

University of Sargodha

BS 1<sup>st</sup> Term Examination 2015

Subject: Software Engineering      Paper: Programming Fundamentals (CMP-2122)

Time Allowed: 2:30 Hours

Maximum Marks: 40

Objective Part      Compulsory

Note: Attempt all questions each question carry equal marks? (2\*12=24)

- i. What is a **variable**? How to declare a legal variable in C program.
- ii. What is the difference between **high level** and **machine level** language?
- iii. Differentiate **for** and **while** loop?
- iv. How many **main()** functions are define in a C program, justify your answer.
- v. Evaluate the expression,  $y = 6 / 2 * 2 + 3 * 5 + 7$ ;
- vi. If **x** is a variable in C then what is difference b/w **x++& ++x**?
- vii. What is **syntax error**?
- viii. Difference b/w **Prototype** and **definition** of a function.
- ix. Why **break** statement is used in switch structure?
- x. Why a programmer use **fopen()** and **fclose()** function in C program?
- xi. What is the **structure**? Define syntax of structure.
- xii. What is a **pointer**? Write an example of initialization of a pointer?

Subjective: (4\*9=36)

Note: Attempt any four questions.

Q 2. Write a program to calculate the **net pay** of an employee. Input the **basic pay**, pass the **basic pay** to the user defines function **paycalculate()**, calculate the **net pay** and return to main function. Calculate the net pay of an employee:

- **House rent** is 43% of the basic.
- **Medical allowance** is 3% of basic pay if basic pay is greater than Rs.7000/-. It is 5% of basic pay if the basic pay is less or equal than Rs.7000/-.
- **Conveyance allowance** is Rs.96/-. If basic pay is less than or equal Rs.7000/-. It is Rs.193/- if the basic pay is more than Rs.7000/-.
- **Net pay** is calculated by adding basic pay, medical allowance, conveyance allowance and house rent.

Q 3. Write a program that displays the following output using **nested loop**.

```

1 2 3 4 5
 2 4 6 8
   3 6 9
    4 8
     5

```

Q 4. Assuming that a text file named **FIRST.txt** contains some text written into it, write a function named **copyupper()**, that reads the file **FIRST.txt** and create a new file named **SECOND.txt** contains all words from the file **FIRST.txt** in uppercase. (Hint **toupper()** function converts the lowercase letter in C to the corresponding uppercase letter).

Q 5. Write a program that takes 10 elements of array from the user. Find **Maximum** element from the array than **Swap** the **Maximum** element with last element of array. Display array **before and after the swapping**.

Q 6. Write a program that accepts an integer number from the user. Calculate and display its **factorial** by using a **recursive** function.

Q 7. Write a C program that creates a structure **Complex** which represents fields by integers **real** and **imaginary**. Program allows the user to enter the real and imaginary parts of **two complex** numbers. This program calculates the **sum** of **two complex** numbers which will be entered by the user. Program will **add real parts** and **imaginary parts** of **complex numbers** and prints the **sum of complex number** on the screen.

## BSSE 1st term - Past Paper 2015

### Objective Part

i) What is variable? How to declare a legal variable in C program.

Def:

The naming of an address is known as variable. Variable is the name of memory location. We can change value of a variable during execution of program.

When we want to use some data value in our program, we can store it in a memory space and name the memory space so that it become easier to access it.

A programmer can choose a meaningful variable name. Example - average, height, number etc.

int a; → Declaration

data type → variable name

ii) Difference b/w High level and Machine level Language?

High-level Language often used by programmers to write program. Example - C++, Java etc. Computer cannot understand directly.

We can use English and mathematical symbols and many other instruction.



Machine Language :-

Machine Language is only language that is directly understood by the computer, and it does not need to be translated. All instruction written in binary form (0,1).

Machine language near to computer and far from human.

iii) Diff b/w for and while loop?

For Loop :-

```

1
2
3
4
for (initialize/declare; condition; increment/decrement)
{
    statement 1;
    statement n;
}

```

If condition is true (loop) all statement is executed and then increment or decrement and then check condition if condition is false the statement are not execute.

While Loop :-

```

while (condition)
{
    Statement --- n;
    increment/Decrement;
}

```

While loop  $\rightarrow$  one or more statement are executed by checking a condition. If condition is true all the statement are execute. If condition is false the statement cannot be execute.

iv) How many main() function are define in C program, Justify your Answer.

Three function we can define in C program -

i) void main()

ii) int main()

iii) main()

v) Evaluate the expression

$$y = 6/2 * 2 + 3 * 5 + 7;$$

$$y = ((6/2) * 2) + (3 * 5) + 7 \Rightarrow \boxed{y = 28}$$

vi) If  $x$  is a variable in C then what is different between  $x++$  &  $++x$ ?

$x++$  : In postfix form, the increment operator is written after the variable.

$++x$  : In Prefix form, the increment operator is written before the variable.

vii) What is Syntax error?

Syntax error is a type of error that occurs when an invalid statement is written in Program.



viii) Different b/w prototype and definition of a function?

\* Function prototype is a model of a function. It provides information to the compiler about the structure of the function to be used in program. Function prototype end with a semicolon.

It consists of following parts.

- Function Name
- Function return type
- Number and type of parameters

\* Function definition is a set of statement that explain what a function does is called function definition.

It can be written at the following places:

- Before main() function
- After main() function
- In a separate file

ix) Why break statement is used in switch?

The break statement in each case label is used to exist from switch body. If break is not used, all case blocks coming after matching case will also be executed.

x) Why a Programmer use `fopen()` and `fclose()` function in C program?

\* `fopen()` function is used to open a file to perform operation such as reading writing etc.

Declaration:

File \* `fopen` (const char \* filename, const char \* mode)

Example:

FILE \* `fp`;

`fp = fopen` ("filename", "mode");

\* `fclose()` function closes the file that is being pointed by file pointer `fp`.

In C program, we close a file as below.

`fclose(fp);`

xi) What is structure? Define syntax of structure.

Structure is user define datatype in C language which allow us to combine data of different type together. Structure helps to construct a complex data type which is more meaningful.

Syntax:



xii) what is Pointer? write an example of initialization of a pointer?

Pointer is a variable ~~da~~ that stores the address of another variable.

A Pointer in C is used to allocate memory dynamically at run time.

Example :

```
int *ptr;  
int q = 50;  
ptr = &q;  
printf("%d", *ptr);
```

## Subjective

**Q2. Calculate the basic pay.**

```
#include<stdio.h>
double paycalculate(double bpay, double rent, double m_al, double con_al);
int main()
{
    double bpay, rent, m_al, con_al;
    printf("enter your basic pay");
    scanf("%d",&bpay);
    double ans=paycalculate(bpay, rent, m_al, con_al);
    printf("your netpay is %d",ans);
}
double paycalculate(double bpay, double rent, double m_al, double con_al)
{
    rent=43*bpay/100;
    if(bpay<=7000)
    {
        m_al=5*bpay/100;
        con_al=96;
    }
    else
    {
        m_al=3*bpay/100;
        con_al=193;
    }
    double netpay=bpay+ m_al+ rent;
    return netpay;
}
```



Q3. Write a program that display the following output using nested loop.

```

1 2 3 4 5
 2 4 6 8
   3 6 9
    4 8
     5

```

```

#include<Stdio.h>
int main()
{
    int i,j,k=0;
    for(i=1; i<=5; i++)
    {
        for(j=1; j<=5; j++)
        {
            if(j>=i)
            {
                if(i==1)
                    printf("%d",j);
                else if(i==2)
                    printf("%d", (i*j)-2);
                else if(i==3)
                    printf("%d", (i*j)-6);
                else if(i==4)
                    printf("%d", (i*j)-12);
                else
                    printf("%d", (i*j)-20);
            }
            else
                printf(" ");
        }
        printf("\n");
    }
    return 0;
}

```

Q4.

I don't know

**Q5. Write a program that take 10 element of an array from the user. Find maximum element from the array than swap the maximum element with last element of array. Display array before and after swapping.**

```
#include<stdio.h>
int main()
{
    int a[10],max,c,temp;
    printf("enter 10 number");
    for(c=0; c<10; c++)
    {
        scanf("%d",&a[c]);
    }
    max=a[0];
    for(c=1; c<10; c++)
    {
        if(a[c]>max)
        {
            max=a[c];
        }
    }
    printf("Maximum element is %d\n",max);
    printf("before swaping\n");
    printf("maximum value=%d and last number of array=%d\n",max,a[9]);
    printf("after swaping between maximum and last number of Array\n");
    temp=max;
    max=a[9];
    a[9]=temp;
    printf("maximum value=%d and last number of array=%d",max,a[9]);
    return 0;
}
```

**Q6. Write a program that accept an integer number from the user. Calculate and display it factorial by using recursion.**

```
#include<stdio.h>
int factorial(int);
int main()
{
    int n;
    int f;
    printf("Enter an integer to find its factorial\n");
    scanf("%d", &n);

    if (n < 0)
        printf("Factorial of negative integers isn't defined.\n");
    else
    {
        f = factorial(n);
        printf("%d! = %d\n", n, f);
    }

    return 0;
}

int factorial(int n)
{
    if (n == 0)
        return 1;
    else
        return(n * factorial(n-1));
}
```

**Q7.**

I don't know

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