ASSIGNMENT-1

COMPUTER PROGRAMMING(BCSG 0002)

Q1. Write a C program for calculating the price of a product after adding the sales tax to its original price. Where rate of tax and price is inputted by user.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float rate,orgprice,fnlprice;
        printf("Enter rate of tax");
        scanf("%f",&rate);
        printf("Enter price");
        scanf("%f",&orgprice);
        fnlprice=rate+orgprice;
        printf("Final price of the product is %.2f",fnlprice);
        return 0;
}
```

Q2. Write a C program to calculate the weekly wages of an employee. The pay depends on wages per hour and number of hours worked. Moreover, if the employee has worked for more than 30 hours, then he or she gets twice the wages per hour, for every extra hour that he or she has worked.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float ww,wph,hrs;
        printf("Enter wages per hour and no. of hours worked");
        scanf("%f %f",&wph,&hrs);
        if(hrs>30)
```

```
        {ww=30.0*wph+(hrs-30)*2*wph;


        }
        else
        {
        ww=wph*hrs;}
        printf("Weekly wages=%.2f",ww);

}
```

Q3. Mr. X goes to market for buying some fruits and vegetables. He is having a currency of Rs 500 with him for marketing. From a shop, he purchases 2.0 kg Apple priced Rs. 50.0 per kg, 1.5 kg Mango priced Rs.35.0 per kg, 2.5 kg Potato priced Rs.10.0 per kg, and 1.0 kg Tomato priced Rs.15 per kg. He gives the currency of Rs. 500 to the shopkeeper. Find out the amount shopkeeper will return to X by writing a C program.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float amt;
        amt=500-(2.0*50+1.5*35+2.5*10+1.0*15);
        printf("Amount the shopkeeper will return to X is %.2f",amt);
        return 0;
}
```

Q4.Write a C program to print your name, date of birth and mobile number in 3 different lines.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
```

```
        printf(" Name:  Shreeja Singh \n DOB:  10th July 2003 \n Mob No:   6398146733");
        return 0;
}
```

Q5.Write a program to read an integer, a character and a float value from keyboard and display the same in different lines on the screen.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{

 int Integer;
 char Character;
 float Floatvalue;
 printf(" Please Enter a Character :  ");
 scanf("%c", &Character);

 printf(" Please Enter an Integer Value :  ");
 scanf("%d", &Integer);

 printf(" Please Enter Float Value :  ");
 scanf("%f", &Floatvalue);

 printf(" \n The Integer Value that you Entered is :  %d", Integer);
 printf(" \n The Character that you Entered is :  %c", Character);
 printf(" \n The Float Value that you Entered is :  %.2f", Floatvalue);
 return 0;
}
```

Q6.Write a program to print the following line (Assume the total value is contained in a variable named cost)

The sales total is : $ 172.53

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float cost;
        cost=172.53;
        printf("The sales total is:%$ %.2f",cost);
        return 0;
}
```

Q7.Raju got 6 and half apples from each of Raghu, Sheenu and Akash. He wants to know how many apples he has in total without adding them. Write a program which could help Raju in doing this.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float a;
        a=6.5*3;
        printf("Total no. of apples Raju have: %.2f",a);
        return 0;
}
```

Q8.Write a program that prints the floating point value in exponential format correct to two decimal places.

Sol

```
#include<stdio.h>
#include<conio.h>
int main()
{float fpv;
printf("Enter floating point value");
scanf("%f",&fpv);
```

```
printf("Floating point value is %f",fpv);
printf("\nExponential format is %.2e",fpv);
return 0;

}.
```

Q9.Write a program to input and print your mobile number (i.e. of 10 digits).

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        long long int mobileno;
        printf("Enter your mobile no.:");
        scanf("%lld",&mobileno);
        printf("Your mobile no. is:  %lld",mobileno);
        return 0;
}
```

Q10.The population of a city is 30000. It increases by 20 % during first year and 30% during the second year. Write a program to find the population after two years? (Ans: 46800)

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        int ppl=30000,total,fy,sy;
        fy=0.2*ppl+ppl;
        sy=0.3*fy+fy;
        printf("Total population after 2 years:  %d",sy);
        return 0;
}
```

Q11. Write a program to find the ASCII value of a character.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        char c;
        printf("Enter a character");
        scanf("%c",&c);
        printf("ASCII value of %c: %d",c,c);
        return 0;
}
```

Q12. Write a program to calculate salary of an employee, given his basic pay (entered by user), HRA=15% of the basic pay and TA=20% of the basic pay.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float salary,BP,HRA,TA;
        printf("Enter the basic pay of the employee");
        scanf("%f",&BP);
        HRA=0.15*BP;
        TA=0.2*BP;
        salary=BP+HRA+TA;
        printf("Salary of the employee:  %.2f",salary);
        return 0;
}
```

Q13. Write a program to find the slope of a line and angle of inclination that passes through two points P and Q with coordinates (xp, yp) and (xq, yq) respectively.

Sol.

```
#include<stdio.h>
#include<conio.h>
```

```
int main()
{
        float xp,yp,xq,yq,slope,aoi;
        printf("Enter the value of coordinates xp,yp,xq qnd yq");
        scanf("%f %f %f %f",&xp,&yp,&xq,&yq);
        slope=(yq-yp)/(xq-xp);
        aoi=atan(slope);
        printf("Slope of a line is:  %.2f",slope);
        printf("Angle of inclination is:   %.2f",aoi);
        return 0;
}
```

Q14. The SPI (Semester Performance Index) is a weighted average of the grade points earned by a student in all the courses he registered for in a semester. If the grade points associated with the letter grades awarded to a student are g1, g2, g3,…….gk etc. and the corresponding credits are c1, c2, c3,……ck, the SPI is given by:

$$\mathbf{SPI} = \frac{\sum_{i=1}^{k} c_i g_i}{\sum_{i=1}^{k} c_i}$$

Where, k is the number of courses for which the candidate remains registered for during the semester/ trimester. Write a program in C to calculate SPI for k =5.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float g1,g2,g3,g4,g5,c1,c2,c3,c4,c5,SPI;
        printf("Enter 5 grade points awarded to a student");
        scanf("%f %f %f %f %f",&g1,&g2,&g3,&g4,&g5);
        printf("Enter credits");
        scanf("%f %f %f %f %f",&c1,&c2,&c3,&c4,&c5);
        SPI=(g1*c1+g2*c2+g3*c3+g4*c4+g5*c5)/(c1+c2+c3+c4+c5);
        printf("SPI of the student is:  %.2f",SPI);
        return 0;
```

```
}
```

Q 15. Write a program to calculate the frequency (f) of a given wave with wavelength (λ) and speed (c), where c=λ*f.

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float f,w,c;
        printf("Enter wavelength and speed of the given wave");
        scanf("%f %f",&w,&c);
        f=c/w;
        printf("Frequency of the given wave is:   %.2f",f);
        return 0;
}
```

Q 16. A car travelling at 30 m/s accelerates steadily at 5 m/s2 for a distance of 70 m. What is the final velocity of the car? [Hint: v2 = u2 + 2as]

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        int v2,u2=30,a=5,s=70;
        v2=u2+2*a*s;
        printf("Final velocity of the car is:  %d m/s",v2);
        return 0;

}
```

Q 17.A horse accelerates steadily from rest at 4 m/s2 for 3s. (a) What is its final velocity? (b) How far has it travelled? [Hint: (a) v = u + at (b) s = ut + ½at2]

Sol.

```
#include<stdio.h>
```

```
#include<conio.h>
int main()
{
        int u=0,t=3,a=4,v,s;
        v=u+a*t;
        s=u*t+0.5*a*t*t;
        printf("Final velocity of the horse is:  %d m/s",v);
        printf("\nDistance travelled by the horse is:   %d m",s);
        return 0;
}
```

Q 18. Write a program to find the sum of your four last digit of your university roll number

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        long long int rollno;int sum=0,r,c=0;
        printf("Enter your University Roll no.");
        scanf("%lld",&rollno);
        while(c<4)
        {
        r=rollno%10;
        sum=sum+r;
        rollno=rollno/10;
        c++;
}
printf("Sum of four last digits of roll no. is:  %d",sum);
return 0;
}
```

Q19. Write a program to initialize your height and weight in cm. and kgs respectively demonstrating compile time initialization and convert them in feets and pounds respectively. Note :- 1 cm = 0.393701inch , 1 Kg = 2.20462

Sol.

```
#include<stdio.h>
#include<conio.h>
int main()
{
        float h,w,conh,conw;
        printf("Enter height in cm. and weight in kgs respectively");
        scanf("%f %f",&h,&w);
        conh=h*0.393701;
        conw=w*2.20462;
        printf("%f cm. height converted in feets is:%f feets",h,conh);
        printf("\5n%f kgs weight converted in pounds is:%f pounds",w,conw);
        return 0;
}
```

Q 20 . Code the variable declarations for each of following:

a) **A character variable named option.**
b) **An integer variable sum initialized to 0**
c) **A floating point variable, product, initialized to 1**

Sol.

```
#include <stdio.h>

int main()
{
   char option;
   int sum = 0;
   float product = 1.0;

   // Rest of the program goes here

   return 0;
}
```

Q21. Write a program that reads nine integers. Display these numbers by printing three numbers in a line separated by commas.

Sol.

```
#include <stdio.h>
```

```
#include<conio.h>


int main()

{

   int numbers[9];


   // Input nine integers

   printf("Enter nine integers:\n");

   for (int i = 0; i < 9; i++)

   {

      scanf("%d", &numbers[i]);

   }


   // Display the numbers in groups of three

   for (int i = 0; i < 9; i += 3)

   {

      printf("%d, %d, %d\n", numbers[i], numbers[i + 1], numbers[i + 2]);

   }


   return 0;

}
```

Q22. What are header files and what are its uses in C programming?

Sol**.** A header file is a file containing C declarations and macro definitions to be shared between several source files. You request the use of a header file in your program by *including* it, with the C preprocessing directive '`#include`'.

Header files serve two purposes.

- System header files declare the interfaces to parts of the operating system. You include them in your program to supply the definitions and declarations you need to invoke system calls and libraries.
- Your own header files contain declarations for interfaces between the source files of your program. Each time you have a group of related declarations and macro definitions all or most of which are needed in several different source files, it is a good idea to create a header file for them.

Including a header file produces the same results as copying the header file into each source file that needs it. Such copying would be time-consuming and error-prone. With a header file, the related declarations appear in only one place. If they need to be changed, they can be changed in one place, and programs that include the header file will automatically use the new version when next recompiled. The header file eliminates the labor of finding and changing all the copies as well as the risk that a failure to find one copy will result in inconsistencies within a program.

Q23. What will be the output of following program?

```
#include<stdio.h>
int main()
{   int num=070;
printf("%d\t%o\t%x",num,num,num);
}
```

Sol. 56 70 38

Q 24. What will be the output of following program?

```
#include <stdio.h>
void main()

{

int x = printf("GLA UNIVERSITY");

printf("%d", x);

 }
```

Sol. GLA UNIVERSITY14

Q25. What are library functions? List any four library functions

Sol. In C programming language, a ***library function*** is a prewritten piece of code that performs a specific task. These functions are included in ***precompiled libraries***, which can be linked to a program to provide additional functionality. ***Library functions*** can be categorized into two types: ***Standard Library Functions*** and ***User-defined Library Functions***.

There are many standard library functions available in C, including:

1. **string.h:** functions for manipulating strings, such as ***strcpy()*** and ***strlen().***
2. **stdio.h:** ***input/output functions***, such as ***printf()*** and ***scanf().***
3. **math.h:** mathematical functions, such as ***sin()*** and ***sqrt().***
4. **time.h:** functions for working with dates and times, such as ***time()*** and ***localtime().***

Q26. What will be the output of following program?

```
#include <stdio.h>
void main()
{
  int x = printf("C is placement oriented Language") – printf(“Hi”);
  printf("%d %o %x", x,x,x);
}
```

Sol. C is placement oriented LanguageHi30 36 1e

Q27. What is the meaning of following statement?

printf(“%d”,scanf(“%d%d”,&a,&b));

Sol. scanf("%d%d", &a, &b);: This part of the statement reads two integers from the user input and stores them in variables a and b. It uses the format specifier %d twice, expecting two integer inputs separated by whitespace.

printf("%d", ...);: This part of the statement is the printf function that prints the result. However, the result of scanf is the number of successfully read items. In this case, if scanf successfully reads two integers, it will return 2.

So, the statement effectively reads two integers into a and b and then prints 2 using printf.

Q28. What will be the output of following program?

```
#include <stdio.h>
void main()
{
```

```
    printf(" \"C %% FOR %% PLACEMENT\"");
}
```

Sol. "C % FOR % PLACEMENT"

Q29. Suppose distance between GLA University and Delhi is m km (to be entered by user), by BUS you can reach Delhi in 4 hours. Develop a 'C' program to calculate speed of bus.

```
Sol. #include<stdio.h>
#include<conio.h>
int main()
{
        float m,speed;
        printf("Enter distance between GLA university and Delhi in km");
        scanf("%f",&m);
        speed=m/4.0;
        printf("Speed of the bus is:%.2f km/h",speed);
        return 0;
}
```

Q30. In an exam Satyam got 50 marks, Suman got 70 marks and Shyam got 80 marks, Write a 'C' program to find average marks of these three participants.

```
Sol. #include<stdio.h>
#include<conio.h>
int main()
{
        float avg;
        avg=(50+70+80)/3;
        printf("Average marks of three participants is:%.2f",avg);
        return 0;
```

```
}
```

Q31. One day, Mohan called Saurav and Sajal and gave some money to them, later he realized that money that was given to Saurav should be given to Sajal and vice-versa. Develop a 'C' program to help Mohan so that he can rectify his mistake.

Sol.
```
#include<stdio.h>
#include<conio.h>
int main()
{
        float m1,m2,c;
        printf("Enter money given by Mohan to Saurav and Sajal");
        scanf("%f %f",&m1,&m2);
        c=m1;
        m1=m2;
        m2=c;
        printf("After rectifying the problem money given to Saurav is %.2f and money given to Sajal is %.2f",m1,m2);
        return 0;

}
```

Q32. One day when I was going for a lunch, suddenly rain started, I was very hungry so started running with speed of 4km/h and it took 3 min to reach mess. Help me to develop a 'C' program to calculate distance travelled by me.

Sol.
```
#include<stdio.h>
#include<conio.h>
int main()
{
        float speed=4,t=3,d;
        d=(speed*0.28)*(t*60);
        printf("Distance travelled is: %.2f m.",d);
```

```
    return 0;
}
```

Q33. Can two or more escape sequences such as \n and \t be combined in a single line of program code?

Sol. Yes, you can use \n and \t more than one time in single line of code.

Q34. What are comments and how do you insert it in a C program?

Sol. In programming, comments are hints that a programmer can add to make their code easier to read and understand.

There are two ways to add comments in C:

1. `//` - Single Line Comment
2. `/*...*/` - Multi-line Comment

1. Single-line Comments in C

In C, a single line comment starts with `//`. It starts and ends in the same line.

3. Multi-line Comments in C

In C programming, there is another type of comment that allows us to comment on multiple lines at once, they are multi-line comments.

To write multi-line comments, we use the `/*....*/` symbol.

Q35. What is wrong in this statement? scanf("%d",number);

Sol. An ampersand '&' symbol must be placed before the variable name 'number'. Placing '&' means whatever integer value is entered by the user is stored at the "address" of the variable name.

Q36. What will be the output?

```
#include <stdio.h>
    int main()
{
   if (sizeof(int) > -1)
      printf("Yes");
   else
      printf("No");
   return 0;
}
```

Sol. No

Q37. Point out which of the following variable names are invalid:

gross-salary INTEREST , salary of emp , avg. , thereisbookinmysoup

Sol. Invalid variable name: salary of emp, avg.

Q38. Tom works at an aquarium shop on Saturdays. One Saturday, when Tom gets to work, he is asked to clean a 175-gallon reef tank. His first job is to drain the tank. He puts a hose into the tank and starts a siphon. Tom wonders if the tank will finish draining before he leaves work. He measures the amount of water that is draining out and finds that 12.5 gallons drain out in 30 minutes. So, he figures that the rate is 25 gallons per hour. Develop a 'C' program to help Tom to calculate time required to completely clean tank.

Sol.# include <stdio.h>

#include<conio.h>

int main()

{

   float rate = 25.0;   // Rate of draining in gallons per hour

   float tankSize = 175.0; // Size of the tank in gallons

```
    float time;

    // Calculate the time required (tank size divided by draining rate)
    time = tankSize / rate;

    // Display the time in hours
    printf("Tom will take %.2f hours to completely clean the tank.\n", time);

    return 0;
}
```

Q39. The percent y (in decimal form) of battery power remaining x hours after you turn on a laptop computer is y = −0.2 x + 1. Develop a 'C' program to calculate after how many hours the battery power is at 75%?

Sol.
```
#include <stdio.h>
#include<conio.h>
void main()
{
float y=0.75,x;
x=-(y-1)/0.2;
printf("After %.2f hours the battery power is 75%%",x);
return 0;
}
```

Q40.Which of the following is used to convert the high level language in machine language in a single go?

a. Compiler **b.Interpreter**

c. Linker **d.Assembler**

Sol. a. Compiler

Q 41. What is the format specifier for an Octal Number?

a.%0 **b.%d**

c. %o **d. %e**

Sol. c. %o

Q 42. Which format specifier is used to print the exponent value upto 2 decimal places.

a. %e **b.%.2f** **c. %f** **d.%.2e**

Sol. d.%.2e

Q 43. Which of the following is not a basic data type?

a. char

b. array

c. float

d. int

Sol. d. array

Q 44. What is the output of following code?

```
#include<stdio.h>
void main()
{
 int x=0;
 x= printf("\"hello\b\"");
 printf("%d",x);
}
```

a. hello7 **b. "hello"7** **c. "hell"8** **d. hell8**

Sol. c. "hell"8

Q 45. What is the output of following code?

```
#include<stdio.h>
void main()
{
 int b,c=5 ;
 int(“%d , %d”, b,c);
}
```

a. 5, 5 **b. 5, 5.000000**

c. Garbage, 5.000000 **d. Garbage, 5**

Sol. c. Garbage,5.000000

Q46. Which of the following is an identifier?

a. &fact **b. Basic_pay** **c. enum** **d. 1sum**

Sol. b. Basic_pay

Q 47. What is the output of the following program?

```
#include<stdio.h>
void main()
{
  char x, a=’c’;
  x=printf("%c",a);
  printf(“%d”,x);
}
```

a. c1 **b. cgarbage**

c. 1 **c. c**

Sol. a. c1

Q48. Perform the following conversion from Decimal to other number as directed-

a) $(365.55)_{10} = (?)_2$
b) $(453.65)_{10} = (?)_8$
c) $(5164.12)_{10} = (?)_{16}$
d) $(23.65)_{10} = (?)_5$

e) $(772)_{10}$ = $(?)_7$

Sol.a) (365.55)10 =(101101101.10011)2

b) (453.65)10 =(705.51)8

c) (5164.12)10 =(1420.21)16

d) (23.65)10 =(43.3)5

e) (772)10 =(2045)7

Q49. Covert the following numbers to decimal number system-

a) $(325.54)_6 = (?)_{10}$

b) $(1001010110101.1110101)_2 = (?)_{10}$

c) $(742.72)_8 = (?)_{10}$

d) $(AC94.C5)_{16} = (?)_{10}$

Sol.a) (325.54)6 =(125.9444)10

b) $(1001010110101.1110101)_2$ =(5120.90625)10

c) $(742.72)_8$ =(428.90625)10

d) $(AC94.C5)_{16}$ =(44181.76953125)10

Q50. Perform the following conversion from Hexadecimal to other number as directed-

$(DB56.CD4)_{16} = (?)_2, \ (?)_8, \ (?)_4$

Sol. $(DB56.CD4)_{16}$=(1101101101010110.110011010100)2 (33532.3164)8 (331332.3134)4

Q51. Perform the following conversion from octal to other number as directed-

$(473.42)_8 = (?)_2, \ (?)_{10}, \ (?)_{16}, \ (?)_5$

Sol. $(473.42)_8$ =(100111011.100010)2 (315.25)10 (9D.82)16 (214.102)5

Q52. Find the value of A?

a) **$(23)_{10} = (17)_A$**

b) **$(21)_{16} = (41)_A$**

c) **$(32)_8 = (101)_A$**

Sol.

a) $(23)_{10} = (17)_4$

b) $(21)_{16} = (41)_0$

c) $(32)_8 = (101)_1$

Q53: What will be the output of following program? Assume integer is of 2 bytes

```
void main(){
int  a=32770;
printf("%d",a);
}
```

Sol. 32770

Q54:

```
#include <stdio.h>
 int main()
{
 float c = 5.0;
 printf ("Temperature in Fahrenheit is %.2f", (9/5)*c + 32);
 return 0;
}
```

Sol. Temperature in Fahrenheit is 37.00

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