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N.I.O.S. *Class* – XII

National Institute of Open Schooling

By : Anand Prakash Srivastava

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Sample Preview of the Solved Sample Question Papers

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Solved Sample Paper - 1

Based on NIOS (National Institute of Open Schooling)

Computer Science - XII

Time : 3 Hours] [Maximum Marks : 60

Note : *(i)* Answer **all** questions.

(ii) Marks allotted to each question are given in the right-hand margin.

Q. 1. Name the header files to which the following built in functions belong:

(i) **gets()**

(ii) **strcat()**

Ans. *(i)* <cstdio>

(ii) < string. h>

Q. 2. Which of the following identifiers cannot be used for naming variable, constants or functions in a program:

pass&fail,_variable, float, For, IOSTREAM, Your_Book

Ans. IOSTREAM, float, for

Q. 3. Assume an integer variable MyNumber. Write a C++ statement using Conditional Operator to assign the value 0 to variable X, if the MyNumber is odd and 1 if MyNumber is even.

Ans.

```
#include <iostream>
using namespace std;

int main() {
int n;

  cout << "Enter an integer: ";
  cin >> n;

  if ( n % 2 == 0)
    cout << n << " is even.";
  else
    cout << n << " is odd.";

  return 0;
}
```

Q. 4. Explain the following terms with examples from C++

(i) **Encapsulation**

Ans. Encapsulation is a process of wrapping similar code in one place. In C++, we can bundle data members and functions that operate together inside a single class. For example, class Rectangle { public: int length; int breadth; int getArea() { return length * breadth; } };

(ii) **Polymorphism**

Ans. Polymorphism in C++ means, the same entity (function or object) behaves differently in different scenarios. Consider this example: The " +" operator in c++ can perform two specific functions at two different scenarios i.e when the "+" operator is used in numbers, it performs addition.

Q. 5. Give two differences between << and >> operators.

Ans. Difference between >> and >>> operator. Both >> and >>> are used to shift the bits towards the right. The difference is that the >> preserve the sign bit while **the operator >>> does not preserve the sign bit**. To preserve the sign bit, you need to add 0 in the MSB.

Q. 6. Write a function CHECKPRIME(), that takes a number as an argument and checks whether it is a prime number or not.

Ans.

```
#include <iostream>
using namespace std;
bool checkPrimeNumber(int);
int main() {
int n;

cout << "Enter a positive  integer: ";
cin >> n;
if (checkPrimeNumber(n))
   cout << n << "is a prime number.";
```

```
        else
            cout << n << " is not a prime number.";
        return 0;
}
bool checkPrimeNumber(int n) {
    bool isPrime = true;
    // 0 and 1 are not prime numbers
    if (n == 0 || n == 1) {
        isPrime = false;
    }
    else {
        for (int i = 2; i <= n / 2; ++i) {
            if (n % i == 0) {
                isPrime = false;
                break;
            }
        }
    }
    return isPrime;
}
```

Q. 7. In a switch..case statement, when is the default statement executed?

Ans. The default statement is executed if no case constant-expression value is equal to the value of expression. If there's no default statement, and no case match is found, none of the statements in the switch body get executed.

Q. 8. Find the syntax errors from the following program. Justify each error.

```
#include<iostream. h>
void main()
{
float al=11. 0;
Try_this(fvarl);
}
float Try_this( float fvarl)
{
        fvarl++;
        cout<<' The Number is '<<fvarl;
}
```

Ans.

```
#include<iostream. h>
 void main()
 {
 float al=11. 0;
 Try_this(fvarl);
 }
 float Try_this( float fvarl)
 {
 fvarl++;
 cout<<' The Number is '<<fvarl;
 }
```

Explanation: 'cout' was not declared in this scope;
',' or ';' before numeric constant float al=11. 0;

Q. 9. Write the output of the following code. Assume all the required header files are already included.

```
#include<iostream. h>
int score=10;
void Testify(int& var , char ch='Z')
{
    var=var*score;
    if (var%5==0)
        cout<<ch;
    else
        cout<<"Sorry";
}
void main()
{
    int score=11;
    char cstr= 'B';
    Testify(: :score,cstr);
    cout<<score<<"*** " <<cstr<<endl;
    Testify (score);
    cout<<score<<"*** " <<cstr<<endl;
    Testify(score, 'K');
    cout<<: : score<<" " <<cstr<<endl;
}
```

Ans. Output:

```
B11*** B
Z1100*** B
K100 B
```

Q. 10. Write a function CHECK() in C++ which accepts an integer number as an argument and displays the reverse of it.

Ans.

```
#include <iostream>
using namespace std;
//Function declaration
int reverseNumber(int num);
int main()
{
int num, reversedNum;
cout << "\nPlease enter a number: ";
cin >> num;
reversedNum = reverseNumber(num);
cout << "The reverse number is: "
<< reversedNum << endl;
system("pause");
return 0;
}
```

Sample Preview of The Chapter

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COMPUTER SCIENCE

MODULE-1 : BASIC COMPUTING

Computer Fundamentals

1

INTRODUCTION

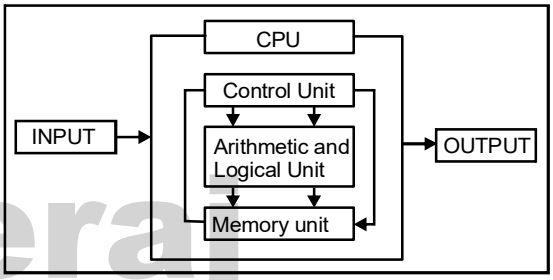
The term computer is derived from the word 'compute', which means 'to calculate'. The impact of computers in our day-to-day life is tremendous and visible in all fields. Similarly in modern libraries, various activities are performed with the help of computers. In this lesson, you will learn about works and functions of a computer.

A computer is a fast calculating device that can perform arithmetic. Although the computer was originally invented mainly for doing high speed and accurate calculations, it is not just a calculating device. It gets the data through an input device, processes it as per the instructions given and information as output. We can define a computer follows. "A computer is fast electronic device that processes the input data according to the instructions given by the programmer/user and provides the desired information as output".

A computer has much more memory of storage capacity than human beings. It can store millions of data and instructions, which can be retrieved and recalled even after number of years. This in not possible in cast of human brain.

CHAPTER AT A GLANCE

Computer is an electronic device which is capable of receiving information or data and performs a series of operations in accordance with a set of operations. This produces results in the form of data or information.



A computer basically performs five major operations or functions such as: • Accepts data or instructions by way of input. • Stores data, • Processes data as required by the user, • Gives results in the form of output and • Controls all operations inside a computer.

Computer has four main components:

1. **Input Devices:** The data is entered/input into the computer through input devices. Example of input devices is keyboard, mouse, scanner etc.
2. **Central Processing Unit (CPU):** The definition of CPU stands for central processing unit, which is the control center of a computer. An example of a CPU is the part of a computer in control of all its functions.
3. **Memory:** Memory refers to the processes that are used to acquire, store, retain and later retrieve information.

- **Output Devices:** The output unit accepts output data from computer via output devices and transforms the data into human readable form

Following are some of the important input devices which are used in a computer:

- **Keyboard:** Keyboard is the most common and very popular input device which helps to input data to the computer.

- **Mouse:** Mouse is the most popular pointing device.
- **Scanner:** Scanner is an input device, which works more like a photocopy machine.
- **Optical Character Recognition (OCR):** OCR is an input device used to read a printed text.
- **Magnetic Ink Character Recognition (MICR):** MICR input device is generally used in banks as there are large number of cheques to be processed everyday.
- **Optical Mark Recognition (OMR):** OMR is a special type of optical scanner used to recognize the type of mark made by pen or pencil.
- **Bar Code Reader:** Bar Code Reader is a device used for reading bar coded data (data in the form of light and dark lines).
- **Digitizing Tablet:** An input device that enables you to enter drawings and sketches into a computer. A ***digitizing tablet*** consists of an electronic tablet and a cursor or pen.
- **Light Pen:** Light pen is a pointing device similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen.
- **Speech input Devices:** Voice input device A device in which speech is used to input data or system commands directly into a system.

Central Processing Unit (CPU) consists of the following features:

- CPU is considered as the brain of the computer.
- CPU performs all types of data processing operations.
- It stores data, intermediate results and instructions (program).
- It controls the operation of all parts of the computer.

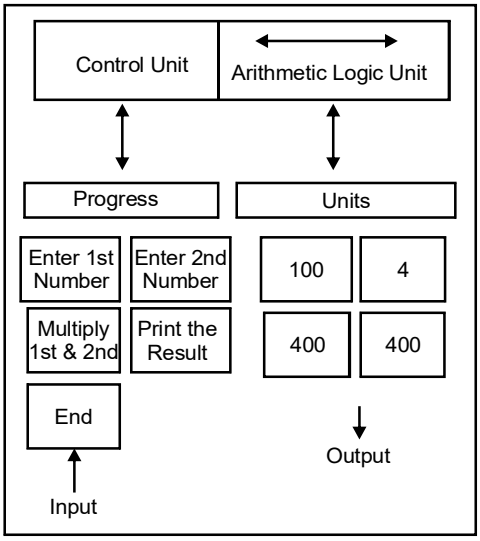
Control Unit (CU): This unit controls the operations of all parts of the computer but does not carry out any actual data processing operations.

Arithmetic Logic Unit (ALU): ALU is performing the arithmetic and logical operation.

Memory Registers: A memory is just like a human brain. It is used to store data and instructions.

How the CPU and Memory work together?

In a computer system, the CPU (Central Processing Unit) and memory work together **to run programs**. In particular, the CPU executes (runs) programs using the fetch-decode-execute cycle, whilst the memory (registers, cache, RAM and virtual memory) store the data and programs that are currently in use.



Following are some of the important output devices used in a computer:

(i) **Monitors:** Monitors, commonly called as **Visual Display Unit** (VDU), are the main output device of a computer.

- **CRT Monitor:** The CRT display is made up of small picture elements called pixels. The smaller the pixels, the better the image clarity or resolution.
- **TFT-LCD Monitors:** TFT LCD (Thin Film Transistor Liquid Crystal Display) has a sandwich-like structure with liquid crystal filled between two glass plates. TFT Glass has as many TFTs as the number of pixels displayed, while a Colour Filter Glass has colour filter which generates colour.

(ii) **Printer:** A printer is a hardware output device that is used to generate hard copy and print any document

- **Dot Matrix Printer:** The dot matrix printers are also known as a pin printer that was released by **IBM in 1957**. It strikes an ink ribbon using print heads that place thousands of little dots to form images and text.
- **Ink-jet Printer:** It is widely used by home and business computer users that prints characters by spraying the ink using magnetic plates on the paper. It contains a **paper feed assembly, ink cartridge, print head, stabilizer bar and belt.**
- **Laser Printer:** It uses the laser or non-impact photocopier technology to print the text and images on the paper.

- **Thermal Printer:** The thermal printer is invented by **Jack Kilby** that is also known as an electrothermal printer, thermal transfer printer, or thermal wax-transfer printer.

(iii) **Plotter:** A plotter is a computer hardware device much like a printer that is used for printing vector graphics.

(iv) **Speakers:** Speakers are used to connect to a computer to generate sound, which are one of the most common output devices.

Memory unit is a component of a computer system. It is **used to store data, instructions and information**. It is also known as a main/primary/internal memory.

Measuring Memory: Computer storage and memory is often measured in Megabytes (MB) and Gigabytes (GB). A medium-sized novel contains about 1 MB of information. 1 MB is 1,024 kilobytes, or 1,048,576 (1024x1024) bytes, not one million bytes. Similarly, one 1 GB is 1,024 MB, or 1,073,741,824 (1024x1024x1024) bytes.

(i) **Primary Memory:** Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity and data is lost when power is switched off. It is generally made up of semi-conductor device. These memories are not as fast as registers.

Random Access Memory (RAM): Computer memory or Random Access Memory (RAM) is **your system's short-term data storage**; it stores the information your computer is actively using so that it can be accessed quickly. The more programs your system is running, the more memory you'll need.

Read Only Memory (ROM): Read Only Memory (ROM) is a type of storage medium that **permanently stores data on Personal Computers (PCs) and other electronic devices**. It contains the programming needed to start a PC, which is essential for boot-up; it performs major input/output tasks and holds programs or software instructions:

- **Programmable Read Only Memory (PROM).**
- **Erasable Programmable Read Only Memory (EPROM).**
- **Electrically Erasable Programmable Read Only Memory (EEPROM).**

(ii) **Cache Memory:** Cache memory is a very high speed semi-conductor memory which can speed up the CPU. It acts as a buffer between the CPU and the main memory.

(iii) **Secondary Memory:** This type of memory is also known as external memory or non-volatile. It is slower than the main memory. These are used for storing data/information permanently. CPU directly does not access these memories, instead they are accessed via input-output routines. The contents of secondary memories are first transferred to the main memory, and then the CPU can access it. For example, disk, CD-ROM, DVD, etc.

- **Magnetic Tape:** Magnetic tape is a medium for magnetic recording, made of a thin, magnetizable coating on a long, narrow strip of plastic film.
- **Magnetic Disk:** A magnetic disk is a storage device that uses a magnetization process to write, rewrite and access data.
- **Floppy Disk:** The floppy disk drive, also known as diskette, is **a removable magnetic storage medium** that allows recording of data.
- **Hard Disk:** Hard disk drive is made up of a series of circular disks called **platters** arranged one over the other almost ½ inches apart around a **spindle**. Disks are made of non-magnetic material like aluminum alloy and coated with 10-20 nm of magnetic material.
- **Optical Disk:** An optical disk is any computer disk that uses optical storage techniques and technology to read and write data.
- **Compact Disk**: Read Only Memory (CD-ROM): The data on these CDs are recorded by the manufacturer. Proprietary Software, audio or video are released on CD-ROMs.
- **Compact Disk: CD stands for Compact Disk:** CDs are circular disks that use optical rays, usually lasers, to read and write data.
- **Digital Versatile Disk (DVD):** DVD stands for Digital Versatile Disk. DVD are optical devices that can store 15 times the data held by CDs. They are usually used to store rich multimedia files that need high storage capacity.
- **Flash Memories:** Pen drive is a portable memory device that uses solid state memory rather than magnetic fields or lasers to record data. It uses a technology similar to RAM, except that it is nonvolatile. It is also called USB drive, key drive or flash memory.

There are several method to access memory as listed below:

- **Direct Access or Random Access**: In this method, any location of the memory can be accessed randomly like accessing in Array. Physical locations are independent in this access method.

- **Sequential Access Memory**: In this method, the memory is accessed in a specific linear sequential manner, like accessing in a single Linked List. The access time depends on the location of the data.

System Security and Data Security: System security describes the controls and safeguards that an organization takes to ensure its networks and resources are safe from downtime, interference or malicious intrusion. If data security is meant to protect the information in the books in the library, then system security is what protects the library itself.

A port is a physical docking point using which an external device can be connected to the computer.

- **Serial Ports:** Serial ports transmit data sequentially one bit at a time. So they need only one wire to transmit 8 bits. However, it also makes them slower. Serial ports are usually 9-pin or 25-pin male connectors.
- **Parallel Port:** Parallel ports can send or receive 8 bits or 1 byte at a time. Parallel ports come in form of 25-pin female pins and are used to connect printer, scanner, external hard disk drive, etc.
- **USB Port:** It can connect all kinds of external USB devices such as external hard disk, printer, scanner, mouse, keyboard, etc.
- **Infrared Port:** Infrared Port is a port that enables wireless exchange of data within a radius of 10m.
- **Bluetooth:** Bluetooth is a telecommunication specification that facilitates wireless connection between phones, computers and other digital devices over short range wireless connection.

The computer systems can be classified on the following basis:

1. On the basis of size.
2. On the basis of functionality.
3. On the basis of data handling.

- **Analog Computers:** Analog computer, any of a class of devices in which continuously variable physical quantities such as electrical potential, fluid pressure, or mechanical motion are represented in a way analogous to the corresponding quantities in the problem to be solved.
- **Digital Computers:** Digital computer, any of a class of devices capable of solving problems by processing information in discrete form.
- **Hybrid Computers:** Hybrid computers are computers that exhibit features of analog computers and digital computers.

Types of Digital Computers

- **Microcomputers:** Microcomputer is a small, relatively inexpensive computer with a microprocessor as its CPU. It includes a microprocessor, memory and minimal I/O circuitry mounted on a single printed circuit board.
- **Minicomputers:** These computers came into the market in mid 1960s and were sold at a much cheaper price than the main frames, they were actually designed for control, instrumentation, human interaction and communication switching as distinct from calculation and record keeping, later they became very popular for personal uses with evolution.
- **Mainframe Computers:** These are commonly called as big iron, they are usually used by big organizations for bulk data processing such as statics, census data processing, transaction processing and are widely used as the servers as these systems has a higher processing capability as compared to the other classes of computers.
- **Supercomputers:** The super computers are the most high performing system. A supercomputer is a computer with a high-level of performance compared to a general-purpose computer.

INTEXT QUESTIONS 1.1

Fill in the blanks:

Q. 1. The four basic functions performed by the computer are ....., ..., ..., ...

Ans. Receive input, process information, produce output, store information for future use.

Q. 2. A bar code reader is a / an .....device.

Ans. input.

3. Choose the correct answer:

***(a)* Arithmetic and logical operations is performed by ..... unit.**

(i) ALU *(ii)* Editor
(iii) Storage *(iv)* Output

Ans: *(i)* ALU.

***(b)* The ALU and CU are jointly known as .....**

(i) RAM *(ii)* ROM
(iii) CPU *(iv)* none of the above

Ans. *(iii)* CPU.