio, video, or both) over the internet.

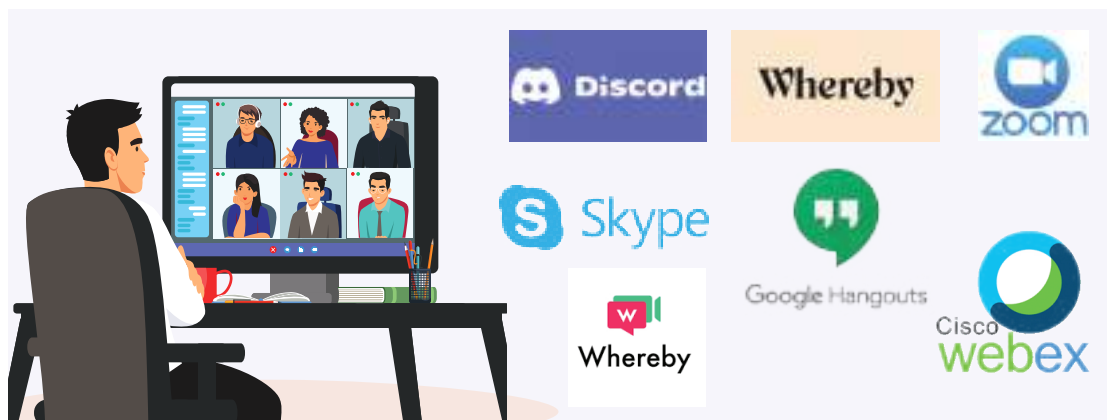
Video conferencing software allows participants, even when located in different geographical regions, to experience a face-to-face meeting environment. On the other hand, audio conferencing software offers the ability to make calls or teleconference at a lower cost compared to traditional telephone services.

With internet connectivity, a built-in webcam, microphone, and speakers available on modern smartphones, tablets, and laptops, web conferencing software can be easily used. However, on a desktop computer, to use this software, you will need an internet connection, a webcam, and a headset (or a microphone and audio speakers).

Features of Web Conferencing Software

- **Video Conferencing:** Video conferencing software, using appropriate hardware, provides a virtual face-to-face experience for individuals located in different geographical areas during a meeting. This software sets up a virtual meeting room where two to several thousand participants can gather from anywhere. In such meetings, a moderator or presenter typically manages the session.
- **Audio Conferencing:** Web conferencing software includes an easy and comparatively affordable IP telephony system for making phone calls and conference calls from any location. Audio conferencing software is often integrated with video conferencing software that allows users to join the meeting without activating their camera.
- **Video Streaming:** The moderator or presenter can display or share video or other media files from their computer with all participants.
- **Slideshow Presentation:** When the presenter discusses or explains a slide presentation, all participants can view the slideshow.
- **File, Screen, and Application Sharing:** Files, screens, and applications shared by the meeting moderator can be accessed by participants. During their presentation, the presenter can also see what they are displaying and what actions they are taking.

- **Internal Messaging or Text Chat:** Participants in the meeting, even if muted, can send questions to the moderator, share comments with other participants, or use the chat function for questions and answers.
- **Whiteboard:** Any participant can use a virtual whiteboard to write notes, draw images, or provide instant explanations.
- **Scheduled Meetings and Calendar Integration:** Web conferencing applications allow for meeting scheduling. Often, these applications integrate with users' existing calendars to help distribute the meeting link to participants, which allows them to join directly from the calendar invitation. The meeting software can be launched, and users can send meeting invitations via email or share a public meeting link for webinars on social media.
- **Maintaining Meeting Privacy or Encryption:** Secure web conferencing software protects the privacy of meetings. Virtual waiting rooms or permission settings are used to verify the identity of new attendees. Additionally, various encryption methods are applied to prevent data theft.
- **Meeting Recording Feature:** Web conferencing software allows for the recording of an entire meeting or specific parts in MP3 or MP4 file formats. This feature is useful for preparing meeting minutes or reusing the conference content as needed.
- **Popular Web Conferencing Software:** Some popular web conferencing software includes Zoom, FaceTime, Facebook Messenger Room, Microsoft Teams, Cisco Webex, Skype, Google Meet, etc.



Group Activity: Arrange a debate creating two teams. one for printed version and another for online version of newspaper.

Vocabulary: one-way broadcast, two-way communication, email address, social network, virtual world.

Lesson 4: Importance of Information and Communication Technology in Business

The use of Information and Communication Technology, like in other spheres of life has brought about a radical change in trade and business. The main objective of every business are to manufacture goods or ensure service by the quickest possible time and with minimum investment, and to market their product fast. Information and Communication Technology plays a vital role in collecting the raw materials, managing the workers involved in production, developing their skills, managing production, marketing and making profit.

Usually the application of ICT brings with it various benefits. Besides, ICT reduces costing. A huge volume of work is done in a short time by using upgraded technology. As a result, the businessmen increase profit margin by reducing production cost. There are many ways to reduce cost:

1. **Controlling stock:** Usually a large amount is expended for stocking products. Stock should be controlled according to the demand of the market. The current information of requisite stock can be known by using specialised software. so, production can be done accordingly.
2. **Production management:** Production management can be developed by the application of ICT. By making production system automatic using ICT controlled machineries; more production is possible in less time. Besides, use of ICT in labour management increase production rate.
3. **Faster mode of communication:** The main devices of Information and Communication Technology like mobile phone, the internet, satellite, etc. have made the mode of communications faster.
 - **Mobile Phone:** Oral communication is possible from any place by mobile phone. So, a businessman can run his business without being physically present. It is possible to contact numerous people at a time by using the conference feature of the mobile phone that allows a person to see other people also. As a result, work can be done faster.
 - **Fax:** Urgent texts and images can be sent through fax. It plays an important role in the countries where signatures of the sellers and buyers are mandatory in business transaction.
 - **Email:** email is very important for business communication as written

communication can be done instantly. The images of the products can be viewed too, and even the link in which the opinion of the purchaser is expressed can be sent.

- Internet: It is possible to spread merchandise benefits over the world through internet.
 - Intranet: The offices of many business organisations may be situated in different locations. Intranet has made the communication among people within the same business organisation smooth.
4. **Proper maintenance of accounts:** Keeping accounts properly is a very important part of business. Small traders can keep their accounts just by using spreadsheet. Besides, they can preserve the information of the consumers, workers and stock of products by using different kinds of database software. The judicious use of this information can propel the business forward.
5. **Marketing:** The application of ICT has brought about a new dimension in marketing.
- **Market analysis:** It is essential to collect information of the market before marketing any new product. By using ICT the market demand of a new product, status of supply and price can be analysed quickly.
 - **Collecting information of the competitors:** Information about competitive commodities and service of competitive firms can easily be collected.
 - **Supply:** It is possible to plan supply of products at a low cost either by GPS or by similar systems.
 - **Publicity:** The advertisement of products or service can be published either at minimum cost or for free in the websites, blogs and social networks.

6. **Sales management and accounts:**

Electronic Point of Sale (EPOS) is such a system by which all the information of sale can be preserved. Round-the-clock monitoring is also one of its advantages.



7. **Payment Collection:** Using ICT, businesses can collect the payment against sold products and directly deposit this to their bank accounts. They can even transfer the cash from the buyers' credit and debit cards or by mobile banking.

ICT helps businesses in different ways besides those mentioned above. This technology can play a vital role in starting up a new business as well.

Group Activity:

How will Information and Communication Technology bring changes in business, and in which fields? Make a list and present it.

Vocabulary: Worker management, Link, Marketing, Blog, Electronic Point of Sale (EPOS)

Lesson 5: The Application of Information and Communication Technology in Government Activities

Government is one of the most important parts of a state. The government of every country tries to create for its citizen employment opportunities that are creative and takes measures for poverty alleviation. One of the general function of the government is to enact laws and regulations, and implement those properly through the different ministries, directorates and departments and finally representing the country properly in the international arena. The government, by imposing taxes and custom duties internally and collecting loans and donations from foreign countries, implements the agenda. Non-government organisations or professionals can be appointed for this purpose, if necessary. The important application of information and communication technology is observed almost in all the activities of government. Some are mentioned below:



- (a) Publishing Government Circulars: All the notices, tenders, quotations, circulars and different types of orders of the government were either hung on the notice board of the concerned department or published in the newspapers before the innovation of the Internet. So, the general populace could not know the rules and regulations and the directives of the government. Now people get all the information through websites or news/job portals. The official portal of the government of Bangladesh is www.bangladesh.gov.bd

- (b) Enacting laws and regulations or amendments: One of the regular activities of the government is to enact new laws and regulations and amend the old ones. The concerned department can collect public opinion through the Internet. Besides, the segment of the population that is not accustomed to the Internet can send opinion through the call centres.
- (c) Communicating Important Events and Informing about Memorable Days: The government can send messages regarding any event directly to the people through mobile phones. At least about 12 crore people use mobile phones. in bangladesh. Any important government announcement can directly be sent to the mobile phone users through short message service (SMS).
- (d) Government Service on the Doorstep: The most innovative and tactical application of ICT in government activities is to bring the service to the doorsteps of the citizens. The essential services to the citizens can be imparted through mobile phone, radio, television and the Internet. In the developed countries, people get passports, deposit the income taxes, get admission into universities, and pay to the government treasury instantly from home. In our country, we also get some service very easily. Those are as follows:
 - **e-settlement Records:** Previously, people were harassed while collecting settlement records of land, but now they can easily collect the records from e-service centres established in 64 districts of the country. A person can apply online to have the duplicates or settlement records or attested copies very easily. Again, while providing the services, the records become digitized, so getting information in future becomes easier.
 - **e-book:** An e-book platform has been opened to allow download of all the textbooks easily from the website(www.nctb.gov.bd). Textbooks of different classes and various supplementary books are kept on this website.
 - **e-permit:** The approval of sugar-mill authority to supply sugar cane has been digitized, and the farmers get their permit for supply through mobile phone. As a result, It has eliminated harassment and ensured the supply as well.
 - **Results of Public Examinations:** Now the results of all the public examinations are being published online and through mobile phones.
 - **e-healthcare:** Telemedicine service centres have been set up in many places of the country to provide healthcare to the people. Besides, complaints against the management of government hospitals can be lodged with the concerned authority. As a result a positive change is taking place in healthcare service.

- **Online Income tax Return Submission:** The income tax payers can assess their income tax and submit the return remotely from home.
- **Money Transfer:** Money can be transferred instantly from one place to another through postal cash card, mobile banking, electronic money transfer system, etc. Besides, easy and instant cash transfer is possible through the Internet and online banking system.
- **Utility Bill Payment:** People would face difficulties while paying the bills of electricity, water and gas previously, but now they can pay these utility bills through mobile phones or online.
- **Transport:** Now we can easily book train, bus, or air tickets online or through mobile phones.
- **Online Registration:** The automation of the Registrar of Joint Stock Company is an example of the standardization of government service by the application of ICT as is shown below.

When a firm or company is formed, it should be registered with a government entity. The Registrar of Joint Stock Companies and Firms is an office of this kind. Once, a disorderly queue, unruly crowds of people, obnoxious treatment of the middlemen, etc. were usual, everyday features of the office premises, but the total scenario has changed with the application of ICT. Now, requisite works are done from the website of the Registrar of Joint Stock Company and Firms (www.roc.gov.bd). A comparative study of some function/activities in the past and present is presented below:

Name of Function/Activity	Duration (Past)	Duration (Present)
Transfer Certificate	Minimum 7 days	30 mins
Registration	Minimum 30 days	4 days
Payment of Fees	Queueing up since dawn	Through Bank Deposit
Physical presence	Minimum 6 times	None

Group Activity:

Make a list, with your group members, of the government activities in your locality which are performed through the application of ICT.

Vocabulary: SMS, e-settlement record, e-permit, Joint Stock Company.

Lesson 6: Healthcare

One of the remarkable changes brought about by information technology is found in healthcare. Once, the doctors or the quacks would try to treat the patients by observing their symptoms. Now the situation has changed. A doctor, before prescribing any medicine, examines the patient and accurately diagnoses the disease. Even the information can be preserved in database and can be retrieved for future treatment. The doctors need not rely only on prediction to advise the patient any course of treatment nowadays. Using ICT doctors can easily select and prescribe medicine. It is not only possible to analyse the diagnostic reports of the patients, but also innovate new healthcare machineries, and such machineries have been put to use. The information collected by these machineries is processed meticulously. Now one can instantly do the work which was impossible to do earlier, without leaving home.



A modern telemedicine centre ready for neurosurgery

The number of physicians in our country is not sufficient. Very often, it is found that experienced doctors are not available in small towns and villages. In future, healthcare facilities will be available in almost all the corners of the country, but until that time information technology will help us



All the machineries used for treatment are completely information technology oriented.

with 'Telemedicine' which is a way of taking physician's advice over telephone. You will be happy to learn that some healthcare centres have come forward with telemedicine facilities. When doctors are beyond reach, a patient can take the help of telemedicine.

As important as it is to take treatment from the doctor after falling sick, it is also very important to

prevent diseases. So, everyone should be immunised routinely. You may boast about our achievement in reducing the child mortality rate by immunising children of our country. The programme of immunising has become successful through the use of information technology, as the concerned authority are able to make plans and implementing the projects meticulously. In our country you can get health care and advice anytime by calling 16263.

Matters concerning treatment that seemed to be impossible once are now easily attainable, though it does not mean that we have achieved everything. Now we can research in a different process. Complex tasks such as solving the human genome mysteries have been easily done by modern computers.

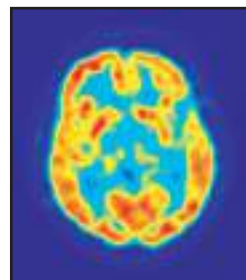
So, a radical change is going to happen.

Now it is possible to remove the exact cause of the disease by successfully detecting it instead of just reducing the symptoms. Not only that, now all the people take medicine of the same generic brand, but in future different medicine will be manufactured for different people as per their need. Now, surgery requires the doctor be physically present in the operation theatre, but in future, the surgeons will perform the surgery remotely by using information technology.

Hope you will contribute to the new world of healthcare in future.



Positron emission tomography machine can take three dimensional picture of the body by using information technology.



It is possible to detect the activated part of the brain with the help of CT scan

Group Activity:

Make a list of the machines being used in treatment and identify the ones that work by the support of information technology.

Vocabulary: Database, Telemedicine, Genome

Lesson 7: Research

Our civilization is advancing due to new inventions and researches.

Perhaps you have guessed that information technology has not only brought about a change in the field of research but has also added a new dimension to it. Nowadays, no one can think of any research work in any field like literature, art, sociology, mathematics, technology, science, etc. without computer and information technology.

To carryout research work, it is imperative to work with information. Information should be collected, processed, analyzed and in the end, represented in an orderly manner. Researchers had to do all these works manually in the past, but now they can process everything by computer. Now they need not worry about processing information. They can only concentrate on research work. You will be pleased to know that the researchers of our country are doing an excellent job in the fields of literature, sociology, economics, and other subjects, and they all use computers for their research.

Computer and information technology play a very important role in science and technology oriented research. These research works are divided into two parts: theory and practice. In theoretical research work, the researchers only concentrate on the theoretical aspect, and they have to rely on computer for their work. They have to match the information stored in enormous database and information bank to be certain whether the research is

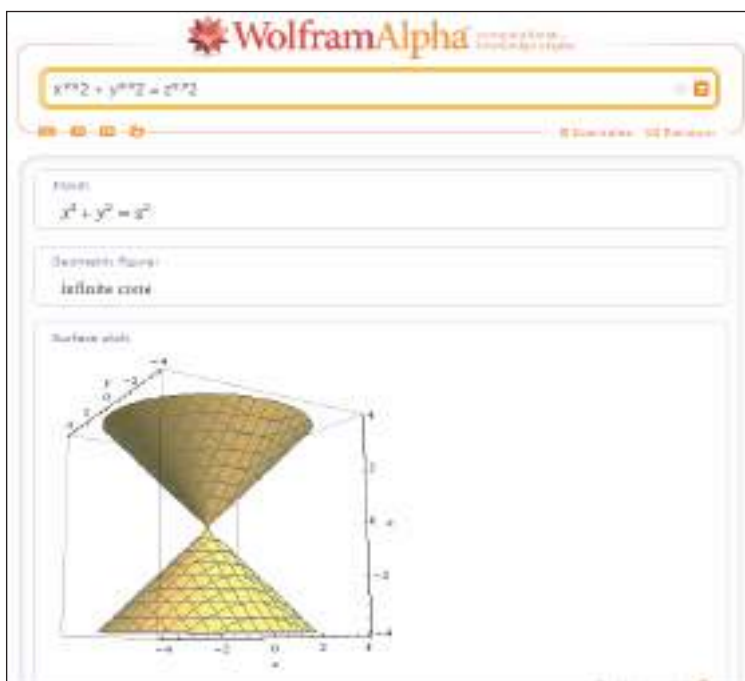
on the right track, and so they use information technology.

Practical research is done in the laboratory where machineries are used for experiments. Scientists use computers to innovate, run and use machines. Computer is always used to process the data collected through the help of machines.

Nowdays the size of computer is



After experimenting in the laboratory, the collected data should be processed in the computer.



smaller than the image of computer that instantly comes to our mind. Small micro controller, FPGA (Field Programmable Gate Array), PLA (Programmable Logic Array), etc. that work as computers have been invented. By installing these devices into the machines, they can be made automatic and the entire research is made easier.

As network can be used

in practical research, the scientists need not stay physically in the laboratory. They can control the whole process of research remotely. This process is a part of virtual laboratory which can be used for practical research and experiments similar to a real laboratory. The example of such virtual laboratory is www.softpedia.com. Along side traditional computers used for experiment and research, sometimes, the scientists use powerful specialised computers.

Group Activity:

What will you do with 10 nail size computers if given to you? Write in details.

Vocabulary: Micro controller, FPGA, PLA.

Sample Questions:

- Which invention has created facilities for doing official works from home?
 - Computer
 - The Internet
 - Mobile phone
 - Optical fibre
- Which one of the following is not a website for outsourcing?
 - www.upwork.com
 - www.elance.com
 - www.guru.com
 - www.bikroy.com

3. What was the means of communication during the war of liberation in 1971?
- Radio
 - Television
 - Computer
 - Land Phone
4. The use of information and communication technology in government work will result in—
- Creating opportunities for the general public to easily access information
 - Making it easier to receive government services
 - Reducing public participation in government work

Which of the following is correct?

- i and ii
- i and iii
- ii and iii
- i, ii and iii

Read the text below, and answer the question nos. 5 & 6:

Raihan goes to his district's land office to collect various records of the land he inherited. A land office official tells him that he could have obtained the necessary records online from Dhaka itself. Therefore, there was no need to spend time and money to come here. Raihan thanks the land office official and returns to his village home. At night, he suddenly feels unwell. Since the local hospital is far away, he feels helpless. His wife calls 16236 on her mobile phone to consult a specialist doctor. The doctor listens to his symptoms, provides necessary advice, and recommends immediate hospitalization.

5. Which service did Raihan's wife use to receive medical assistance?
- Internet
 - Telemedicine
 - Computer
 - Optical fiber
6. Based on the advice of the land office official, Raihan can—
- avail e-Parcha service
 - obtain digitized land records
 - collect records of land documents

Which of the following is correct?

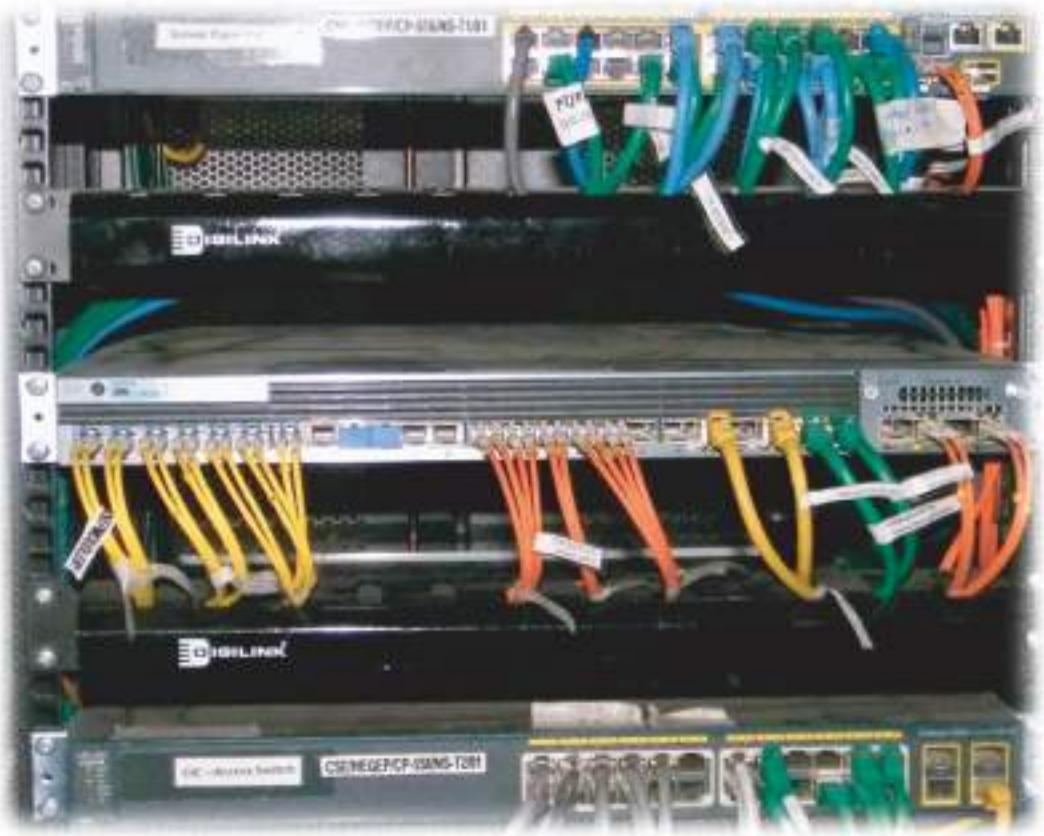
- i and ii
- i and iii
- ii and iii
- i, ii and iii

Short Answer Questions:

- What is meant by outsourcing?
- How does ICT help reduce business costs?
- Why does a student need knowledge of ICT?
- Describe the use of the internet and intranet in the business sector.
- What is 'e-Parcha'? Write one advantage of e-Parcha.

Chapter Two

Computer Network

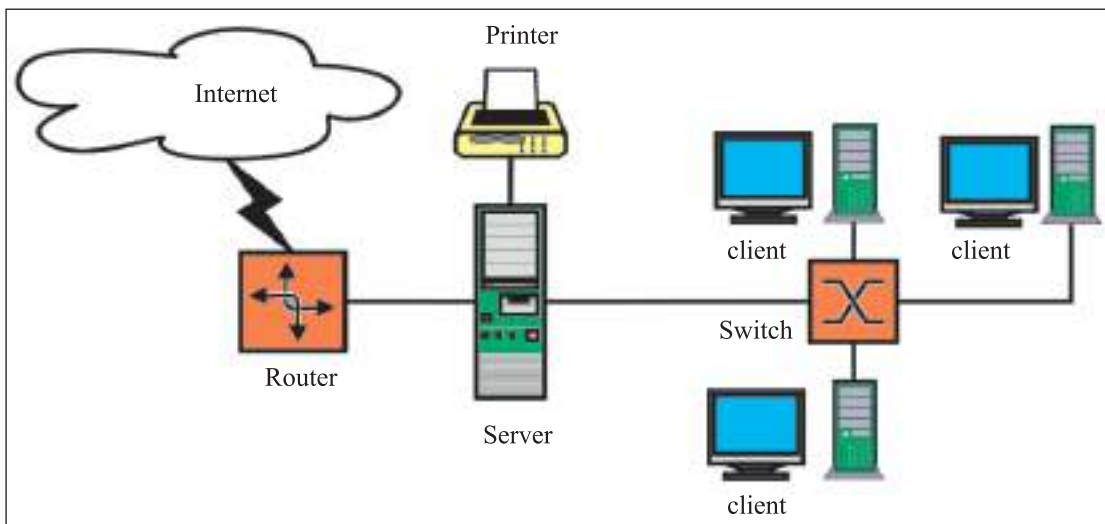


At the end of this chapter, we will be able to –

1. explain the idea of computer network;
2. explain different network related devices.

Lesson 8: The Idea of Network

If two or more computers can exchange data among themselves after being connected through any medium, it is called computer network. Perhaps you have guessed that connecting merely two or three computers is not considered a real network; a network involves a large number of computers. Nowadays, it seems as though a computer is not truly used until or unless it is connected to the network. A user of computer can then use many features of a network. He can use the resource that he does not have from the network.



A Network

In order to get a better idea of what networking involves, we should learn about some devices related to it.

Server: As the name indicates, its function is to serve—that is, a server is a powerful computer that provides services to other computers connected to the network. A computer network can have several server.

Client: Ordinarily if anybody receives service from any person, he is called the client. The meaning of client is almost similar in computer networks. The computers that receive information from the server are called clients. Suppose you want to send an email from your computer by using the network; your computer will be the client. The computer of the network that provides you with the service of sending email for you is called the server—that is, email server.

Media: The thing used to connect the computers is called media. Electric cable, coaxial cable optical fibre, etc. are examples of media. Computers can also be connected to network without any cable or any media, as in the case of WiFi.

Network Interface card: A computer cannot be directly connected to the network. A network interface card (NIC) needs to be attached with the computer to do so. The card can collect information from the media and transfer these to computers for use, and alternately receive data from computers and send these to the network.

Resource: The advantages offered to the clients for use are called resources. If a printer and a fax machine are connected to a computer, they become resources.

If anybody uses a piece of software kept on the server, it is called a resource. A computer user who uses network not only receives resources but also offers the same when a piece of important information or amusing images preserved in his computer are used by others, and thus his computer will turn into a resource.

User: The client who uses resources from a server is called the user.

Protocol: It is mandatory to follow some rules and regulations to exchange information from one computer to another after connecting them together. The people who create network determine these rules including in which language and by following which rules and regulations they will ensure the inter-communication of the computers. These are called protocols. For example, the protocol for browsing web pages on the Internet is the hypertext transfer protocol (http).



A Server

Group Activity

What are the resources necessary for getting the computers of your school on to network? Make a list.

Vocabulary: Server, Client, Media, Network Interface card, Resource, User, Protocol, http.

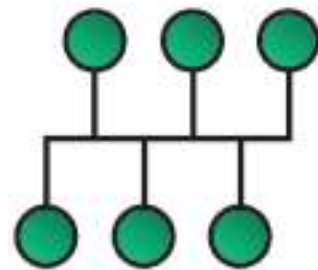
Lesson 9: Topology

You have already learnt that numerous computers are connected to a network so that one can communicate with others. Based on the location of the computers within the network, computer network can be divided in the following ways:

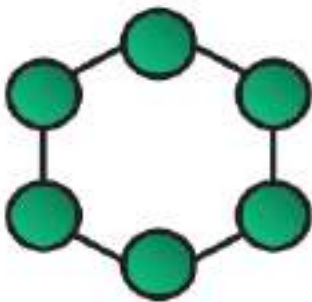
- PAN (Personal Area Network)
- LAN (Local Area Network)
- MAN (Metropolitan Area Network)
- WAN (Wide Area Network)

PAN is a personal network, where Bluetooth is used. At schools, colleges or universities the LAN is generally used. Again, a MAN is a network that connects a whole city. But WAN is used to connect the whole country or the world. The computers under this Network are connected by different systems. These different systems are called topology. Let us discuss some types of topology here.

Bus Topology: All the computers are connected to a main backbone or a main line in this topology. If a computer wants to contact another computer in bus topology system, the information is shared with all the computers connected to it, but only the desired computer receives the information, and the other computers ignore it. Remember that if the bus or backbone gets damaged, the whole network collapses.



Bus Topology

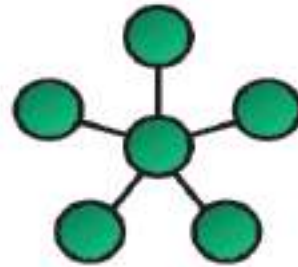


Ring Topology

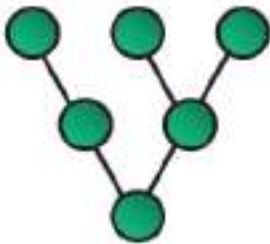
Ring Topology: Ring topology is circular in shape. From the image, you can understand that every computer is connected to two more computers. In this topology, information or data moves from one computer to another following a particular direction; but keep in mind that in ring topology, the computers need not to be connected in a circular way. They can stay scattered, but connection must always remain circular in ring topology. Remember that if any computer gets damaged, the whole network becomes inactive.

Star Topology: If all the computers of a network are connected to a central hub/switch, it is called star topology. It is comparatively an easy topology. If anybody wants to create a network fast, he needs to use the star topology.

If a computer gets damaged in this topology, the rest of the computers remain active, but if the central hub/switch is damaged, the total network will stop functioning. It is not necessary for the computers to be arranged in star formation in this topology.



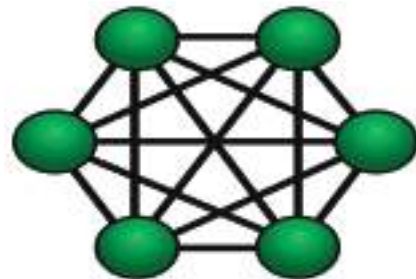
Star Topology



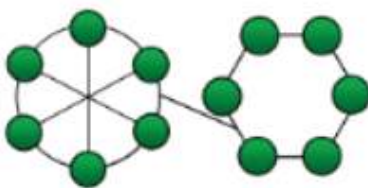
Tree Topology

Tree Topology: This topology looks like a tree. If you look at the image carefully, you will notice that it really resembles a tree. Just branches grow out from the trunk and multiply rapidly, each computer branches out. The interesting thing here is that numerous star topologies are integrated together to form a tree topology.

Mesh Topology: In this system of topology, computers are connected to each other through a number of ways. The computers connected here can not only receive the information but also distribute it among other computers. If all the computers of a network are directly connected to all other computers, it is called a complete mesh. An image of a complete mesh of 6 computers has been represented here.



Mesh Topology



Hybrid Topology

Hybrid Topology: A hybrid topology is a network structure combining two or more topologies, such as a star, ring, bus, or mesh topology. It is designed to leverage the advantages of individual topologies (star, ring, bus, or mesh) and minimize their weaknesses to improve functionality.

Group Activity

Design a poster on topology in groups

Vocabulary: Bus topology, Ring topology, Star topology, Tree topology, Mesh topology, PAN, LAN, WAN.

Lesson 10: Use of Network

Man is a social being. In ancient times, man started to live collectively in a society to tackle dangers. Everyone has some responsibilities in society, and everyone learns to perform their duties accordingly.

Living together socially has added a new dimension to the advancement of the society. Now a days , the network of information and communication technology has changed our lives a lot. The way we do certain things has also changed.

The most important use of network is to use information effectively. Once, it was a very difficult task to send a piece of information to somebody. Now it is possible to disseminate any information not only to acquaintances, but also to the whole country, even to the whole world instantly. Once, information was considered as asset: The more information a man had, the more powerful he was. This concept has changed, thanks to the innovation in network. Now, information is open to all. Different organizations protect their information according to their own needs, but other information is accessible to all. Both a powerful and an ordinary person have equal access to information. Now both of them can get the some information from the same database.

A new trend hasbeen introduced in the world for presenting information through network.

Now information is preserved in database, but once it was preserved in papers, and people would have to search through a mountain of papers to get a piece of information. The job was unpleasant and time-consuming. Now anybody can preserve the information in computer database just with a stroke of finger and use it when needed as well.

Once, reams of papers were required to preserve information in black and white, but now it is preserved in computer database. The use of papers has dropped dramatically. Air ticket is an example of this. Once, the passengers had to carry

The screenshot shows the WikiAirlines website interface. At the top, there's a header with the 'WikiAirlines' logo. Below it, a section titled 'YOUR TICKET-ITINERARY' displays flight details for three segments: NYK 3280 (Shinjuku to Toronto), WK 2485 (Frankfurt to Tokyo), and NYK 3281 (Toronto to Shinjuku). Each segment lists the flight number, route, class, and status. Below the itinerary, there's a section for 'Passenger Name' (JONES, JOHN DOE) and 'Ticket Number' (012-3456-789012). A 'Fare Breakdown' table lists various fees like Base Fare, Airport Improvement Fee, Security Fee, and Fuel Surcharge. At the bottom, the 'TOTAL FARE' is shown as 909.39 CAD, paid by credit card.

WikiAirlines

YOUR TICKET-ITINERARY | YOUR BOOKING NUMBER: 000001

Flight	From	To	Aircraft	Class/Status
NYK 3280	Shinjuku (TOK)	Toronto (YYZ)	Boeing 747-400	Y Confirmed
WK 2485	Frankfurt (FRA)	Tokyo (NRT)	Boeing 747-400	Y Confirmed
NYK 3281	Toronto (YYZ)	Shinjuku (TOK)	Boeing 747-400	Y Confirmed

Passenger Name: JONES, JOHN DOE | **Ticket Number:** 012-3456-789012 | **Class:** Y Confirmed

Fare Breakdown	Price
Fare (JL3280YR, JL3280YR)	880.00
Canada - Airport Improvement Fee	10.00
Canada - Security Fee	11.00
Canada - GST #1234-5678	1.00
Canada - GST #1234-5678-901	1.00
Security - Airport Security Fee	10.00
Security - Airport Service Fee	10.00
Fuel Surcharge	10.00
Total Base Fare (per passenger)	880.00
Number of Passengers	1
TOTAL FARE	909.39

Payment Method: Credit Card | Card Number: 0000-0000-0000-0000

Notes: Ticket is non-refundable. Changes allowed, subject to availability. Please read carefully all fare rules & conditions.

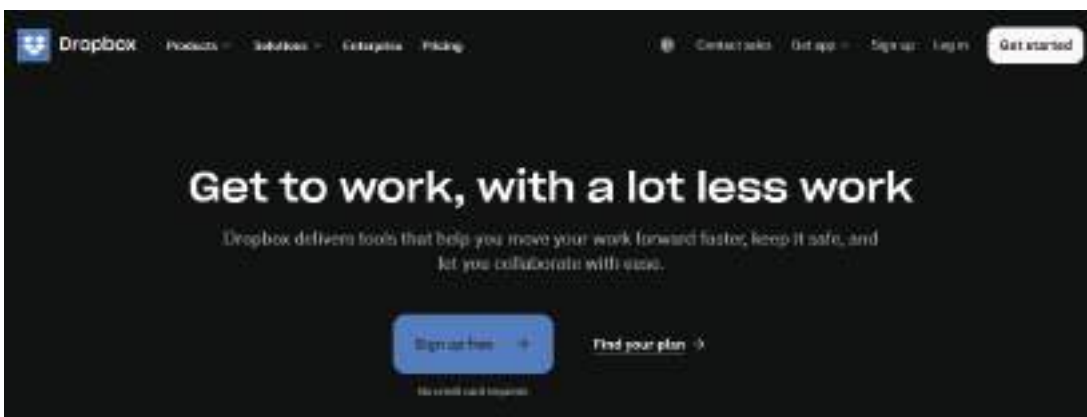
You need not keep air ticket with you as it is possible to download e-ticket from anywhere.

the tickets with them to the airport, but now the system of e-ticket has been introduced in the whole world. The airlines officers can access all relevant information of the passenger from his identity and can arrange everything for him. In the future, no one will have to carry passports for travelling. The information of a person can be searched in the database by taking finger prints or by scanning the retina of his eyes.

Another important use of network is to share software related to information technology. In the past, it was necessary to load the required software separately in every computer. Now it is unnecessary to keep software in personal computer. Softwares are kept either in the main computer or in a server, and the other computer users can use that software kept in the server. Thus, a user can use software for free or subscribing at a minimum charge. In this way, a user can keep his personal files of information in a different location. He can use it from anywhere of the world. Dropbox is the name of such a popular service and it has been used to store all the information at the time of writing this book.



Scanning finger print



Home page of Dropbox

Group Activity

Write five use of networks that are not mentioned here.

Vocabulary: e-ticket, Retina scan, dropbox.

Lesson 11: Use of Network

Networking of ICT resources is a new concept in sharing information. Usually it is called 'Cloud Computing'. An organization has to purchase hardware, server, etc. to have services of information technology. Experts need to be appointed, and expensive and complicated software are bought for the skilled use of server. Thus, the organization can get proper service from information technology. Sometimes, an organization requires a temporary service, but this, too is an expensive process. The information technology devices are being upgraded so fast that its value falls within a few years after purchasing, and the organization suffers financial loss.

To counter this problem, a new kind of service called 'Cloud Computing' has come into being in the field of information technology. The idea behind it is very simple. Either a user or an organization can receive any kind of service from computer-service-disseminating organization by using network. Here, the organization will arrange everything for the client. If the user's need is temporary, he will use it for a certain time and pay the charge only for the service used.



This concept has become popular and the world wide use of cloud computing is gradually increasing. The technology of sending email by hotmail, yahoo or gmail is a part of cloud computing.

A new trend of communication through social network has begun by using network. Photos, videos, information, emails, etc. can be sent or exchanged through the network. Now Facebook and X (previously Twitter) are on the top of the list of social networking sites.



Some types of Social Media

You can make phone calls by using network. Now it is possible to also see the person on the other end of the telephone. In offices, the processing and exchanging of files are done faster and skillfully by using network.

Network plays a very vital role in entertaining people. Once, either people had to go to the cinema hall or to purchase a CD for watching a movie, but now they can download the film directly from the network. The use of network has added a new dimension to the world of entertainment.

Network is used in running the state, in ensuring security and conducting warfare. Information is an asset in this changed world. He, who is able to use information skillfully, will be the most powerful in this world and using information to fullest capacity requires powerful network. Certainly, we will be introduced to more new systems in the field of networking.

Group Activity

Make a list of facilities one can avail using network

Vocabulary: Cloud computing, Hotmail, Yahoo, Gmail, Facebook, Twitter.

Lesson 12: Network Related Devices

Hub:

Hub is used to connect a number of wired ICT machines like, computers, printers to a cable network. Hub offers the facility to connect one device with others. All the computers connected by the hub to the same network can contact one another. Hub means either the Internet hub or networking hub, but nowadays, there is a USB hub too.

When either data or information is transferred from one computer to another, the hub can not read it. While transferring a piece of information, the hub sends it to all the computers connected to it, even to the computer from which it is sent. This means that the hub can not send it to any particular destination. Currently, the use of hub is gradually decreasing as it is not fast and it can not provide many advantages.



Hub and USB hub

Switch

This is a tiny ICT device like the hub. Now switch is frequently used to create a network. The main difference between a hub and a switch is that a switch connected to a wire can identify every node separately, but the hub can not. So, any node of a network created by switch can directly contact the other. The node connected to the switch can send data or information to the desired destination.



Switch

Now the question is how the switch works.

Switch allocates a different address for every node connected to it and exchanges data or information to the addresses-that is, the switch transfers data from one address to another whenever necessary. This is called Media Access Control (MAC) address according to the terminology of information and communication technology. Switch works faster than the hub as it uses separate addresses. That is why switch is the most popular device for creating network.



Router

Router

The word 'Router' originated from 'Route'. It is an important device which is the combination of both hardware and software. It is used to create network. The Internet is made up of numerous networks. Router is used to connect two active networks under the same protocol (This will be discussed in details in the higher classes). A huge number of routers are active in the Internet now.

The main job of the router is to show the route of data or information. Suppose someone wants to send a photo to a friend in Australia. The image, after being divided into several data packets, will reach the friend's computer through the Internet. The address of destination is linked in every data packet. As the Internet is globally extended like a web, the data packet can reach the destination through different routes. When a data packet reaches a router, it gives the direction to reach the destination easily and quickly.

An example will clear the matter to you. Suppose you want to visit a country by air, but there is no direct flight from Bangladesh. What will you do then? The airlines company will take you to a convenient country from where you will get the connecting flight to reach your destination. Have you understood the nature of the workings of a router now?

Group Activity

Show the differences among the hub, switch and router.

Vocabulary: Hub, USB hub, Node, Switch, MAC Address, Router, Protocol, Data packet.

Lesson 13: Some More Network Related Devices

Modem

The most important device needed for getting connected to the internet especially through telephone line, is modem. The word 'Modem' originated by combines 'Mo' from modulator with 'Dem' of demodulator. This can be used either through cable or by wireless technology.

Some signal is required for sending data or information through the Internet. [Modem is such a network device that transforms the digital signals received from the computer to analog signals and sends it to the network. Similarly, it transforms the analog signals received from the network to digital signals and sends it to the computer.]

Ealier, low speed dial-up modem was used. Now instead a high speed cable or DSL (Digital Subscriber's Line) modem is used. Moreover, Wi-Fi (Wireless Fidelity) modems are also being used in great numbers.



Modem



LAN Card with cable

LAN Card

The device that is essential for connecting two or more computers is LAN card - that is, if we want to create any network, LAN Card is a must. It is necessary for exchanging data or information from one device to another. The role of the LAN card is that of an interpreter.

Now in almost all the computers and laptops of all brands and in nodes, LAN card is in-built. However, in some devices, LAN cards need to be connected externally. Due to technological advancement, wireless LAN card is a very popular device now.



wireless LAN Card

Group Work

Discuss the problems of cable connecting LAN card and the advantages of wireless LAN card in groups and do a presentation.

Vocabulary: Modem, Modulator, Demodulator, DSL modem, Wi-Fi modem, LAN card, Interpreter.

Lesson 14: Satellite and Optical Fibre

You know that network is not restricted to an organization nor is it limited to a city or a country. It has spread out to the whole world which means that, a signal reaches any place of the world from another. If the distance is near, it can be sent through the electric wires, but when it is necessary to send the signal from one place to the farthest corner of the world, satellite or optical fiber is the most effective means.



The floating Communication Satellite in space

Satellite

Satellite orbits round the earth while floating in space. As it moves with the help of earth's gravity, no fuel or energy is spent to keep it moving in space. The earth makes a complete spin on its own axis every 24 hours. If the satellite can be made to orbit once every 24 hours, around the earth, from the earth it will appear motionless in the sky. This satellite is called geo-stationary satellite. It cannot be placed at just any height. It should be placed in a certain orbit at least about 36 thousand kilometers above the ground. Once a geo-stationary satellite is sent to space, signals from one corner of the world are sent there and the satellite resends it to the other corner. Thus, signals can be sent through the radio, telephone, mobile phone and the Internet. When a geo stationary satellite was set up in space in 1964, a new era began in the field of communication.

Bangladesh has also sent a satellite named Bangladesh Satellite 1 on 12 May 2018 in the space. Bangladesh is fifty seventh among the satellite launching countries of the world. A new era has dawned with the launching of this satellite.

There are two kinds of problems in sending information through satellite. As the satellite stays far above the earth, high antennas are needed to send signals there. The second problem is an unusual one. The signal sent from the earth is a wireless signal, and though it moves very fast, it takes some time to cross the long distance. That is why, in telephone conversation, the speech is not

heard instantly, it is received after an interval.

Optical Fibre

Optical fiber is a kind of thin plastic glass. Light signal is sent through the optical fiber just as electrical signal is sent through electric wire. A question might arise as to how light signal is sent through optical fiber. By this time you have already learnt about infrared light. Through this infrared light, light signal is sent through optical fiber.



Optical Fibre

First, electric signal is transformed into light signal. Then, the light signal is transmitted through optical fibre. On the other end, light signal is converted to electric signal. In this way signal can be sent through optical fibre.

It is possible to send a large number of signals through optical fibres. You will be surprised to know that thousands of telephone calls can be sent just through a single optical fibre.



Bangladesh is now connected to the outside world with submarine cables called SEA ME-WE4 and SEA ME-WE5.

Nowadays communication through optical fibre has become so developed that all the countries of the world are connected to each other through the network of optical fibre. Most of the time, the fibre is laid out between one continent and another through under an water route. This is called a submarine cable.

The satellite signal can move as fast as the speed of light. When it moves through the optical fibre, the velocity decreases by one-third. In spite of that, the signal can be sent from one part to the farthest corner of the world very quickly through optical fibre. Because the signal need not return from the satellite floating 36 thousand kilometers above the earth.

Group Activity : Debate on which is more effective the satellite or the optical fiber?

Vocabulary: Geo stationary, Infrared.

Sample Questions:

1. In which topology is a computer connected to two more computers?
 - a. Mesh topology
 - b. Ring topology
 - c. Star topology
 - d. Tree topology
2. In which topology is every computer connected to each other?
 - a. Mesh topology
 - b. Ring topology
 - c. Star topology
 - d. Tree topology
3. What is the asset of the new world?
 - a. Information
 - b. Data
 - c. Computer
 - d. The Internet
4. The functions of a Network Interface Card are—
 - i. Providing information from media to the client
 - ii. Taking information from the client and supplying it to the network
 - iii. Providing protection for computer hardware

Which of the following is correct?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

Read the text below, and answer the question nos. 5 & 6:

Mr. Karim preserves scanned copies of his academic certificates, National ID card, driving licence etc. in his drop box. Once he was attending a seminar in London. He got a chance to pursue higher education while there. He had to submit certain certificates, and he was able to do it very easily.

5. How did Mr. Karim get the certificates?
 - a. Through postal delivery;
 - b. Through fax;
 - c. By using computer;
 - d. By using the Internet;
6. Mr. Karim was able to complete the task easily because—
 - i. Dropbox can be accessed from anywhere
 - ii. Information in Dropbox remains confidential and secure
 - iii. Dropbox data can be retrieved even without an internet connection

Which of the following is true?

- a) i and ii
- b) i and iii
- c) ii and iii
- d) i, ii and iii

Short Answer Questions

1. What is a client in networking? Give an example.
2. What is a protocol in computer networking?
3. What is the function of a router?
4. What does a modem do?
5. What is the necessity of a LAN card?

Chapter Three

Safe and Ethical Use of Information and Communication Technology



At the end of this chapter, we will be able to –

1. explain the importance of safe use of devices;
2. explain the importance of the ethical use of information and communication technology;
3. explain the importance of ICT to eradicate corruption;
4. learn the application of protecting documents by using password;
5. use the devices of ICT without any risk;
6. explain the right to information.

Lesson 15: The Idea of Security

You have already come to know that information technology plays a very vital role in our daily life, in running the state and preserving its security. We take the help of ICT to make our life beautiful, easy and productive. Now no one is isolated from others because of widespread global network. In one sense, everyone is related to each other. It is a unique creation, but it creates a new kind of risk.

As people are connected to the network, some unscrupulous persons try to enter the territory where he should not. They try to get the information kept secret. Those who have created the network try their level best so that no one can get access to any information unethically. Every computer or network has its own security measures, and the owners want their sites not to be visited by those breaking the security wall. The invisible security wall is called the firewall. In spite of tight security measures, devious people entering other users' personal sites view, make copy and sometimes destroy their information. This is called hacking, and those who hack are called hackers. A hacker hacked into the networks of the organizations like Dell, Yahoo, Amazon, e-bay, CNN, etc. in 2000, and caused damage worth about \$ 100 crore.

Specific password are provided for the user to connect to the network to ensure security. The password is given in such a secret way that no one can easily guess it. But a special kinds of computer or robots have already been invented to guess the passwords. All the time these try to know the passwords of other users by using all possible passwords until they get the right one. That is why, nowadays, even after entering the right password the user does not get access immediately. He has to type some stylized characters that he can easily understand, but a machine or a robot cannot. This process to differentiate between a man and a machine is called 'captcha'.



These letters are written in such a way that only humans will recognise it, but a robot will not understand. It is called 'Captcha'.

As time passes, we are relying more and more on information technology and network. If this network stops for even a moment for any reason, a catastrophe will befall the earth. The world will fall into chaos. That is why all

possible measures are taken to keep the network running. The large storehouses of information are called 'Data centres'. Measures are taken to protect these from malfunction, damage by fire, earthquake, and criminal attack.

A different kind of insecurity is spreading in the Internet at an alarming rate, about which most of us do not have a clear idea. Nowadays, we rely on the Internet for all kinds of information, but not all of it is reliable. Somebody either knowingly or unknowingly confuses people by giving misinformation. There are numerous instances of propagating wrong information for political gain. So, we should verify the content before accepting any information as genuine from the Internet.



Einstein and Zillard are seen in the photograph on the left, but the head of scientist Satyan Bose has been superimposed on that of Zillard on the right. This doctored photo is found in the Internet. If people do not know of the genuine picture, they could easily be misled.

Group Activity

Imaging what kind of catastrophe will befall on earth if network fails. Describe the situation.

Vocabulary: Firewall, Hacking, Hacker, captcha.

Lesson 16: Malicious Software

Any work in computer is done through programming. Usually computer has two types of programmes or cluster of programmes. One of the programmes is the operating system software and the other is application software. Main function of system software is to keep the computer hardware in a usable condition so that the application software can function properly. Any kind of job is done with the application software and we are very much familiar with these softwares. Office management software (Microsoft Office or Open Office or Libre Office), database software (Oracle or Mysql), website browser (Mozilla Firefox or Google Chrome), etc. are softwares of this kind. When a piece of software works, some parts of it are stored in the primary memory of the computer and the rest of it perform other function in collaboration with the operating system.

But it is possible to write programming codes that can interrupt the smooth function of the software, destroy the software interface of hardware, or damage the computer. As these programming codes or programmes are harmful for computers, they are called 'Malicious software', or 'malware'. They disrupt the usual functions of both the operating system software and the application software. Some malware not only impede the functions but also steal or erase information from the hard drive of the computer. Sometimes, it enters the system secretly without the knowledge of the computer user. It can take the form of programming code, script, active file, software, etc. The common names of all harmful software that enter the computer and damage it is malware.

Computer virus, Worm, Trojan horses, Rootkits, Killgar, Dialer, Spyware, Adware, etc. are all examples of malware. In our experience, the percentage of Trojan horses and worms are higher than those of computer viruses. Though the upgrade and release of malware is strictly prohibited under the cyber act in different countries, its creation has not been stopped. Computer users try to protect their computers by using anti-virus. At the very beginning, malware was created on a whim. The first internet-worm called 'Morris worm' was also created whimsically, but many unscrupulous programmers create malware with ill intentions.

How does Malware Work?

There is a possibility of attack by malware in the computers where the security system of software is faulty. It is possible to create malware and make the software malfunction if there is fault in the design of the software too. Of

all the operating systems running currently in the world, the malware of windows operating system is larger in number than that of the other operating system. One of the reasons is that most of the computer users use windows operating system, but no one is aware of its danger. If any fault is detected in operation, malware can be created by exploiting the fault. Malware was not as widespread before the explosive progress of the Internet. When it was made possible to spread malware through the Internet, the number of malware started increasing at an alarming rate.

Types of Malware

The following are the most common of the identified malware:

- a. Computer virus
- b. Computer worm
- c. Trojan horse

Emphasis is given not on the difference in nature but on the difference of contagious factors when it comes to computer virus and worm. Computer virus is such a kind of malware that attaches itself with an executable file, and when the computer user runs that file, the virus attacks other executable files automatically. When it is spread out on the Internet, it is transmitted to other computers-that is, it can not be spread out without the interference of the users. For example, if a pen drive contains any virus-infected file, it can not be activated and spread out as long as it is not connected to other computers. On the other hand, worm, being active, automatically spreads out from network to network and attacks the computers.

The target of the malware becomes successful when it is not identified as malware. That is why a malware hides its identity under the guise of useful software. The users use it confidently and damage their computers. This is now the Trojan horse works. When the disguised software becomes active, the Trojan corrupts the files and imports new Trojans.

Group Activity

Discuss in group why malware should not be created.

Vocabulary: Programming code, Malware, Worm, Trojan horses, Rootkit, Killgar, Dialer, Spyware, Adware, Morrisworm, Executable File.

Lesson 17: Computer Virus

Computer virus is a kind of Malicious software or malware that can be multiplied and transmitted from one computer to another. It is a common misconception that virus includes all kinds of malware though spyware and adware do not have any power of replication. Computer virus damages the system in various ways. Reducing of speed, hanging or freezing and



rebooting are come visible damages. Most of the viruses damage the system without the users becoming aware. Some viruses do not damage the system; they just draw the attention of the users. A virus called CIH used to become active on 26 April every year and formatted the hard disk. Now it is inactive

The History of Virus

Before writing computer virus programme, in 1949 scientist John Von Newman shed light on it. The idea of virus programme came from his concept of self-replicating programme. Then it was not called virus. American computer scientist Fredrick B Cohen first named this type of programme 'Virus' for its replicating nature. A virus programme can make its own copy. In the 70s, at ARPANET, the elementary stage of the Internet, a virus called creeper virus was detected. Then a software named 'Reaper' was created to kill the creeper virus. At that time, viruses were stationary and unable to move from place to place.

In 1982, a virus called Elk Cloner started spreading from one computer to another through floppy disk drive globally. But the devastating nature of virus was first exposed by a virus named Brain in 1986. Two Pakistani brothers manufactured the programme in Lahore. Since then, every year many viruses are created all over the world. Of the harmful viruses and malicious software, the following are the most dangerous:

Brain, Vienna, Jerusalem, Pingpong, Michael Angelo, Dark Avenger, CIH Anna Kurnikova, Code Red Worm, Nimda, Daprosy Worm, etc.

Types of Virus

Every programme should be able to execute the code and write on memory for

reproduction. As no one will run any virus programme knowingly, it chooses an easy way to reach its goal. The virus successfully attaches its code to the programmes run by the users regularly (for example, word processing software), and when the user runs the active file, the virus becomes active too.

Based on its nature of working after becoming active, the virus can be divided into two types:

Some viruses after becoming active look for the programmes that are vulnerable and after infecting them return the control to the main programme and become inactive. These are called non-resident virus. On the other hand, some viruses after becoming active take up permanent residence in the memory. When the users run any programme, it infects that one. This virus is called resident virus.

The Way to Get Rid of Malware

The users can get rid of malware by using a special kind of software. These are called anti-virus or anti-malware software. Although most of the anti-virus softwares have proved to be effective against different malware, they have been called anti-virus software since the very beginning. All the anti-virus softwares available in the market work effectively against all malware but not all viruses. All the virus-programmes have some specific patterns. Anti-virus software preserves a list of these patterns. The list is prepared after doing extensive research. When anti-virus software works, it finds out the patterns in the files of computer system and compares it with its own list of patterns. If it finds similarities, it confirms it as a virus. As most of the viruses infect the active files, taking measure is possible by examining the files. But the main drawback of this system is that if the list is not regularly upgraded, detection of virus becomes tough. So, many anti-virus software examining the nature of all computer programmes try to identify the virus. The problem with this process is that the software unknown to the anti-virus software is identified as a virus, and this is detrimental. That is why all the anti-virus companies of the world adopt the first system. The popular anti-virus softwares are Norton, Avast, Panda, Kaspersky, Microsoft Security Essential etc.

Group Work

What should be done after virus infection? Discuss in groups and describe.

Vocabulary: Reboot, Non-Resident Virus, Resident Virus.

Lesson 18: Online Identity and Its Safety

The number of Internet users is increasing day by day. Physical presence is not necessary on the Internet. By listening to the voice over telephone, we can identity the person talking on the other side, but it is impossible to do so by using the Internet. Most of the users create an identity online. This identity represents the individual on the social networks, blog or website. It is called online identity. Although people use their original names online, some of them like to use pseudonyms. But, Some people use neither real names nor pseudonyms.



Identity Theft

If anybody is recognised by his online identity, he becomes trustworthy; if the identity of the user is not recognised, he is regarded as a suspicious person.

The online identity of a man can be any one of the following or a combination of both:

- a. email address;
- b. his profile name on social network;

No matter now she wishes to be known online, a user has to try to protect his identity. So the user should be careful about using the mediums mentioned above to protect his identity on the Internet. He must be vigilant so that nobody can use his email, or facebook account. The secrecy of password to enter the account should strictly be preserved and this is mandatory. Some tips/techniques are given bellow to protect the secrecy of password:

1. We can use long passwords instead of short ones. A favourite Phrase can be used if necessary. 123456, abcdef, qwerty, abcd fghjkl etc. should not be used as passwords;
2. A combination of capital and small letters can be used instead of using either all capital or small letters;
3. We can use a strong password. Create password with a word, sentence, number and symbol; For example, Z26alsalrl8al@gmail.com;

4. There is a scope to verify the strength of password online. we should Verify the strength of password, and if it seems weak, strengthen it;
5. If we use any system used by many people (as in Cyber cafe, Union Information and Service Centre), log out before leaving the place;
6. We can use password manager, such as, Last pass, Kee pass, etc. as many users use;
7. We should routinely change passwords;

Computer Hacking

Hacking means getting into any computer system or network without the permission of the concerned authority or the users. Those who do this are called hackers .

A hacker hacks other's computers for numerous reasons. To earn illegally, harm a person, humiliate an organization or disrupting the peace and security are some of the reasons for hacking. Sometimes hacking is used as a means to protest or challenge. Some computer security experts do not like to call them hackers. They like to call them crackers though they are recognized as hackers through out the world.



The hacker community has divided themselves into different groups: white hat hacker, black hat hacker, gray hat hacker, etc. White hat hackers try to find out the loopholes of the security measures of a system. They are called 'Ethical Hackers'. On the other hand, black hat hackers get into a system for dishonest purposes.

Hacking is considered a crime in many countries around the world. It is also a crime in Bangladesh. According to the Cyber Security Ordinance, 2025, if someone commits a crime like hacking, he can be punished with a maximum of 5 years in prison or a maximum fine of 5 million taka, or both.

Group Work

Discuss in groups and describe the difference among malware, virus and hacking.

Vocabulary: Hacking, Hacker.

Lesson 19: Cyber Crime

A very harrowing incident occurred in Bangladesh on 30 September 2012. In the dead of night, a large number of Buddhist temples were set on fire. At least 3 people were killed and 15 others injured when a bomb exploded in Boston Marathon on 15 April 2013.



A powerful bomb exploded after the Boston Marathon

An alarming news was published on 9 June 2011 in The New York Times in which it was reported that the credit card numbers and the secret information of thousands of citi Bank clients had been leaked and the security of their deposit was under threat. In February 2016, a theft occurred at the Bangladesh Bank, known

as the Bangladesh Bank Cyber Heist. Bangladesh Bank's reserve dollars were deposited in an account at the Federal Reserve Bank of New York in the United States. Through the SWIFT (Society for Worldwide Interbank Financial Telecommunication) network, hackers sent thirty-five fraudulent instructions to illegally transfer approximately 1 billion USD from the Federal Reserve Bank of New York account. Five of these thirty-five fraudulent instructions successfully transferred 101 million USD, with 20 million transferred to Sri Lanka and 81 million to the Philippines. The Federal Reserve Bank of New York grew suspicious due to a misspelled instruction and blocked the remaining thirty transactions, amounting to 850 million USD. However, all funds transferred to Sri Lanka were recovered, but as of 2018, only 18 million USD out of the 81 million transferred to the Philippines had been recovered. Most of the funds transferred to the Philippines went to four private accounts held by an individual associated with Rizal Commercial Banking Corporation (RCBC). So, this money did not get to any company or corporation. It is worth noting that a movie based on this incident, titled Million Dollar Heist and directed by Daniel Gordon, was produced in Hollywood in 2023.

These incidents seem to be totally separate but all three were interconnected by cyber crime. A corrosive picture was sent through the Internet to provoke the communal sentiment among people to destroy the Buddhist temple. The

criminals learnt how to create a bomb getting instructions through internet. The hackers hacked the database of a bank to leak out the numbers of credit cards. We now enjoy numerous advantages from information technology and internet but there is a price to pay. A new kind of crime called cyber crime has emerged. These crimes are done by using ICT, and the criminals find out new ways to commit crimes. Some traditional cyber crimes are:

Spam

Those who use email are more or less attacked by this cyber crime. Spam is unwanted, unnecessary, and pernicious email sent to a user's mailbox continuously. Time and money are spent to take measure against spam attacks.

Fraud: A major part of cyber crime is fraud. Using fake identity and giving a piece of wrong information, they try to defraud people. For example, the announcing of huge financial offer through Email.

Disclosing Objectionable Information: Sometimes objectionable and wrong information about a person is released on the Internet either for rivalry, or for political gain, or for any dishonest intention. It is possible to stop this if the attempt is made by using any reliable organization, but most of the time it is done concealing the identity, and in that case, it becomes tough to stop it. Popular Internet service like facebook and Youtube were shut down in our country temporarily for spreading of hatred through sharing of corrosive news.

Threatening:

By using the social networking sites, an unscrupulous person can harass others. On the Internet, as nobody interacts face to face, a person can easily threaten another person.

Cyber War:

The personal conflict among people can take a nasty turn. A group or community or a country can proclaim a kind of cyber war against another group, community or country. This is a common occurrence against people or group holding different or opposing ideology or political beliefs and when this happens, the rules and policies of the cyber world are violated.



A New York Times news shows that Credit Card Customers' Data of Citi Bank has gone to the criminals' custody

Cyber crimes are relatively new and People still do not know how to fight against them. Cybercrime is a new kind of crime and it is only recently that decisions here began to be made about fitting punishment to match the gravity of the crime.

Group Activity

Design a poster to strengthen publicity against cyber crime.

Vocabulary: Spam, Credit Card, Cyber battle.

Lesson 20: Eradication of Corruption

We are all trying our best to minimize widespread corruption, and information technology has become a powerful weapon to fight against corruption. Corruption is done in secrecy because no society encourages it. Information technology has made easy the access to information. So if corruption is done anywhere, it is instantly revealed to everyone. It is now impossible to run an office by keeping only written records. The total system of preserving and processing data should be done through information technology. When ICT is used to run an institution, it simultaneously works to eradicate corruption and maintain transparency. If any suspicious transaction is done, the information goes to the database and is revealed to others.



Tender No.	Description	Status	Date
1	Supply of...	Open	2023-10-27
2	Supply of...	Open	2023-10-27
3	Supply of...	Open	2023-10-27

A special portal is made in Bangladesh to call e-tender

Every country follows a specific rule of expenditure. As per the conventional rules and according to the requisitions of an office or organization, works are done by calling tenders in the newspaper. The interested groups drop tenders mentioning the estimation and the concerned office picks the group that submits the lowest quotation. Once the corrupted and influential organizations would interfere and impede others from dropping tenders and thus forcefully win the contract. Nowadays the total process is completed

through e-tender, and as people can submit every relevant detail through information network and without having to confront anybody, the scope of corruption is minimized.

People in our country who produce anything to sell can not directly reach the consumers. The brokers purchase the products from the producers at a cheap rate and sell at to the consumers of a high rate. Thus, the producers do not get fair price and the consumers are cheated as well. But now, the producers can directly sell their products to the consumers with the help of ICT and the Internet without the interference of the brokers. Now, no showroom or shop is necessary for selling products; no storehouse is necessary for storing the products. Thus, both the producers and consumers reap the benefit and neither loses money.



The producers can directly sell their products, even vegetable to the consumers

Many powerful countries and organizations of the world show injustice to different countries or wage war on them and put the innocent people at risk. The victims are forced to suffer a lot. The whimsical decision of an autocrat or a dishonest chief of state might be responsible for this. Once, people did not have the strength or courage to raise voice against them. Now many organizations expose the confidential information they have through the Internet, though there is a debate about whether this breaks the law or not. In spite of that, people come to know about the heinous crimes committed by the states.

Group Activity

A dishonest man is caught by using ICT. Stage a drama on the issue.

Vocabulary: e-tendering, e-commerce.

Lesson 21: Right to Information and the Right to Information Act

When data is processed after being obtained from different sources, it becomes information. Individuals, organizations, government and non-government establishments, etc. always create information. The right of the people to know the information related to government and non-government establishments is the right to information. According to a survey conducted by UNESCO in 2023, 120 countries have acknowledged it as a legal right. That is why the Right to Information Act has been enacted in these countries and implemented as well. The Right to Information Act has been in force in Bangladesh since 2009. In this act, getting information is regarded as the prerequisite of individual freedom of thought, speech and conscience

In the Right to Information Act, information means the structure, formation, official memorandum, book, design, map, contract, letter, statement, accounts, project proposal, photograph, audio, video, sketch, film, electronic instrument, machine-readable document, infrastructure, and other informative things and objects of any establishment. But in every country, some pieces of information are kept outside the purview of the act; for example, it is the right of a citizen to know the information of the number of teachers, students, tuition fees of an educational institution, but it is not anybody's right to know anything about the probable questions of any examination.

Every organization throughout the world is bound to reveal their information. If the act is violated, the violators are sure to receive punishment. An information commission is formed to monitor the implementation of the act in the countries where it is operative. There is a commission like this in Bangladesh (www.infocom.gov.bd). The commission works as a guardian and if anybody fails to get any information, he can lodge a complaint to the commission.



Website of Information Commission

Sample Questions:

1. Which one is a malicious software?
 - a. Microsoft Word
 - b. Trojan Horse
 - c. Google Chrome
 - d. Mozilla Firefox
2. The ethical hackers are-
 - a. Black hat hacker
 - b. White hat hacker
 - c. Blue hat hacker
 - d. Gray hat hacker
3. For password security, we must:
 - i. Use a long password
 - ii. Use a password that cannot be easily guessed
 - iii. Change the password from time to time

Which one is correct?

- a. i & ii
- b. i & iii
- c. ii & iii
- d. i, ii & iii

Read the writing below, and answer the question nos. 4 & 5:

Some sample passwords are:

- | | |
|------------|-------------------|
| A. rakib. | B. baBualAmin1985 |
| C. Shaymol | D. Piku2014 |

4. Which password is the most useful according to what you have learnt?
 - a. A
 - b. B
 - c. C
 - d. D
5. If any password is used except the appropriate one-
 - i. the others can easily get to know it;
 - ii. secrecy may be violated;
 - iii. it may be difficult to remember the password;

Which one is correct?

- a. i & ii
- b. i & iii
- c. ii & iii
- d. i, ii & iii

Short Answer Questions

1. What is malware? Give one example.
2. Why is CAPTCHA used?
3. How does e-tendering play a role in reducing corruption?
4. Why is hacking done?
5. What is cybercrime? Explain with example.

Chapter Four

Use of Spreadsheet



At the end of this chapter, we will be able to –

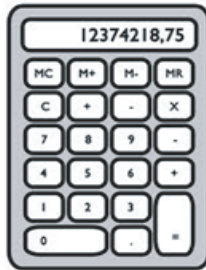
1. explain the relationship between Information Technology and Spreadsheet;
2. identify the fields of spreadsheet usage;
3. explain the objectives of using spreadsheet software;
4. describe the techniques of using spreadsheet software.

Lesson 22: Spreadsheet

Human beings have been keeping accounts since the dawn of time. They would keep it by using symbols either on stones or on the bark of trees. The invention of abacus is the result of this attempt. Paper and ink were the only means of keeping the accounts 50 years ago. The invention of calculator gave human beings the advantage in calculating, but the problem of carrying out complicated and large calculation persisted. These problems were solved with the invention of computer.



Abacus



Calculator



Computer

Concept of Spreadsheet

According to the dictionary, spreadsheet is a sheet of paper big in size. This kind of sheet is used to keep the accounts of business firms. The accounts were recorded in table format and gave an overview of the firms account, but now the software based spreadsheet programme has replaced paper-based spreadsheet. Thus, the use of spreadsheet became popular.

In the late 70s, the Apple Company first invented the spreadsheet software called 'VisiCalc. After that software called Microsoft Excel, Open Office Calc, KSpread were devised. Now, the most popular and extensively used spreadsheet software is Microsoft Excel.

The icons of different Spreadsheet software are as below:



Excel

Open Office Calc.

What is Spreadsheet Programme?

Spreadsheet is a kind of application computer programme. It is sometimes called 'workbook'. Just as a register book has numerous pages, so does a workbook have numerous worksheets. A worksheet has many rows and columns. It looks like the picture given below:

	A	B	C	D	E	F	G	H
1								
2								
3								

Columns and rows are numbered by A, B, C... and 1, 2, 3... respectively. The boxes are called the cells.

Spreadsheet and ICT

This is the age of information and communication technology. Data processing is a very important job today. The data collected for any research work or for use for any business-purpose requires analysis in order to be presented in a comprehensive way. The primary analysis of data can be done with the help of spreadsheet programmes.

In a worksheet of the spreadsheet programme, data entry of all kinds is possible. So an enormous volume of data can be edited, calculated, and analysed, and an effective report can be prepared.

Objectives of Using Spreadsheet Software

Case Study 1. A large register used to be used to prepare the results of various term tests of 'N atun Kuri High School'. The teachers would write down the marks obtained by the students against their names or roll numbers, and by calculating the subject wise grade points, they would finally sum up the GPA. Errors were made in this process, and they had to correct it when it was detected. They required a few days to complete the whole process.

Case Study 2. 'SR Enterprise' is a business organization that makes huge transactions everyday. Some of it is done by cash, some on credit. The cashier has a difficult time keeping the accounts.

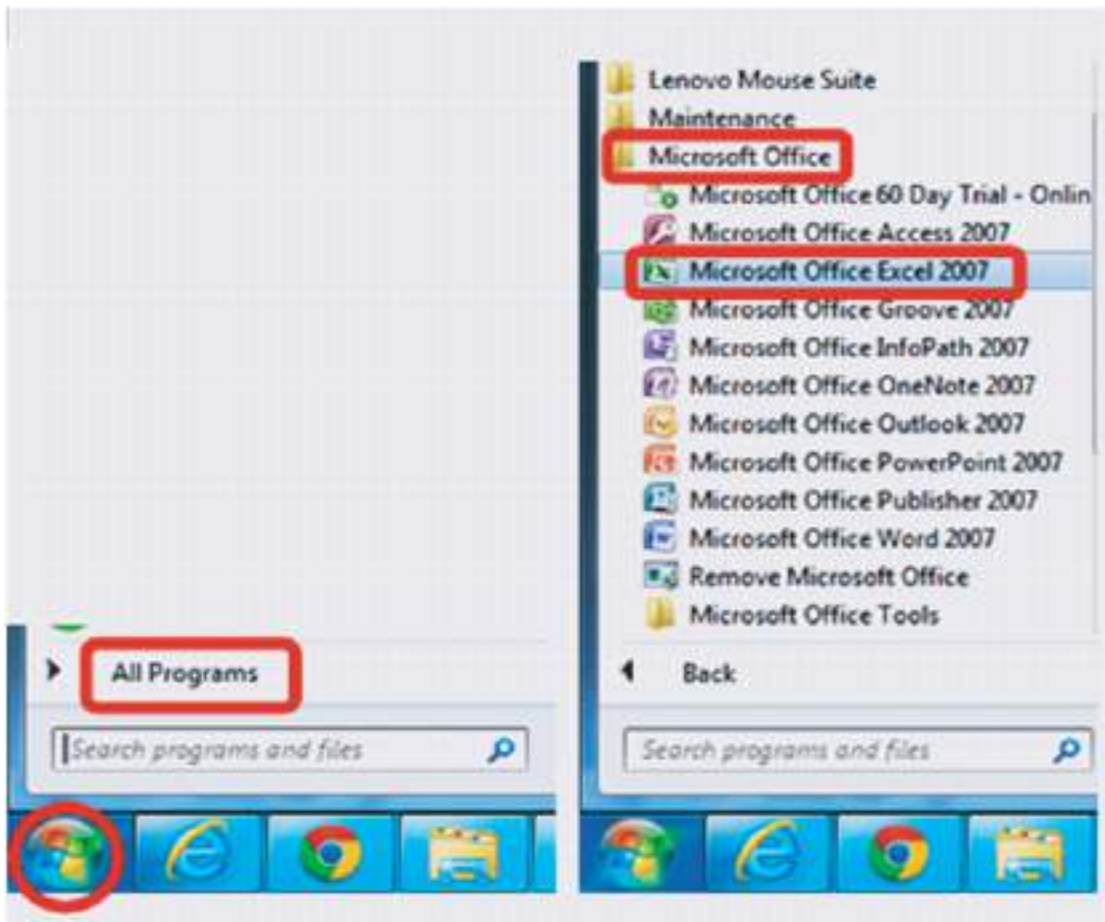
Case Study 3. Mr. Suman always tries to live within his means. He keeps the records of income and expenditure, but sometimes, discrepancies occur.

In the above case studies the problems faced by individuals and the business organisations can be solved by using spreadsheets. A huge amount of data can easily be processed in the spreadsheet software, and the calculation can be done unerring. As there is a scope of using formula in this software, the calculation is automatically done. As the same formula can frequently be used, it requires minimum time to process the data. Showing figures of data in this software is easy, too. The management and preservation of postal and email address is easy with spreadsheets.

Lesson 23-43: The Technique of Using Spreadsheet Software

In the previous grade, you learnt how to open word processing software. The system of opening spreadsheet is the same. On a running computer, click the start button and go to All Programmes, and then click the icon of the spreadsheet programme.

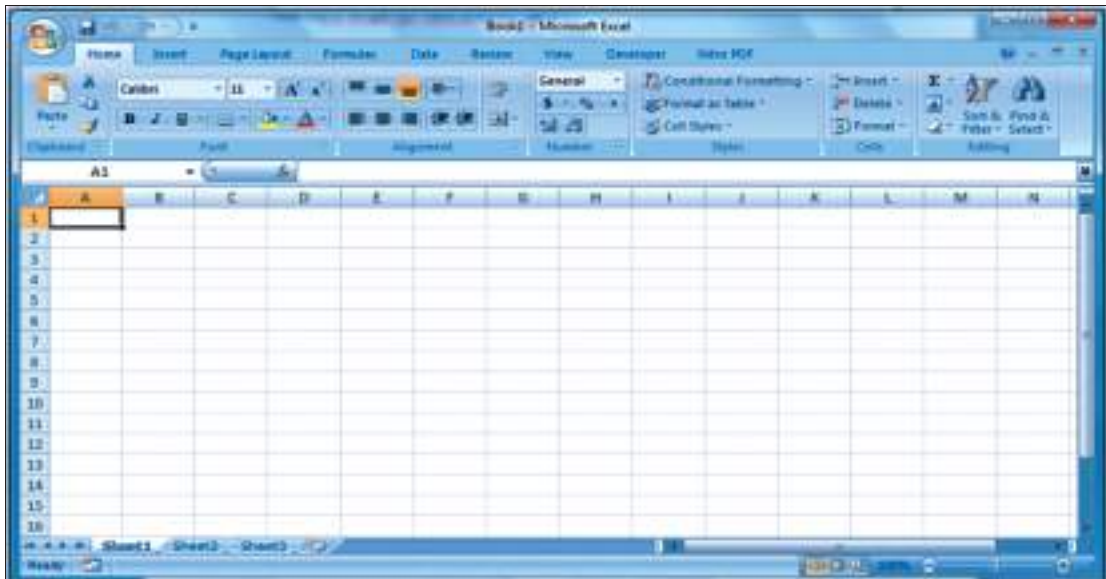
The system of opening spreadsheet software of Microsoft Excel is shown below:



The spreadsheet programme can also be opened from the desktop by double clicking on the icon of spreadsheet programme  or on .

Microsoft Excel Window

When Microsoft Excel programme is opened this is what we see:



Title Bar



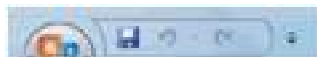
The title of the workbook is written on the top of the Excel Window. This is called 'title bar.'

Office Button

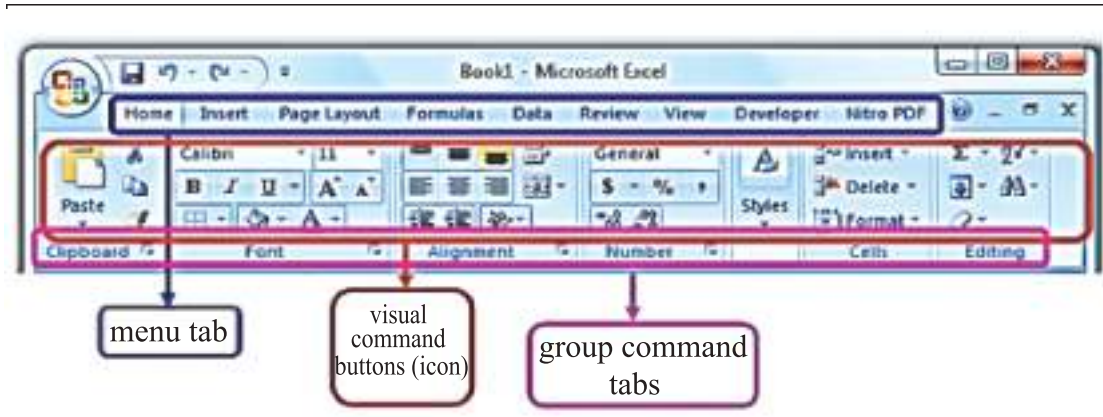
The button  at the left corner on the top of Excel Window is called the office button. New Excel workbook, and previous workbook can be opened, and workbooks can be preserved by clicking the button.

Quick Access Toolbar

The position of quick access toolbar is next to office button. The buttons used most are found here.



Ribbon



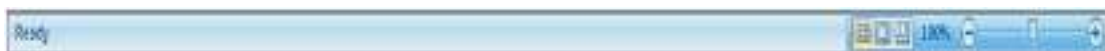
Different commands are arranged in clusters in Microsoft Excel. Together these are called 'Ribbon'. These commands are arranged with icons under every menu.

Bar or Formula Bar to Show the Positioning of Cells and the Items of Cell



Its position is below the ribbon. The positioning of cell or the reference to cell is shown along with the items and contents here.

Status Bar



The position of status bar is below the worksheet. The current status of different works is projected on this bar. Options for viewing worksheet in different ways are given to the right of the status bar.

Sheet Tab



The sheet tab shows the number of worksheets in any given workbook. It is used to switch between different sheets.

The System of Opening New Worksheet

The system of opening new worksheet when the excel is open is shown below:

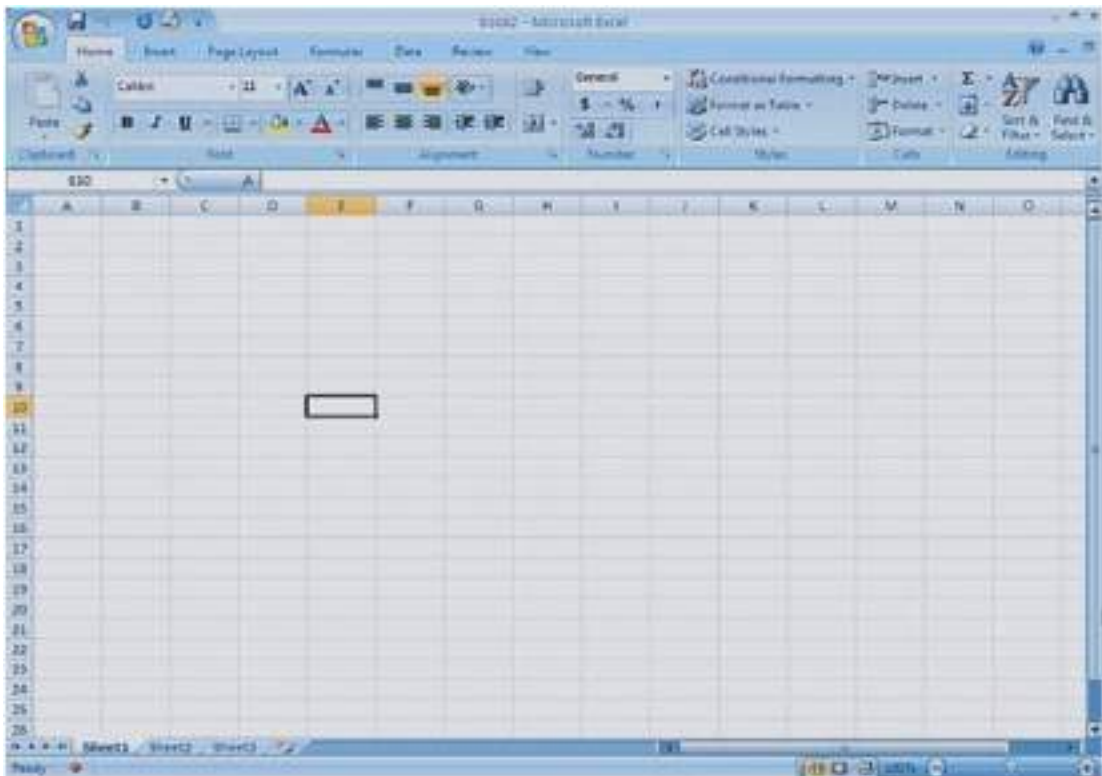


The new worksheet can be opened through keyboard too by pressing Ctrl+n.

The Technique of Using Spreadsheet software:

We have already learnt that the grid of worksheet appears in spreadsheets as columns and rows. The title of every column and row is indicated with English alphabets and numerical figures respectively. So, the address of or the reference to every cell in the grid remains separate and specific as well. For example, by E 10 the cell positioned at the intersection of the column number E row number 10 is indicated.

Let us enter data on the spreadsheet software.



In the figure the position of Cell E10 is shown.

Take the cursor to any of the cells and type in letters or numbers with the keyboard. You have started to use the spreadsheet. We can take the cursor to any cell of the worksheet by moving the arrow key. The cursor can be taken to any cell by clicking the mouse too.

	A	B	C
1			
2		Name	Age
3		Wakim	11
4		Bina	7
5		Mahir	7
6			

Work

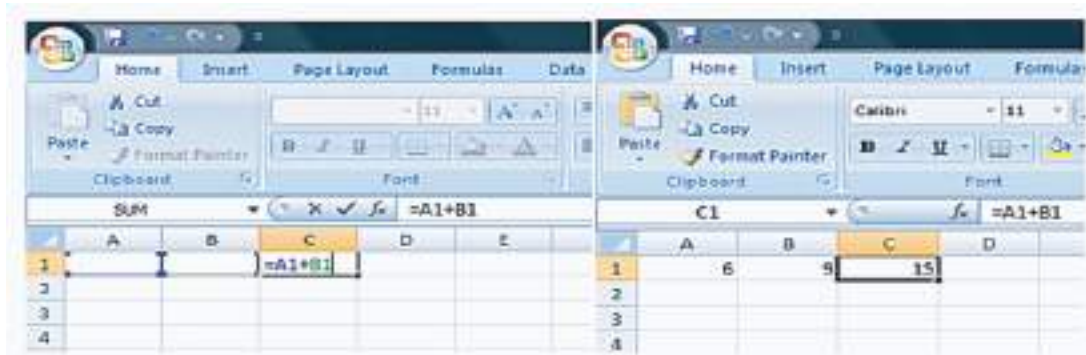
Khokon scored 70 in Bangla first paper, 40 in the second paper, 70 in English first paper, 30 in second paper and 45 in Information and Communication Technology. Type this information by using spreadsheet software.

Arithmetical Functions in Spreadsheet Programme

Different kinds of Mathematical calculations can successfully be done by using spreadsheet. We will learn how to do addition and subtraction by using Excel programme.

Addition

In Excel addition is done in two ways: automatically and manually. For both the calculations, taking the cursor to the cell of result, click . For manual summation, write = sign and the formula in the result cell. This has been shown in the image below:



Besides, we can get summation by applying formula. By indicating cell range, which cells will be included for summation is shown: =Sum(A1:D1) means that the summation of data in A 1, B 1, C 1, and D 1 will be made.

Subtraction

The subtraction process in Excel worksheet is similar to the summation process, but there is no way of auto-subtraction. So by inserting formula in the result cell, subtraction can be done. In the picture below the system of subtraction has been shown:



To subtract the Data in B1 from that A1, the formula will be = Sum(A1- B1)

Drawing Bar Diagram



Information presented with bar diagram

The following process should be followed to draw bar diagram:

1. Enter data in worksheet;
2. Select the data to be presented in chart.
3. Click 'insert' on ribbon, then 'column' in chart option;



You will learn more details in the Next grade.

* Variations in the title and menu bar may be observed due to software version.

Sample Questions:

1. Which one is the first spreadsheet software invented?
 - a. Microsoft Excel
 - b. VisiCalc
 - c. Open Office Calc
 - d. KSpread
2. The workbook cannot be used -
 - a. to prepare the result sheet of school exam;
 - b. to keep the accounts of business;
 - c. to make medical diagnosis;
 - d. to keep scores of a cricket match;

3. In which cluster are the commands of Microsoft Excel arranged?
- a. Quick Toolbar
 - b. Menu Bar
 - c. Ribbon
 - d. Status Bar
4. The invention of spreadsheet in ICT_
- i. has made keeping accounts easy;
 - ii. has made new scope for worker-management;
 - iii. has made it possible to do many works without learning;

Which one is correct?

- a. i
- b. i & iii
- c. ii & iii
- d. i ii & iii

Read the text below, and answer the question nos. 5 & 6:

The result of JSC

- ♦ 10 students of Girabo Primary School have obtained GPA5;
 - ♦ 15 students of Dirai Primary School have obtained GPA5;
 - ♦ 5 students of Nalam Primary School have obtained GPA5;
 - ♦ 18 students of Palash Primary School have obtained GPA5;
5. Which option of Excel is appropriate/convenient to make comparative study of results of these schools?
- a. Table
 - b. Chart
 - c. Formula
 - d. Filter
6. By using Microsoft Excel_
- i. the total number of students who got GPA5 can be calculated;
 - ii. the percentage of students who got GPA5 can be calculated;
 - iii. the total number of students can be calculated;

Which one is correct?

- a. i
- b. i & iii
- c. ii & iii
- d. i, ii & iii

Short Answer Questions

1. What is a spreadsheet? Mention one use of a spreadsheet.
2. How do spreadsheets assist in ICT?
3. Describe the process of addition and subtraction in Excel.
4. Why is using spreadsheets convenient for preparing and storing exam results?

Chapter Five

Use of the Internet in Education and Daily Life



At the end of this chapter, we will be able to –

1. explain the importance of the internet in education;
2. evaluate the importance of internet in daily life;
3. communicate with classmates by opening an email account;
4. use the internet to solve the problems of everyday life.

Lesson 44: Use of the Internet in Daily life

'In which work of our daily life can we use the internet? 'Once we used to ask people, but with the advancement of information technology, the scenario has changed to such an extent that we may ask the opposite question "which aspect of our daily life does not require the use of internet?"



A Smartphone

Previously huge desktop computers were needed for using the internet. Gradually, it became smaller and has taken the shape of Laptop. After that, it became even smaller and took the shape of netbook and tab/pad. Now a Smartphone is enough to serve all the function of a computer. Now, the Smartphones are so cheap that anyone can buy one. She can keep it in his pocket and can stay connected to the internet at every moment. Not only that, but most of the institutions too, provide people with wireless internet service that is known as Wi-Fi. Thus, most of the times, we receive internet service. The technologically advanced nation cannot function for even a second without constant communication through the internet. We are rapidly approaching that state.

The uses of internet in our daily life is manifold. Lets look at only a few examples. Usually we begin our day with the newspaper. Now-a-days, all the newspapers are available on the internet. So, a reader can get all the news of the day reading the online version without going through the printed version of newspaper. In the past, a reader would read only one or two newspapers, but now it is possible for him to read almost all the newspapers



The driver is driving the taxi with the help of a GPS device.

of home and abroad. Besides, we would listen to radio or watch television, but now this, too, is internet-oriented. We can enjoy any programmes of radio and television through the internet. When we leave home to begin the day, we get information on the go from the internet. Global Positioning System or GPS can show us our locations accurately, and this device is attached to every Smartphone. So, we get the instruction of the route to be taken or the locations of institutions through the internet. Almost in all the new model cars, GPS navigation system is installed.

In our workplace, the use of the internet depends on the nature of our job. More or less everyone uses the internet, and we can hardly find any person who is not dependent on the internet. At the very least, we have to send and receive emails. It does not make any difference whether the email comes from next door or from the farthest corner of the world through the internet.



It is possible to read e-book like the printed version by using tablets.

When we come back home after finishing our work, the use of the internet in daily life continues in a new way. Once, we could only talk on telephone, but for the increase of bandwidth of the internet, we are not satisfied with talking only; we can also view the person to whom we are talking. Once, when someone would go abroad, handwritten letter was the only mode of communication.

Now, it has become very trendy to see the person while talking on the internet. Entertainment plays a vital role in making the daily life cheerful. This entertainment is unimaginable without the internet. All kinds of books are now available in e-book format on the internet, and anyone can have quick access to from home. Not only books, but also music and movies can easily be downloaded from the internet. If the bandwidth is of high frequency, download is not required, direct streaming of music and movies is possible. Many people love to play computer games for entertainment. The use of the internet adds a new dimension to playing video games.

Regarding popularity, social networking accounts for the maximum use of the internet in our daily life. People exchange views, photographs, videos with each other or initiate a discussion.

The internet has impacted our lives in such a way that if it is unavailable, we feel very helpless.

Now-a-days, the young generation spends most of their time on social networking sites like Facebook. But they must not forget that there are many other forms of entertainments in the real world like sports and real people like friends and relatives. All in all, they must keep in mind that there is a real world other than the cyber world.

Group activity:

Write the diary of a person who uses the internet.

Vocabulary: Wi-Fi, facebook, e-book, Bandwidth.

Lesson 45: Influence of the Internet in Education

As the internet has a tremendous influence on all spheres of our life, it is not surprising that it has a deep impact on education. Those who go to schools may already have noticed it. The internet has been extensively used for preparing the book you are reading right now. Not only that, this book and other text books are kept in the website of the NCTB. (www.nctb.gov.bd) If you somehow lose your books, you can easily download it for your own use from the website of the NCTB.

The internet has an extensive use in the education sector of our country. After finishing your examination, you will get the results directly from the internet. The internet is also used for admission purpose. The information of different schools and colleges can be found from the internet, which is also used for running a lot of schools of the country.

Besides managing the education system, the internet contributes a lot to the development of education. If you fail to understand a certain point of your textbook, you can seek help from the internet where you will definitely get information on that subject. If you do not get information for some reason, you may ask questions in a forum where someone or the other will have the answer. Any individual or group having access to the internet may answer your question. Previously, questions were to be written in English in order to search for answer in the internet and all the information was in English. Now things have changed.

If you require, you can easily search for your information on the internet writing in Bangla. The information bank in Bangla on the internet should be enriched to make exchange information in our mother tongue more convenient. The process is gradually developing.

In the early 2020s, due to the global Corona epidemic, the government announced the temporarily suspension of direct classroom activities in all educational institutions for public safety. During this time online classes were conducted successfully with the participation of both students and teachers. This enabled the students to continue their studies. This is due to the unprecedented progress that Bangladesh has made in the field of information technology.

In education, specially in science education, we need to carry out experiments in different fields. In many cases, a virtual display of how it can be carried out is possible. It is not possible to conduct such experiments by the effort of an individual or an organization. But as a rich information bank has been developed on the internet by collective effort, the scientific experiment which was impossible for you to carry out by yourself earlier has now become possible.



A student is asking questions from the earth to an astronaut at the space station

Thanks to the advent of the internet, you need not confine yourself to the textbook or the teacher's lecture in order to learn. Now-a-days, many exciting courses are offered on the internet, and anybody can take any of these courses. The internet does not offer courses only from schools, colleges and universities. The school students can request the astronauts in space stations to make any experiment in the vacuum of space. The astronauts show that experiment with pleasure. The students on earth can learn something new by watching them. So, you can comprehend that the internet has extended its web to the space, beyond the surface of the earth.

Now we are accustomed to reading the printed version of books that will be very soon replaced by e-books. All the books of the world will be preserved in e-book format on the internet, and anyone will easily be able to download it to his e-book reader. Once, a man had to be satisfied only with the book he could carry. But now, with the blessings of the internet, human beings can choose to access necessary books at any given moment. It may sound unbelievable, but you can store not only a book but also a complete library in your pocket if you require.

Group Activity

Make a list of things necessary to build an e-book club at your school.

Vocabulary: search engine, space station.

Lesson 46: The Role of the Internet in Solving Everyday Problems

Story1: Sakib's father fell sick in the dead of night some days back. Sakib's mother tried hard but failed to communicate with anybody. Suddenly, an ambulance appeared at the door of their house. When asked, Sakib informed his inquisitive mother that he, had called for an emergency ambulance service after searching for one on the internet. That time, Sakib's father was saved from any critical damage to his health as he was taken to the hospital in time.

Story2: Sufia went to Singapore with her parents on holiday. All of a sudden, her father had to be admitted to a hospital after an accident. He required a lot of blood for his recovery. Sufia posted a status on her Facebook page that her father was in the urgent need of blood. Many Bengali people living in Singapore, coming to know about the incident, assisted them and arranged blood for transfusion.

The above two incidents describe the successful use of the internet in solving the problems of our daily life. Incidentally, both of them are health related, but the internet can play an effective role to solve almost all other problems.

Information remains scattered in the internet. All sorts of information including those related to education, health, transport, commerce, research, the structure of government, politics, etc. are available there.

The main tool of solving problems of daily life is information that can be searched for in the internet, and by using it, we can solve the problem. That is why we should enhance our skill to search for information on the internet. The most popular search engine of the world is google (www.google.com). Information can be sought in English or Bangla.

There are numerous websites on the internet to solve the problems of the learners. Besides, a special website called 'wolframalpha'(wolframalpha.com) is available to help the learners to do calculations correctly. The solutions of different mathematical problems are also available on this site. Another such website is [www. Khanacademy.com](http://www.Khanacademy.com) from which learners can get necessary information regarding different subjects.

Numerous internet oriented help centres are set up to solve the problems of daily life. The internet support centres of the mobile companies of Bangladesh are the best examples of these kinds of help centres. The consumers here get the solutions of mobile phone and service related problems.

The email oriented service centres are operative throughout the world. Services can be received from these help centres through email.

Adolescents can develop a spontaneous inclination for solving problems through the internet. Many internet games are created in such a way that a user has to solve many minute problems to win the game. The young learners can develop skill of solving problems by playing these games. It is possible to be linked with like-minded people through different social networks like blog, facebook, etc. It helps to solve many social problems too. A village boy was kidnapped by some miscreants. The Organizers of local union information and service centre shared the matter in their blog. The matter drew the attention of the local administration, as the officials were the members of the blog, and they immediately took measures and rescued the boy.

There are only some of the ways in which information and communication technology in the form of internet can help solve our problem.

Group Activity

What kinds of help would you like to get from the internet to solve the problems of daily life? Discuss in groups and describe.

Vocabulary: Internet game, Sharing in blog

Lesson 47-69: email

The meaning of email is 'electronic mail' or 'electronic letter'. We can send any writing or photo to any email account through electronic device. Those who have email addresses have mailboxes as well. The email is stored in the mailbox. The user who owns the mailbox can open the mail at any time.

The most interesting thing is that the sending and reading of the letter can be done for free. Now the communication through email has become a very simple matter. Many people of your acquaintance have email accounts. Internet browsing is possible almost in all the Smartphones. So, both sending and receiving emails are possible through the internet. You can send any file by attaching it with the mail. Different types of files that could be sent are any word document or excel file or image. Nowadays, it is impossible to think of conducting business and trade without email.

It is very easy to send email after opening an email account. We will learn how to do it very shortly. Opening an email account is possible with only a little practice. If an ICT device is attached to the internet, email accounts can be created for free. It can be sent very fast from one corner of the world to the other. It is not necessary to keep the device open for receiving emails. It is possible to send and read email 24 hours a day. One letter can be sent to many accounts. It is also possible to send mails by maintaining secrecy. But some caution is necessary for opening emails. Any unfamiliar suspicious email should not be opened because it may be carrying a virus and opening it would put your ICT device in danger. So be careful!

Opening an email Account:

Let us learn how to open an email account. At first, we have to decide which email service provider we would like to use. There are many websites for opening email. You are familiar with the popular sites of the world, such as yahoo mail service, gmail service, hot mail service, etc. Many people acquainted with us have email accounts with these services.



Choose your service provider

Now connect to the internet on your computer. Running the browser of your computer, enter the service provider site that you prefer.

After entering a site, we have to sign up for opening a new email account. The system of signing up in all the sites is almost the same with a few exceptions. The user has to fill up a form, and this is very easy.

Following the directions of the site, finally click on 'Create account', and thus, your email account is created. Your ID and password should be preserved carefully and secretly, or anybody can log into your account unlawfully.

The information required to fill up the form and the system of opening the email are mentioned here. For example, here we have used Yahoo website, but you can use any other website. You have to use English language for opening an email account, but you can exchange message in Bangla. We will gradually become accustomed to using it.

Steps for opening an email account in the popular website 'Yahoo':

1. Go to website of Yahoo : <http://www.yahoo.com>
2. Click on 'mail'



3. Click on 'Create account'



The following devices are needed to open an email account:

1. A computer or ICT device
1. Internet connection

This form will be seen on the monitor after clicking on 'Create Account'

 A screenshot of the Yahoo! 'Sign up' form. The form includes fields for 'First name', 'Last name', 'Yahoo username' (with a dropdown for '@yahoo.com'), 'Password' (with a 'Show password' link), 'Mobile number' (with a country code dropdown), 'Birthday' (with month, day, and year dropdowns), 'Gender' (Male/Female radio buttons), 'Optional recovery number' (with a country code dropdown), and 'Relationship' (a dropdown menu). At the bottom, there is a checkbox for 'I agree to the Yahoo! Terms and Privacy' and a 'Create account' button.

4. Fill up the form : All the information should be given in English.

(a) Write the first part of your name in the box written 'First name' and the last part of your name in the box 'Last name'

(b) Write your ID in the box written 'Yahoo username':

i. You have to start writing your ID with letters. Its length should be 4-32 characters. In the ID letters, numbers, underscore (_) and a dot (.) can be used. Here, you can see the advice of Yahoo. You can accept it if you like.

ii. Keep your ID easy and understandable

iii. Sample Id : Suppose, the name of a student is 'Anika'

Anika's Yahoo ID may be : anika_dhaka. Then Anika's Yahoo mail account will be : anika_dhaka@yahoo.com.

(c) Type the password :

i. The length of the password should be limited between 6-32 letters. For password, capital letters and small letters are considered as different letters. The name of any place, person or yahoo ID should not be used

as password.

ii. To protect your password, use –

- Letters and numbers;
- Special character (for example, @);
- Combination of capital and small letter ;

iii. Do the following after you have typed the password :

- Select the country and type your mobile number;
- Select your date of birth. Here you have to select first the month, then the day and at last the year.
- Select the gender;
- Next, alternate recovery number should be given.(in case someone forgets their email ID)
- Select the country and type mobile number
- Type the relation between you and the user of this mobile number
- Click on 'Create Account' button.

Your email account has been created now. But remember, to open an email account in Yahoo this form is not always used. The Yahoo authority very often changes this form for opening an email account.

Now, you have your own email address, haven't you?

Will you send an e-mail now?

Sending an e-mail:

To send an e-mail, you need to browse on the website where your e-mail address is. Below is shown how to send an e-mail by using Yahoo mail:

1. First open Yahoo browser site and Click on the 'Mail'



2. Write your yahoo ID and password. Then click on the "Sign in" button.

 A screenshot of the Yahoo! sign-in form. It features the Yahoo! logo at the top, followed by the text 'Sign in to your account'. Below this are two input fields: 'Yahoo username' and 'Password'. There is a checkbox labeled 'Keep me signed in' which is checked. At the bottom is a blue 'Sign In' button.

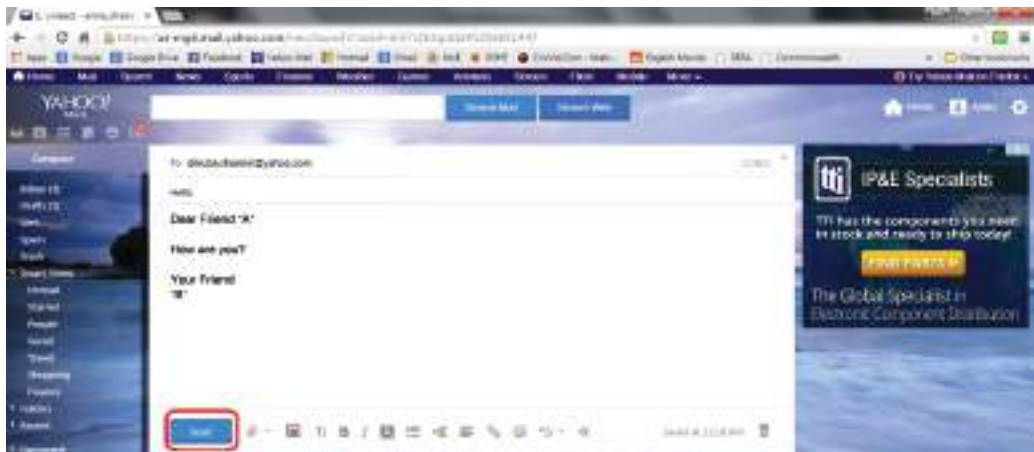
What we need to send an e-mail:

- A computer or ICT device
- Internet connection
- Email address

3. Now click on the 'Compose' button with the mouse and wait for a bit.



4. Now, beside the header 'To' write your friend's e-mail address and write something in the subject line and the compose a letter in the blank space below.



5. Now, Click on the 'Send' button and send your email.

Tell your friend to open his/her email account and ask whether he/she has received your mail or not.

Have you understood everything?

Can you send an email to anyone you like?

Practise the procedure several times. Now, you have learnt to communicate with people by e-mail.

How to Sign out from your e-mail account:

1. Put the cursor to the right of your email account. The profile menu will appear.

Now, click on “Sign out”



This is a safe way of signing out. Your e-mail account will remain safe. This means, your e-mail account and password will be protected from being hacked.

To send an attachment:

We have learnt earlier that any document file, excel file, photo or PDF file etc. can be sent by attaching it with the email. This can be done very easily. Finish writing the email by following the above procedure. Now click on the attachment icon beside 'send' button.



The following page will be visible on the screen



Select a file from a location and click the open button, the file will be attached to email. How much time it will take to be attached will depend on the size of profile and the speed of your internet connection. After the completion of the attachment, send it following the directions mentioned earlier, and the email will reach the desired destination. You have learnt the process of attaching files.

Practise several times to accustom yourself to the process.

Group Activity

Following this lesson, open up email account with gmail and send emails with attachment to one another.

Sample Questions:

1. What is email?
 - a. Emergency mail
 - b. Electrical mail
 - c. Engineering mail
 - d. Electronic mail
2. To read the online version of any newspaper, you need—
 - i. an internet connection;
 - ii. to pay regularly for reading newspaper;
 - iii. to learn how to browse the website;

Which one is correct?

- a. i & ii
- b. i & iii
- c. ii & iii
- d. i, ii & iii

Read the text below and answer the question nos. 3 & 4:

Era told her niece Topa, 'you will inform your Daddy that I will send an email with a photo attachment at 11 pm.' Topa replied, 'Auntie, send the email by 10 am tomorrow. We shut down our computer after 9 pm.'

3. When should Ira send an email?
 - a. At 10 AM
 - b. At 11 PM
 - c. Anytime that is convenient
 - d. After checking if the computer is on
4. In which sequence should Ira attach a picture to an email?
 - a. Scan → Copy → Paste
 - b. Attach → File Select → Open
 - c. Copy → Paste → Send
 - d. Copy → Paste → Open

Which one is correct?

- a. i
- b. i & iii
- c. ii & iii
- d. i, ii & iii

Short Answer Questions

1. How can the internet help in learning a subject?
2. Describe the importance of internet usage in daily life.
3. How can internet technology help continue educational activities if an institution is unexpectedly closed?

The End

2026 Academic Year

Class Eight : ICT

সত্যকে ভালোবাসো আর ভুলকে ক্ষমা করো।

—ভলতেয়ার

