



CHANDIGARH ENGINEERING COLLEGE, LANDRAN (MOHALI)

DEPARTMENT OF APPLIED SCIENCES

PPS (BTPS-101-18)

Branch-ECE/ME Sem-1

**B.Tech -Question Paper-1 Solution
December- Odd Sem-2018 QP**

Section-A(10*2= 20 Marks)

1. Write short Notes on:

a) What is the syntax of if statement?

Ans:

Syntax of if statement:

```
if(condition)
{
//statements to be executed if condition is true
}
```

Example:

```
if(a%2==0)
{
Printf("a is even number");
}
```

b) What is the syntax of switch statement?

Ans:

Syntax of switch statement:

```
switch(value)
{
case value1:
Statements to be executed if value matches with value1;
break;
case value2:
Statements to be executed if value matches with value2;
break;
--
default:
default statement if no value matches;
}
```

Example:

```
switch(n)
{
    case 'S':
        printf("Sunday");
        break;
    case 'M':
        printf("Monday");
        break;
    case 'T':
        printf("Tuesday");
        break;
    case 'H':
        printf("Thursday");
        break;
    default:
        printf("Out of Choice");
        break;
}
```

c) What is the syntax of do while statement?

Ans:

Syntax of do-while statement:

```
do
{
    Statements to be executed
}while(condition);
```

Example:

```
do
{
    printf("Enter a number: ");
    scanf("%d", &number);
    sum += number;
}
while(number>0);
```

d) What is a pointer?

Pointer is a variable that stores/points the address of another variable. A is used to allocate memory dynamically i.e. at run time. The pointer variable might be belonging to any of the data type such as int, float, char, double, short etc.

Pointer Syntax : data_type *var_name; Example : int *p; char *p;

Where, * is used to denote that “p” is pointer variable and not a normal variable

e) What is the scope of local variable?

Variables that are declared inside a function or block are called local variables. They can be used only by statements that are inside that function or block of code. Local variables are not known to functions outside their own.

Example:

```
#include <stdio.h>
int main () {
    /* local variable declaration */
    int a, b;
    int c;
    /* actual initialization */
    a = 10;
    b = 20;
    c = a + b;
    printf ("value of a = %d, b = %d and c = %d\n", a, b, c);
    return 0;
}
```

f) What are the conditional operators available in C?

Conditional operators return one value if condition is true and returns another value if condition is false. This operator is also called as ternary operator.

Syntax : (Condition? true_value: false_value);

g) What is RAM?

Random Access memory (RAM) is a primary memory device. It is volatile in nature as data stored in it is lost if power is off. Types: EROM,PROM,EPROM

h) What is a compiler?

Compiler is software which translates the entire program into machine code. It generates intermediate object code which requires linking. C, C++ are languages which use compiler.

i) What is the syntax of PRINTF statement?

Ans:

Syntax of PRINTF statement:

Printf('Data to be printed');

If any value has to be printed then

Printf("Format specifier", variablename);

Example:

Printf("%d is an even number",a);

j) What is the need for operating system?

Ans:

An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

Some popular Operating Systems include Linux Operating System, Windows Operating System, VMS, OS/400, AIX, z/OS, ios.

*Total 5 – Questions to be attended opting at least two from section B and C (5*8=40 Marks)*

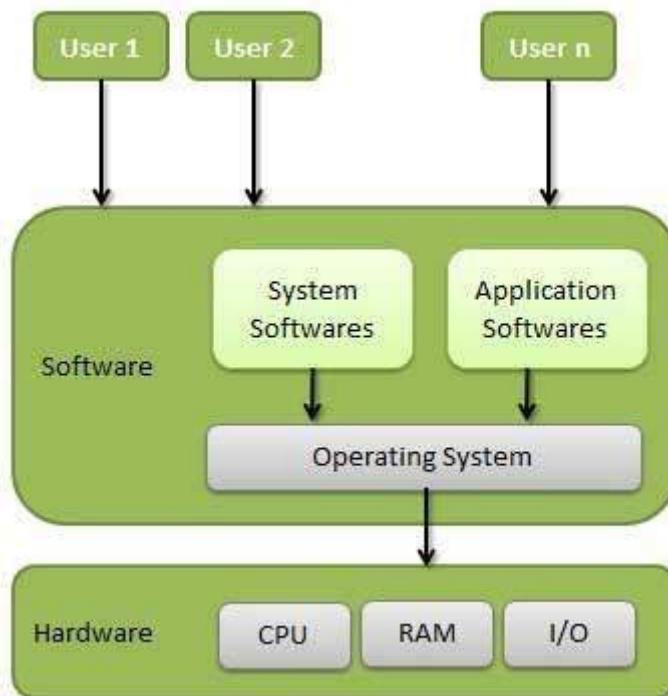
Section- B (8 marks Questions)

2. What is an operating system? What do you mean by loading, saving, compiling and executing of a program?

Ans:

An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

Some popular Operating Systems include Linux Operating System, Windows Operating System, Windows,IOS,Unix,Linux.



The compilation and execution process of C can be divided in to multiple steps:

Preprocessing - Using a Preprocessor program to convert C source code in expanded source code. "#includes" and "#defines" statements will be processed and replaced actually source codes in this step.

Saving: The program has to be saved

Compilation - Using a Compiler program to convert C expanded source to assembly source code.

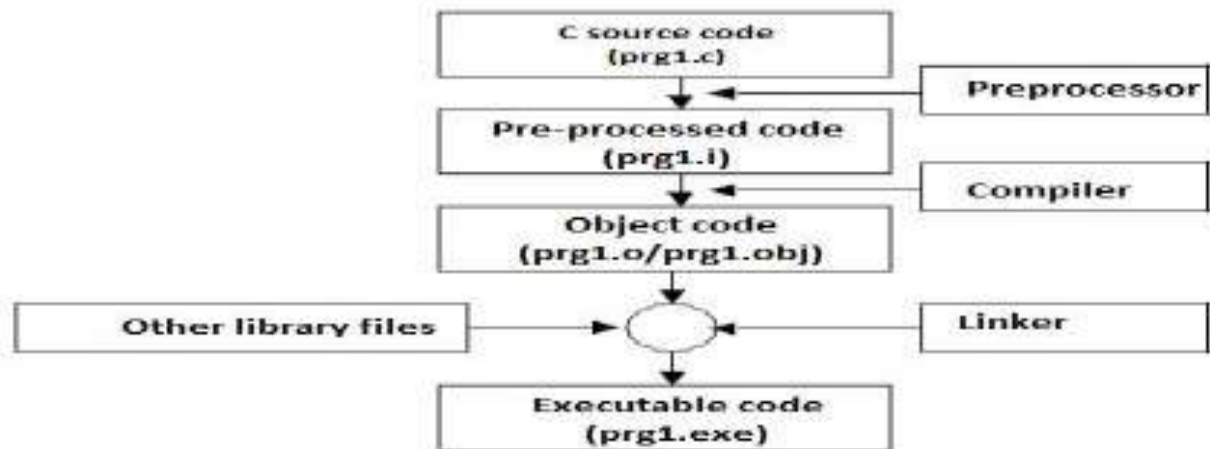
Assembly - Using a Assembler program to convert assembly source code to object code.

Linking - Using a Linker program to convert object code to executable code. Multiple units of object codes are linked to together in this step.

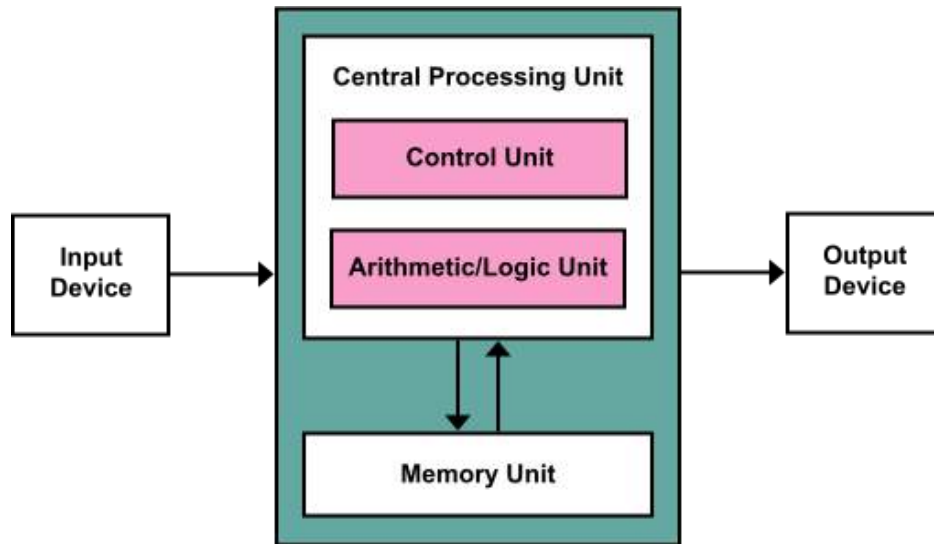
Loading - Using a Loader program to load the executable code into CPU for execution.

Here is a simple table showing input and output of each step in the compilation and execution process:

Input	Program	Output
source code	> Preprocessor	> expanded source code
expanded source code	> Compiler	> assembly source code
assembly code	> Assembler	> object code
object code	> Linker	> executable code
executable code	> Loader	> execution



3. Explain the block diagram of computer. Explain difference between primary memory and secondary memory?



Input: This is the process of entering data and programs in to the computer system. This is done through input device which takes input and performs some processing and gives out processed data. Example: Keyboard, mouse, joystick, light pen.

Central Processing Unit (CPU)

The ALU, Memory and the CU of a computer system are jointly known as the central processing unit. CPU is the brain of any computer system. It is just like brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer functions by activating and controlling the operations. In order to carry out the operations mentioned in the previous section the computer allocates the task between its various functional units. The computer system is divided into three separate units for its operation. They are

Arithmetic Logical Unit (ALU)

Logical Unit: After you enter data through the input device it is stored in the primary storage unit. The actual processing of the data and instruction are performed by Arithmetic Logical Unit. The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing the output is returned back to storage unit for further processing or getting stored.

Control Unit (CU): The next component of computer is the Control Unit, which acts like the supervisor seeing that things are done in proper fashion. Control Unit is responsible for coordinating various operations using time signal. The main functions of control units are given below:

- It performs the data processing operations with the aid of program prepared by the user and send control signals to various parts of the computer system.
- It gives commands to transfer data from the input devices to the memory to an arithmetic logic unit.
- It also transfers the results from ALU to the memory and then to the output devices.

- It stores a program in the memory.
- It fetches the required instruction from the main storage and decode each instruction and hence execute them in sequence.

The memory unit performs the following major functions:

- All data and instructions are stored here before and after processing.
- Intermediate results of processing are also stored here.

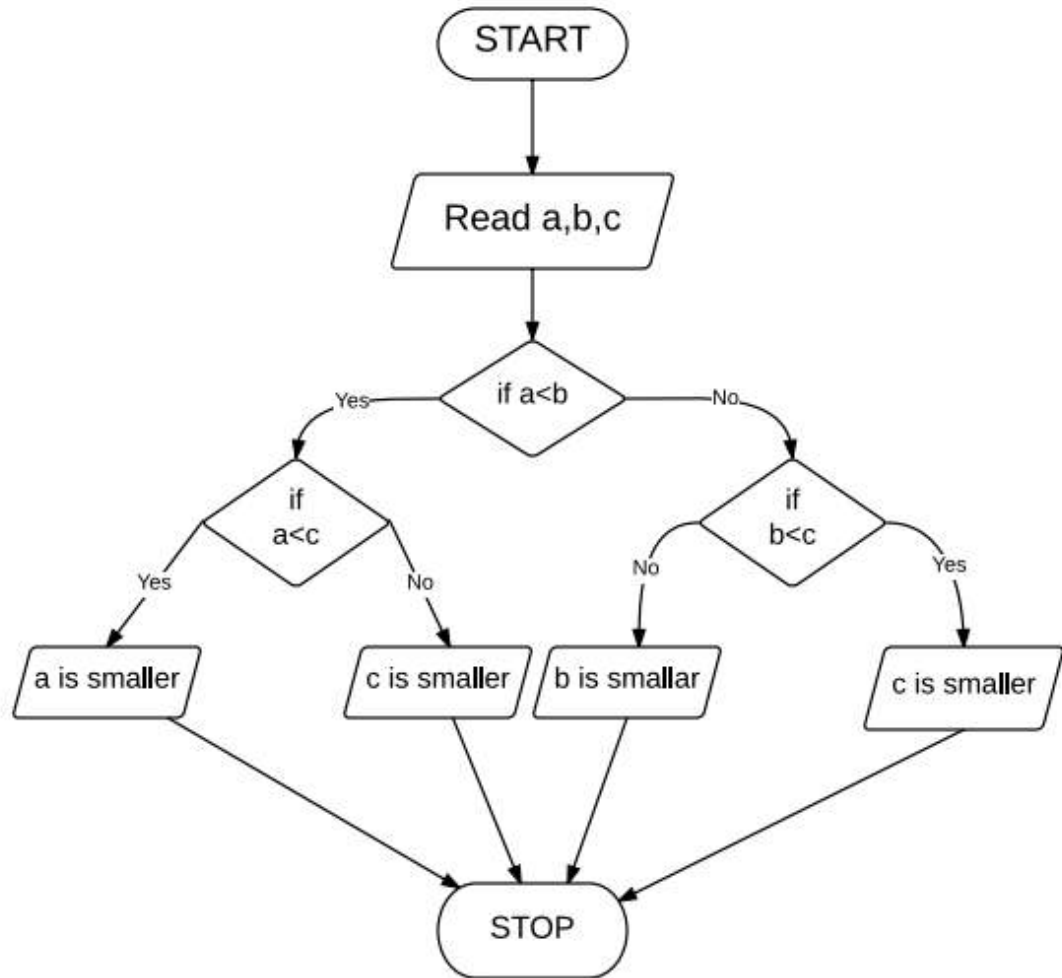
Sr.No.	Primary memory	Secondary memory
1	Primary memory is temporary.	Secondary memory is permanent.
2	Primary memory is directly accessible by Processor/CPU.	Secondary memory is not directly accessible by the CPU.
3	Nature of Parts of Primary memory varies, RAM- volatile in nature. ROM- Non-volatile.	It's always Non-volatile in nature.
4	Primary memory devices are more expensive than secondary storage devices.	Secondary memory devices are less expensive when compared to primary memory devices.
5	The memory devices used for primary memory are semiconductor memories.	The secondary memory devices are magnetic and optical memories.
6	Primary memory is also known as Main memory or Internal memory.	Secondary memory is also known as External memory or Auxiliary memory.
7	Examples: RAM, ROM, Cache memory, PROM, EPROM, Registers, etc.	Examples- Pendrive, CD, Floppydisk

Output Unit: This is the process of producing results from the data for getting useful information. Example: Printer, Monitor, speakers.

4. What is a flowchart? Draw the flowchart to find smallest of three numbers.

A flow chart is a step by step diagrammatic representation of the logic paths to solve a given problem. It is a visual or graphical representation of an algorithm.

Flowchart to find smallest of three numbers



5. What are the various applications of computers?

Computers play a role in every field of life. They are used in homes, business, educational institutions, research organizations, medical field, government offices, entertainment, etc.

Home

Computers are used at homes for several purposes like online bill payment, watching movies or shows at home, home tutoring, social media access, playing games, internet access, etc. They provide communication through electronic mail. They help to avail work from home facility for corporate employees. Computers help the student community to avail online educational support.

Medical Field

Computers are used in hospitals to maintain a database of patients' history, diagnosis, X-rays, live monitoring of patients, etc. Surgeons nowadays use robotic surgical devices to perform delicate operations, and conduct surgeries remotely. Virtual reality technologies are also used for training purposes. It also helps to monitor the fetus inside the mother's womb.

Entertainment

Computers help to watch movies online, play games online; act as a virtual entertainer in playing games, listening to music, etc. MIDI instruments greatly help people in the entertainment industry in recording music with artificial instruments. Videos can be fed from computers to full screen televisions. Photo editors are available with fabulous features.

Industry

Computers are used to perform several tasks in industries like managing inventory, designing purpose, creating virtual sample products, interior designing, video conferencing, etc. Online marketing has seen a great revolution in its ability to sell various products to inaccessible corners like interior or rural areas. Stock markets have seen phenomenal participation from different levels of people through the use of computers.

Education

Computers are used in education sector through online classes, online examinations, referring e-books, online tutoring, etc. They help in increased use of audio-visual aids in the education field.

Government

In government sectors, computers are used in data processing, maintaining a database of citizens and supporting a paperless environment. The country's defense organizations have greatly benefitted from computers in their use for missile development, satellites, rocket launches, etc.

Banking

In the banking sector, computers are used to store details of customers and conduct transactions, such as withdrawal and deposit of money through ATMs. Banks have reduced manual errors and expenses to a great extent through extensive use of computers.

Business

Nowadays, computers are totally integrated into business. The main objective of business is transaction processing, which involves transactions with suppliers, employees or customers. Computers can make these transactions easy and accurate. People can analyze investments, sales, expenses, markets and other aspects of business using computers.

Training

Many organizations use computer-based training to train their employees, to save money and improve performance. Video conferencing through computers allows saving of time and travelling costs by being able to connect people in various locations.

Arts

Computers are extensively used in dance, photography, arts and culture. The fluid movement of dance can be shown live via animation. Photos can be digitized using computers.

Science and Engineering

Computers with high performance are used to stimulate dynamic process in Science and Engineering. Supercomputers have numerous applications in area of Research and Development (R&D). Topographic images can be created through computers. Scientists use computers to plot and analyze data to have a better understanding of earthquakes.

Section –C (8 marks Questions)

6. Write a program to reverse the digits of a number and sum of digits of a number.

Program:

```
#include<stdio.h>
int main()
{
    int num,rev=0,rem,sum=0,original;
    printf("\n Enter a number: ");
    scanf("%d",&num);
    original=num;
    do
    {
        rem=num%10;
        sum=sum+rem;
        rev=rev*10+rem;
        num=num/10;
    }
    while(num>0);
    printf("\nThe reverse of the given number %d is %d",original,rev);
    printf("\nThe sum of digits of the given number %d is %d",original,sum);
    return 0;
}
```

Output:

Enter a number:234

The reverse of the given number 234 is 432

The sum of digits of the given number 234 is 9

7. What are the user-defined data types in C. Explain with example.

A structure is a user defined data type in C/C++. A structure creates a data type that can be used to group items of possibly different types into a single type. 'struct' keyword is used to create a structure.

Example:

```
struct address
{
    char name[50];
    char street[100];
    char city[50];
    char state[20];
    int pin;
};
```

Program using structure:

```
#include<stdio.h>
#include<string.h>
#define MAX 2
struct student
{
    char name[20];
    int roll_no, i;
    float marks;
};
int main()
{
    struct student arr_student[MAX];
    int i;
    for(i = 0; i < MAX; i++ )
    {
        printf("\nEnter details of student %d\n\n", i+1);
        printf("Enter name: ");
        scanf("%s", arr_student[i].name);
        printf("Enter roll no: ");
        scanf("%d", &arr_student[i].roll_no);
        printf("Enter marks: ");
        scanf("%f", &arr_student[i].marks);
    }
}
```

```

printf("\n");
printf("Name\tRoll no\tMarks\n");
for(i = 0; i < MAX; i++)
{
    printf("%s\t%d\t%.2f\n",
        arr_student[i].name, arr_student[i].roll_no, arr_student[i].marks);
}
return 0;
}

```

Output:

Enter details of student 1

Enter name: Jim

Enter roll no: 1

Enter marks: 44

Enter details of student 2

Enter name: Sim

Enter roll no: 2

Enter marks: 76

Name Roll no Marks

Jim 1 44.00

Sim 2 76.00

8. Write a program using functions to find all the roots of a quadratic equation.

Program:

```

#include <math.h>
#include <stdio.h>
#include <stdlib.h>
// Prints roots of quadratic equation ax*2 + bx + x
void findRoots(int a, int b, int c)
{
    // If a is 0, then equation is not quadratic, but
    // linear
    if (a == 0) {
        printf("Invalid");
        return;
    }
    int d = b * b - 4 * a * c;
    double sqrt_val = sqrt(abs(d));
    if (d > 0) {
        printf("Roots are real and different \n");
    }
}

```

```

    printf("%f\n%f", (double)(-b + sqrt_val) / (2 * a),
           (double)(-b - sqrt_val) / (2 * a));
}
else if (d == 0) {
    printf("Roots are real and same \n");
    printf("%f", -(double)b / (2 * a));
}
else // d < 0
{
    printf("Roots are complex \n");
    printf("%f + i%f\n%f - i%f", -(double)b / (2 * a),
           sqrt_val, -(double)b / (2 * a), sqrt_val);
}
}
int main()
{
    int a = 1, b = -7, c = 12;
    // Function call
    findRoots(a, b, c);
    return 0;
}

```

Output

Roots are real and different
4.000000
3.000000

9. Write a program to find sum of two matrices.

Matrix Addition

```

#include <stdio.h>
int main()
{
    int m, n, c, d, first[10][10], second[10][10], sum[10][10];
    printf("Enter the number of rows and columns of matrix\n");
    scanf("%d%d", &m, &n);
    printf("Enter the elements of first matrix\n");
    for (c = 0; c < m; c++)
        for (d = 0; d < n; d++)
            scanf("%d", &first[c][d]);
    printf("Enter the elements of second matrix\n");
    for (c = 0; c < m; c++)
        for (d = 0; d < n; d++)

```

```
        scanf("%d", &second[c][d]);
    printf("Sum of entered matrices:-\n");
    for (c = 0; c < m; c++)
    {
        for (d = 0 ; d < n; d++)
        {
            sum[c][d] = first[c][d] + second[c][d];
            printf("%d\t", sum[c][d]);
        }
        printf("\n");
    }
    return 0;
}
```

Output:

```
Enter the number of rows and columns of matrix
2 2
Enter the elements of first matrix
1 2
3 4
Enter the elements of second matrix
5 6
2 1
Sum of entered matrices:-
6 8
5 5
```