Boys' High School And College, Prayagraj.

Session 2020-2021

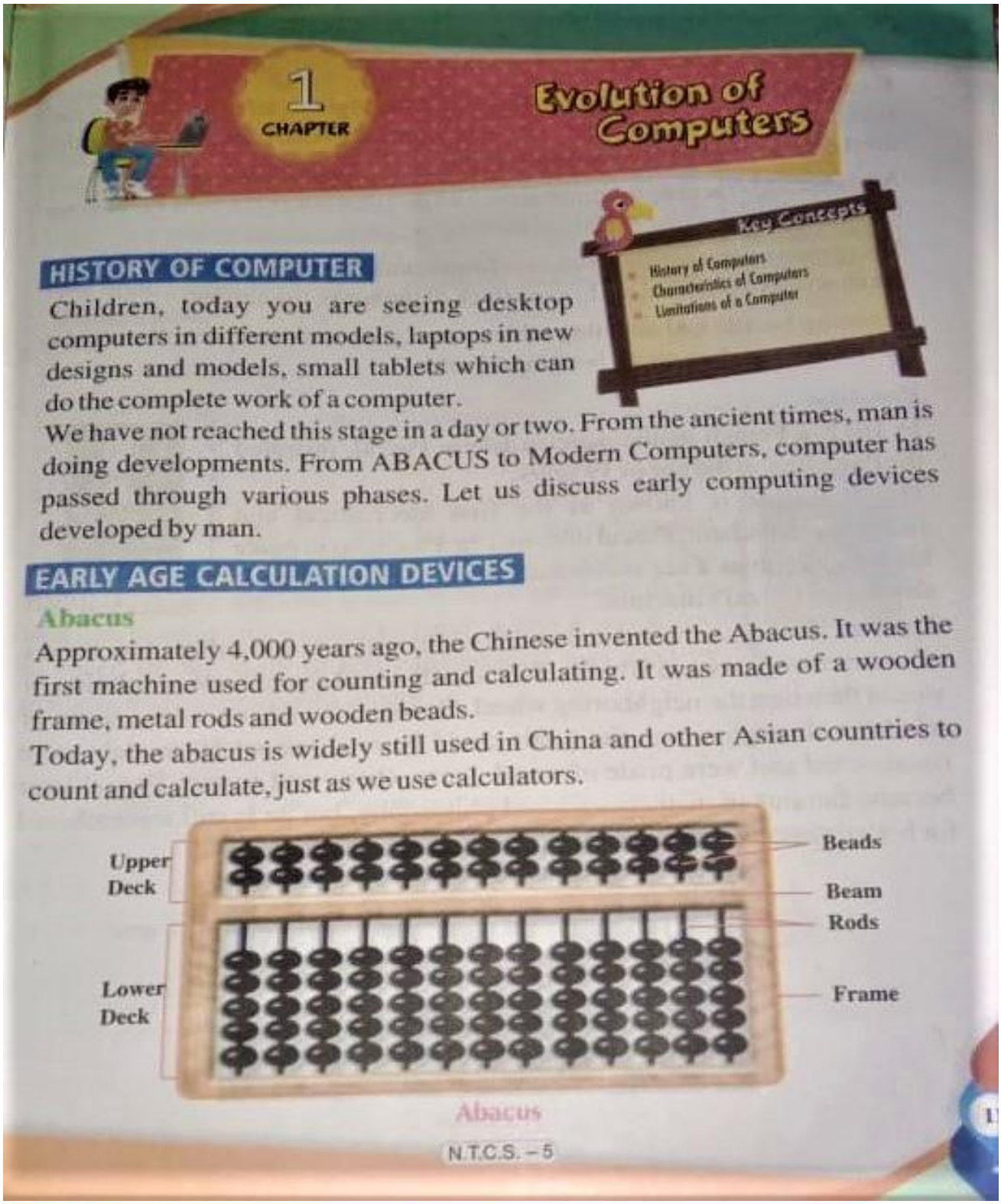
Computer Studies

Worksheet No.1

Evolution of Computer

Class 5 (A-F)

Instructions- Parents are requested to make sure that the child reads and understands the chapter and the related exercises.



1 CHAPTER

Evolution of Computers

Key Concepts

- History of Computers
- Characteristics of Computers
- Limitations of a Computer

HISTORY OF COMPUTER

Children, today you are seeing desktop computers in different models, laptops in new designs and models, small tablets which can do the complete work of a computer.

We have not reached this stage in a day or two. From the ancient times, man is doing developments. From ABACUS to Modern Computers, computer has passed through various phases. Let us discuss early computing devices developed by man.

EARLY AGE CALCULATION DEVICES

Abacus

Approximately 4,000 years ago, the Chinese invented the Abacus. It was the first machine used for counting and calculating. It was made of a wooden frame, metal rods and wooden beads.

Today, the abacus is widely still used in China and other Asian countries to count and calculate, just as we use calculators.

Abacus

Each bead has a specific value. Reading from right to left, the beads in the first column are worth 1, in the second column the beads are worth 10, in the third column the beads are worth 100, etc.

Addition, subtraction, multiplication and division are performed by moving the correct beads to the middle of the abacus.

The person operating the abacus performs calculations in their head and uses the abacus as a physical aid to keep track of the sums, the carries.

Counting boards and counting tablets were also used to represent everyday calculations such as goods bought and sold.

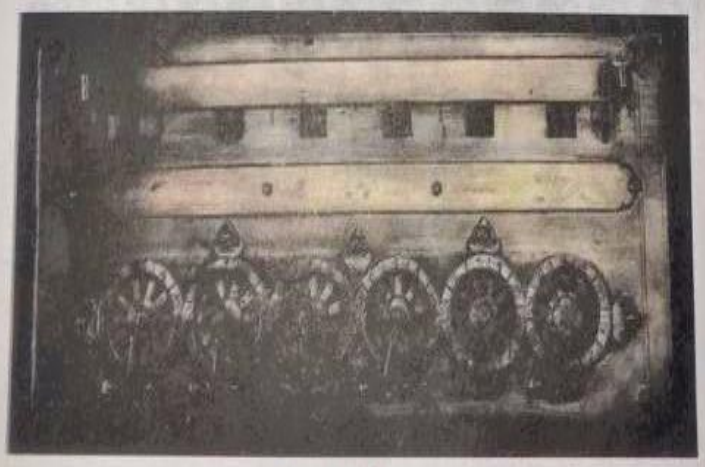
Pascaline

Blaise Pascal

In 1642, a French mathematician Blaise Pascal, invented the Pascaline, at the age of 19 years.

The Pascaline is known as the first mechanical and automatic calculator. Pascal invented the Pascaline to make his father's job as a tax accountant easier. The machine is also called Pascal's machine.

The Pascaline was a wooden box that could only add and subtract by means of a series of gears and wheels. When each wheel rotated one revolution, it would then turn the neighboring wheel. On top of the wheels were a series of windows through which the totals could be read. About 50 models were constructed and were made of wood, ivory, ebony and copper. Pascal later became famous in mathematics and philosophy, but he is still remembered for his role in computer history.



Pascaline

Napier's Bones

In the early 17th century, John Napier, a Scottish mathematician, invented another calculating tool. It used marked strips of wood or bone, side by side, to multiply and divide. This tool became known as "Napier's Bones."

Napier's Bones

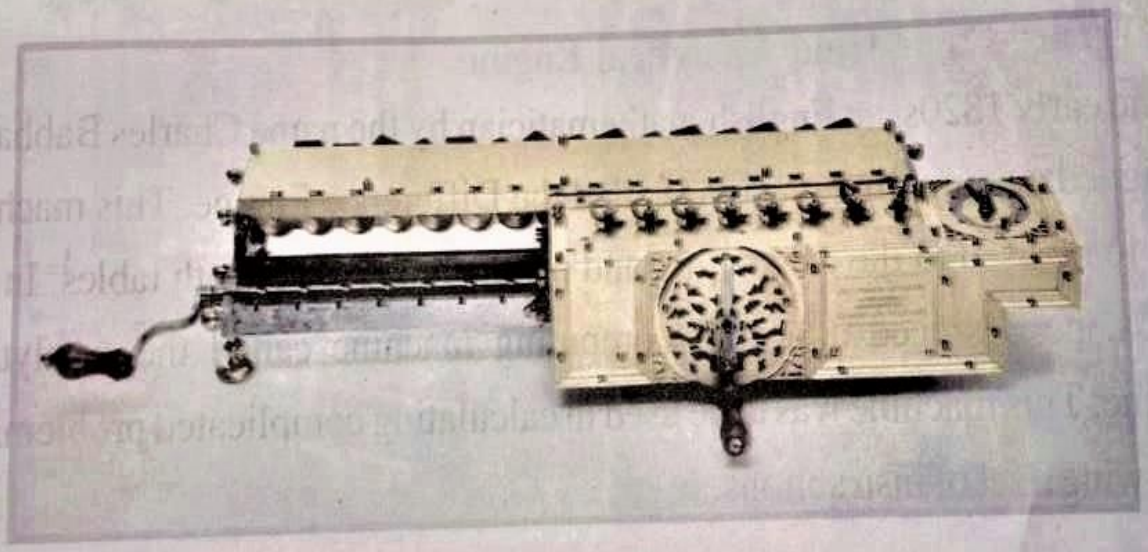
John Napier

Leibniz Calculator

In 1673, German inventor Gottfried Leibniz developed the Leibniz Calculator.

The Leibniz was also a calculating machine, but much superior to that of the Pascaline. It could do more than just add and subtract. The Leibniz Calculator could also multiply, divide and find square roots of numbers. It too was mechanical and worked by hand. A crank was added to speed up the work of this calculator. It was used by mathematicians and bookkeepers.

G. Leibniz



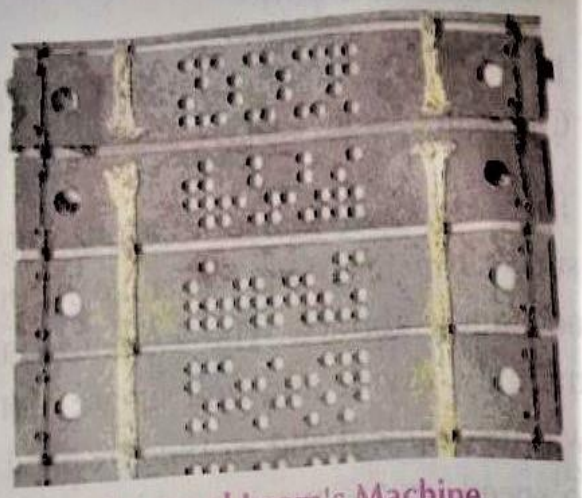
Leibniz Calculator

Jacquard Loom

In 1801, Jacquard invented the Jacquard Loom. It was a weaving machine that was controlled by punched cards. While the loom was being pumped, cards with holes in them were attached together in a pattern through which strings of thread were automatically fed. These cards would feed the right pieces of thread into the loom to make a beautiful cloth.

Jacquard Loom

Weavers today still use the Jacquard Loom. In the years to follow, variations on Jacquard's punched cards would find a variety of uses, including representing the music to be played by automated pianos and the storing of programs for computers.



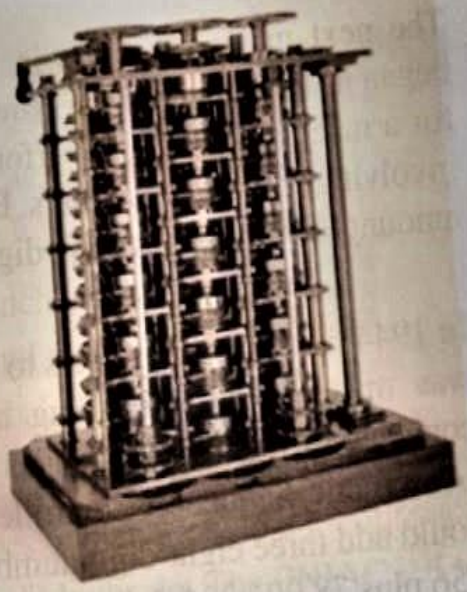
Jacquard Loom's Machine

Difference Engine and Analytical Engine

In the early 1820s, an English mathematician by the name Charles Babbage, designed a computing machine called the Difference Engine. This machine was to be used in the calculating and printing of simple math tables. In the 1830s, he designed a second computing machine called the Analytical Engine. This machine was to be used in calculating complicated problems by following a set of instructions.

Difference Engine

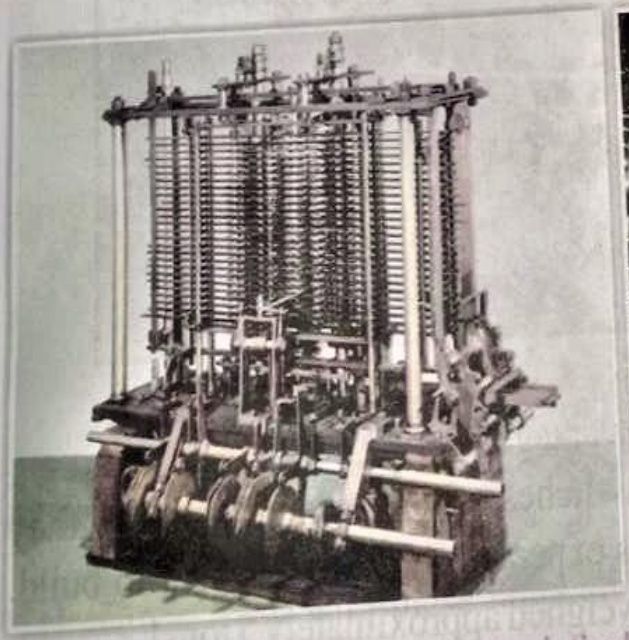
However, neither of these machines were ever finished because the technology at the time was not advanced enough and both of his projects lacked financial funding. The computing machines made in the 1900s and even those today are based on the designs of the Difference Engine and the Analytical Engine. This is why Charles Babbage is known as the "Father of Computers."



Difference Engine

Analytical Engine

The Analytical Engine was a mechanical computer that could solve any mathematical problem. It used punched-cards similar to those used by the Jacquard loom and could perform simple conditional operations.



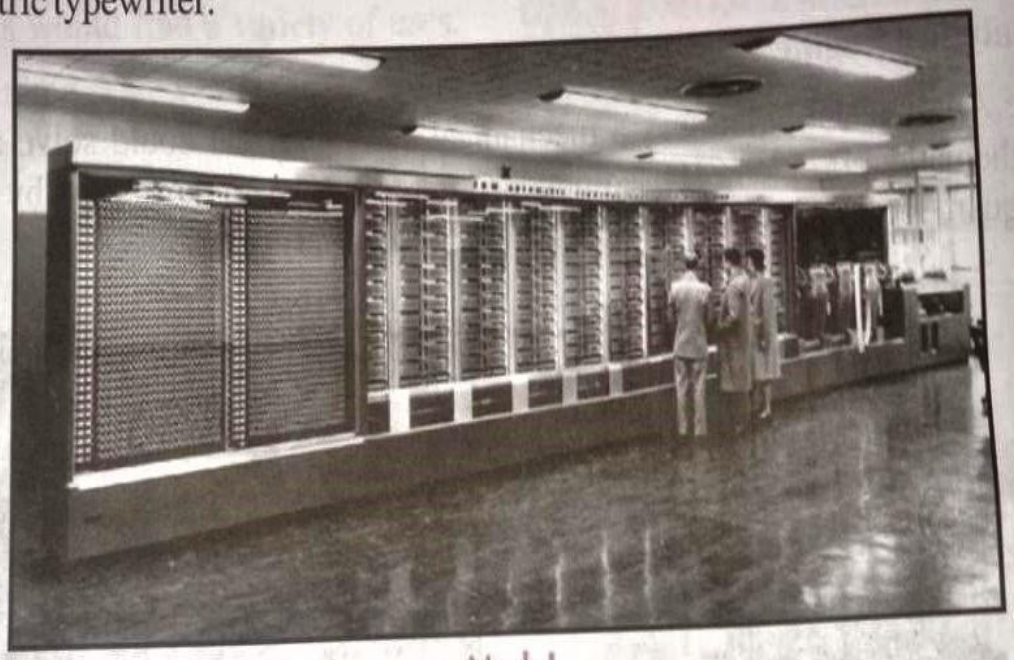
Analytical Engine

Mark-I

The next major invention in the history of computing began in 1937. In that year Howard Aiken outlined a plan for a machine that could perform mathematics problems involving very large numbers. Because it handled distinct amounts or numbers, it was a digital device.

Howard Aiken

In 1944, IBM paid engineers to build Aiken's machine called the Mark-I, it was made up of 78 adding machines and desk calculators that were connected by almost 500 miles of wires. Mark-I is also known as ASCC (Automatic Sequence Controlled Calculator). In one second, the Mark-I could add three eight-digit numbers; for example – 12 345 678 plus 90 123 456 plus 78 901 234. It could print out its results on punched cards or on an electric typewriter.



Mark-I

The machine had some serious disadvantages. It was very big-51 feet long and 8 feet high. Its 3,000 electrical switches made a terrible racket as they kicked on and off. The Mark - I was expensive and complicated to build. After all, it had one million parts and weighed approximately 5 tons!

ENIAC

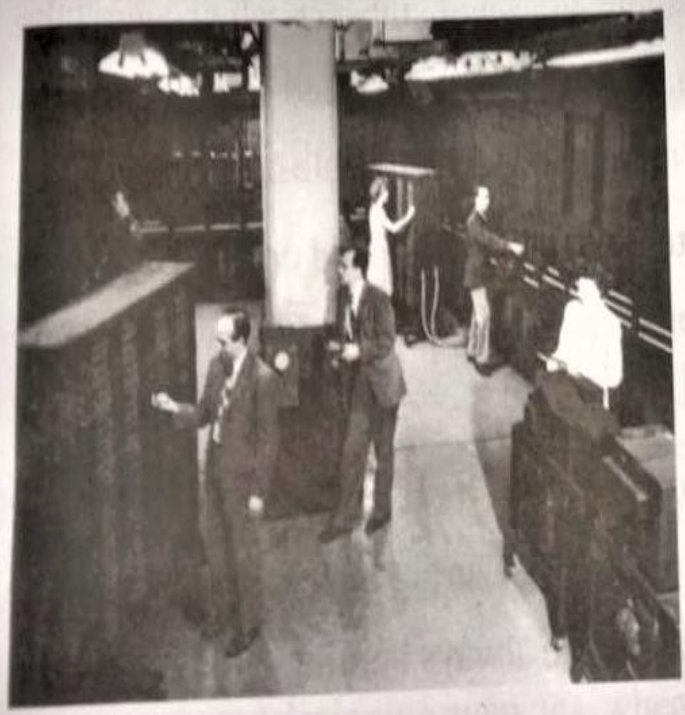
ENIAC is termed as the First Generation Computer.

The first generation computers were huge, slow, expensive and often undependable.

Vacuum Tube

In 1946 two Americans, Eckert and John Mauchly built the ENIAC (Electronic Numerical Integrator and Computer) electronic computer which used vacuum tubes instead of the mechanical switches of the Mark I.

The ENIAC used thousands of vacuum tubes, which took up a lot of space and gave off a great deal of heat just like light bulbs do. The ENIAC led to other vacuum tube type computers like the EDVAC (Electronic Discrete Variable Automatic Computer) and the UNIVAC(UNIVersal Automatic Computer).



Without any moving parts, vacuum tubes could take very weak signals and make the signal stronger (amplify it). Vacuum tubes could also stop and start the flow of electricity instantly (switch). These two properties made the ENIAC computer possible. The ENIAC gave off so much heat that it had to be cooled by gigantic air conditioners.

However, even with these huge coolers, vacuum tubes still overheated regularly. It was time for something new.

Mauchly and Eckert

The first general-purpose electronic computer appeared in 1946. It was developed by John William Mauchly and John Presper Eckert. They called their machine the Electronic Numerical Integrator and Computer (ENIAC).

Unlike previous counting tools, ENIAC had no mechanical parts, no counters and no gears. It relied solely on vacuum tubes. Each vacuum tube contained an electronic circuit, a tiny pathway that carried electricity. Each circuit could turn on and off very much the way a light bulb does.

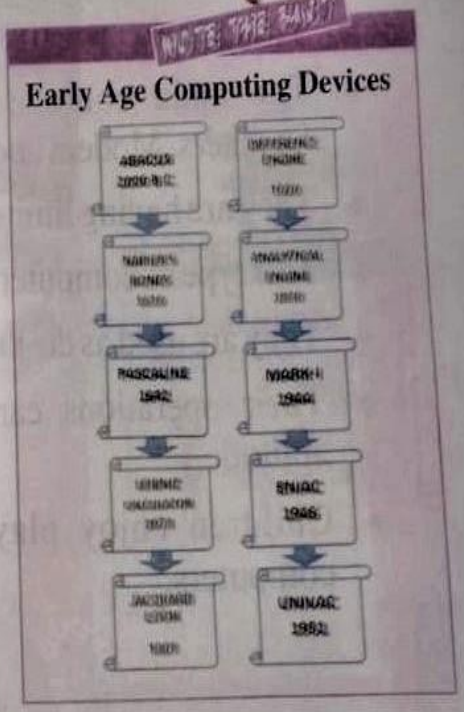
ENIAC operated 1000 times faster than Mark-I. It could do 5000 additions per second and 300 multiplications. The cost of this machine was around 3 million dollars.

However, ENIAC had a number of problems. Its 19,000 vacuum tubes took up so much space that it required a room measuring 20 feet by 40 feet. The tubes also produced a lot of heat and were always burning out. On average, 50 tubes burned out each day.

UNIVAC

In 1951, Eckert and Mauchly designed another computer called the UNIVAC (UNIVersal Automatic Computer). It was the first computer to be sold to businesses. UNIVAC contained 5,400 vacuum tubes and used magnetic tapes to give instructions to the computer. The UNIVAC was used to predict the presidential election of Dwight Eisenhower. No one believed the machines prediction at first, but it was very accurate.

Mauchly and Eckert



MODERN AGE COMPUTERS

Micro Computers are termed as modern age computers. They are also called Personal Computers. They brought revolution in the history of computers. These are the smallest computers that we see around. They can be commonly seen at homes, offices, educational institutions, small businesses and designing agencies, where they are used for data processing activities. These computers are cheaper and easily available in the market.

They are available in Desktop, Laptops, Handheld computers.

Examples : IBM PCs, PS/2, Apple Macs and even laptops.

Applications of Personal Computers

Personal Computers are used in DTP(Desk Top Publishing), accounting, statistical analysis, graphic designing, project management, teaching and entertainment.

Characteristics of Personal Computers

- They are cheaper and user friendly.
- The main components are Monitor, CPU, Keyboard, Mouse, Speakers, Modem and Printer.
- They are having limited peripherals attached to them.
- This type of computers can use a wide range of software.
- They are used as desktops either in offices or even homes.
- Their operations can be easily learnt by anyone having logical aptitude.
- Children enjoy playing games and watching movies in these computers.

Desktop

Desktop computer is also called Personal Computer. Desktop computers can be commonly seen at homes, offices, educational institutions, small businesses and designing agencies, where they are used for data processing activities. These computers are cheaper and easily available in the market.

QUICK QUIZ

What is a notebook?

NOTE THE FACT

Most popular personal computer's processing chip manufacturing company is Intel.

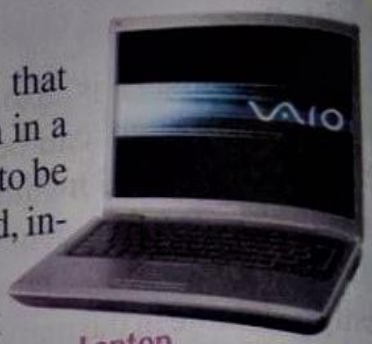
They are portable computers and they can be placed from one place to another with ease.

NOTE IT

Personal Computers are also called Micro Computers.

Laptop

A laptop computer is a small-sized computer that integrates all the elements of a computer system in a compact form. Additional parts are not required to be used with it. For example, it has in-built keyboard, in-built mouse, in-built MODEM.



Laptop

A laptop computer is also called a notebook computer.

The main advantage of a laptop computer is its mobility as well as its reduced size.

Handheld Computers

In the mid 1990s, many new types of small personal computing devices were introduced and these are referred to as handheld computers. These computers are also referred to as Palmtop Computers.


Handheld Computer

This type of computer is named as handheld computer because it can fit in one hand while you can operate it with the other hand. Because of its reduced size, the screen of handheld computer is quite small.

It also has small keyboard. The handheld computers are preferred by travelers. These computers are used by moving employees, such as meter readers and parcel delivery boys, whose jobs require them to move from place to place.

The examples of handheld computers are:

1. Personal Digital Assistant
2. Smart Phone

Personal Digital Assistant

PDA (Personal Digital Assistant) is a term used for any small mobile handheld device that provides computing and information storage and retrieval capabilities for personal or business use. They are often used for keeping schedule calendars and address book information.


Personal Digital Assistant

Smart Phone

A smart phone is a mobile phone which has various features of a PC or laptop. A smart phone allows you to run multiple applications at a time, customize menus and shortcuts.

A smart phone has the following features:

- Wireless e-mail, Internet, Web browsing and fax
- Personal information management
- Online banking
- LAN connectivity
- Local data transfer between phone and computers
- Remote data transfer between phone and computers
- Remote control of computers

Smart Phone

CHARACTERISTICS OF COMPUTERS

Computer is playing an important role in our everyday life. It has become the need of people just like television, telephone or other electronic devices at home. It solves the human problems very quickly as well as accurately. New generation computers have opened the vistas for amazing work. The important features of new generation computers are :

1. Speed

The computer is a very high speed electronic device. The operations on the data inside the computer are performed through electronic circuits according to the given instructions. The data and instructions flow along these circuits with high speed that is close to the speed of light. Computer can perform billion of operations on the data in one second.

2. Accuracy

Computer is also very accurate device. It gives accurate output result provided that the correct input data and set of instructions are given

to the computer. It means that output is totally depended on the given instructions and input data. If input data is incorrect then the resulting output will be incorrect. In computer terminology, it is known as garbage-in garbage-out.

3. **Reliability**

Electronic components in modern computer have very low failure rate. The modern computer can perform very complicated calculations without creating any problem and produces consistent (reliable) results. In general, computers are very reliable. Many personal computers have never needed a service call. Communications are also very reliable and generally available whenever needed.

4. **Automation**

A computer can automatically perform operations without interfering the user during the operations. It controls automatically different devices attached with the computer. It executes automatically the program instructions one by one.

5. **Versatility**

Versatile means flexible. Modern computer can perform different kind of tasks one by one simultaneously. It is the most important feature of computer. At one moment you are playing game on computer, the next moment you are composing and sending emails etc.

6. **Storage**

A computer has internal storage (memory) as well as external or secondary storage. In secondary storage, a large amount of data and programs (set of instructions) can be stored for future use. The stored data and programs are available any time for processing.

7. **Retrieving Data and Programs**

Data and programs stored on the storage media can be retrieved very quickly for further processing. It is also very important feature of a computer.

8. Arithmetical and Logical Operations

A computer can perform arithmetical and logical operations. In arithmetic operations, it performs the addition, subtraction, multiplication and division on the numeric data. In logical operations, it compares the numerical data as well as alphabetical data.

9. Communications

Today computer is mostly used to exchange messages or data through computer networks all over the world. For example, the information can be received or send through the Internet with the help of computer. It is most important feature of the modern information technology.

10. Diligence

A computer can continually work for hours without creating any error. It does not get tired while working after hours of work it performs the operations with the same accuracy as well as speed as the first one.

11. Consistency

People often have difficulty to repeat their instructions again and again. For example, a lecturer feels difficulty to repeat a same lecture in a classroom again and again. Computer can repeat actions consistently (again and again) without loosing its concentration :

(i) To run a spell checker (built into a word processor) for checking spellings in a document.

(ii) To play multimedia animations for training purposes.

(iii) To deliver a lecture through computer in a classroom etc.

A computer will carry out the activity with the same way every time. You can listen a lecture or perform any action again and again.

LIMITATIONS OF A COMPUTER

Computer has done this and that. Actually this is not the computer which has done this but the user. Despite its various features, a computer does have the following limitations:

1. **No Self Intelligence**

Today, a computer is able to do a work which is impossible for man. Computers are used to do risky and dangerous work and where perfection is needed. But it does not have any intelligence of its own. It works according to the instructions only.

2. **No Decision-Making Power**

Computer cannot take any decision of its own. It does only those tasks which are already instructed to it.

3. **No Learning Power**

Computer has no learning power. Once you give instructions to a computer how to perform a task, the very task cannot perform if you do not give it any instructions for the next time. For example, when you are taught how to solve a problem and if same type of problem is given to you to solve, then you can do it because you have learned how to solve the problem.

4. **Retrieval of Memory**

A computer can retrieve data very fast but this technique is linear. A human being's mind does not follow this rule. A human mind can think randomly which a computer machine cannot.

5. **Feelings**

One of the main limits in the computer is of feeling. A computer cannot feel about some like a human. A computer cannot meet human in respect of relations.

Human can feel, think and care but a computer machine itself cannot.

A computer cannot take place of human because computer is always dependent of human.

Exercises (To be learnt)

Ques.1) Fill in the blanks: -

1. Abacus was the first calculating machine.
2. Pascaline was invented by Pascal.
3. Analytical computer was a mechanical computer.
4. Babbage is called the Father of computer.
5. ENIAC is termed as first-generation computer.
6. A laptop is a personal computer.

Ques.2) Write true or false: -

1. A handheld computer is a mini computer. – False
2. The computer you use in your house is a personal computer. – True
3. Abacus was the first computing device. -True
4. Pascaline was developed by Blaise Pascal. – True

Ques.3) Multiple choice questions: -

1. The first calculating device was _____.
   a. Slide rule.
   b. Mark-I.
   c. Pascaline.
   d. Abacus.
2. A tablet is a _____.
   a. Micro computer.
   b. Super computer.
   c. Mini computer.
   d. Desktop computer.
3. Mark-I is also known as _____.
   a. American Sequence Controlled Calculator.
   b. Automatic Sequence Calculating Controller.
   c. American Sequence Controlled Computer.
   d. Automatic Sequence Controlled Calculator.
4. Who built the first Mechanical Calculator?
   a. Joseph Marie Jacquard.
   b. John Mauchly.
   c. Blaise Pascal.
   d. Howard Aiken.
5. Which was the computer conceived by Babbage?
   a. Analytical Engine.
   b. Arithmetic Machine.
   c. Donald Knuth.
   d. All of these.
6. The lower deck of an abacus is known as _____.
   a. Heaven.
   b. Sky.
   c. Earth.
   d. Floor.

7. Charles Babbage is considered as the father of modern computers because _____.
   a. Of his difference engine.
   b. Of his analytical engine.
   c. Of his concept of input, mill and output.
   d. All of these.

Ques. 4) Answer the following: -

1. **Name the first computing device.**

Ans. Abacus was the first computing device.

2. **Write the name of any four computing devices.**

Ans. The four computing devices are as follows: -

a. Pascaline.
b. Leibniz calculator.
c. Difference engine.
d. Analytical engine.

3. **What is a modern computer?**

Ans. Modern computers are those computers that brought revolution in the history of computer. They are the smallest computer that we see around. They are cheaper in price and are easily available in the market. They are also known as micro computers or personal computer.

4. **Write any two features of modern computer.**

Ans. The two features of modern computer are as follows: -

a. Modern computers are cheaper and user friendly.
b. They can us a wide range of softwares.

5. **Write any three characteristics of computer.**

Ans. The three characteristics of computer are as follows: -

a. Speed – The computer is a very high-speed electronic device. Computer can perform billion of operations on the data in one second.
b. Accuracy – Computer is a very accurate device. It gives accurate results.
c. Storage – IT can store large amount of data. IT has internal as well as external storage capacity.

6. **Write the three limitations of computer.**

Ans. The three limitations of computer are as follows: -

a. No self-intelligence – Computer does not have any intelligence of its own. It works according to the instructions given by us.

b. No decision-making power – Computer cannot take any decision of its own. It works according to the instructions given by us.
c. Feelings – A computer cannot feel anything a human being does. It is always dependent on human beings.

Ques.5) Write the full form of the following: -

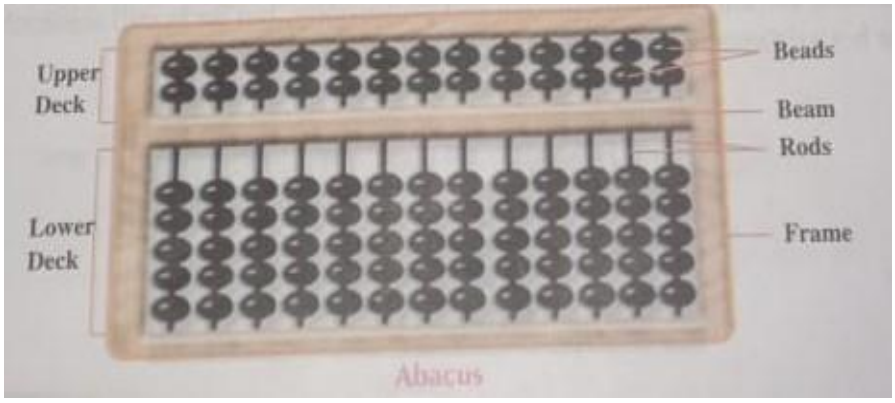
1. ASCC - _____.
2. ENIAC - _____.
3. UNIVAC - _____.
4. DTP - _____.
5. PDA - _____.

Ques.6) Mention the year when following devices were invented: -

1. Abacus – _____.
2. Pascaline - _____.
3. Napier Bones - _____.
4. Leibniz calculator - _____.
5. Jacquard Loom - _____.

Diagrams: -

1. **Abacus (Page no. 11)**



2. **Types of Modern Age computer (Page no.21 & 22)**

Desktop

Handheld computer

Laptop

Smart Phone

Note: - Assessment questions can also be framed from in between the chapter.

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