ASSIGNMENT

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.

Ans1.

```c
#include<stdio.h>
#include<conio.h>
int main() {
float price, taxRate, finalPrice;

    printf("Enter the original price of the product: ");
    scanf("%f", &price);

    printf("Enter the sales tax rate (in percentage): ");
    scanf("%f", &tax Rate);

    finalPrice = price + (price * taxRate / 100);

    printf("The final price of the product after adding sales tax is: %.2f\n", finalPrice);

    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.

Ans2.

```c
#include<stdio.h>
#include<conio.h>
int main() {
double hourly_wage, hours_worked, weekly_wages;
    // Input hourly wage and hours worked
    printf("Enter hourly wage: ");
    scanf("%lf", &hourly_wage);
    printf("Enter hours worked this week: ");
```

```
    scanf("%lf", &hours_worked);
    // Calculate weekly wages
    if (hours_worked <= 30) {
        weekly_wages = hourly_wage * hours_worked;
    } else {
        double base_pay = 30 * hourly_wage;
        double extra_hours = hours_worked - 30;
        double extra_pay = 2 * hourly_wage * extra_hours;
        weekly_wages = base_pay + extra_pay;
    }
    // Display the result
    Printf("weekly wages:$%2lf\n",weekly_wages);
    return 0;
}
```

Q.3 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.

Ans3.

```
#include<stdio.h>
#include<conio.h>
int main() {
float applePrice = 50.0;
    float mangoPrice = 35.0;
    float potatoPrice = 10.0;
    float tomatoPrice = 15.0;
    float appleQty = 2.0;
    float mangoQty = 1.5;
    float potatoQty = 2.5;
    float tomatoQty = 1.0;
    float totalCost = (applePrice * appleQty) + (mangoPrice * mangoQty) + (potatoPrice * potatoQty) + (tomatoPrice * tomatoQty);
    float amountGiven = 500.0;
    float change = amountGiven - totalCost;
    if (change >= 0) {
```

```
      printf("Shopkeeper will return Rs. %.2f to Mr. X\n", change);
   } else {
   Printf("Mr.X did not give enough money.he owes Rs.%2f to the shopkeeper\n",-change);
}
return 0;
}
```

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

Ans4.

```
#include <stdio.h>

int main() {

    printf("Name: Advik srivastava\n");

    printf("Date of Birth: 04/03/2005\n");

    printf("Mobile Number:  9696991143\n");

    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.

Ans5.

```
#include<stdio.h>
#include<conio.h>
int main() {
int num;
char ch;
float fnum;
```

```
printf("Enter an integer: ");
scanf("%d, &num);
printf("Enter a character:");
scanf(" %c" , &ch);
printf("\nYou entered:\n");
printf("Integer: %d\n" , num);
printf("character: %c\n", ch);
printf("Float: %.2f\n", fnum);
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

Ans6.

```
#include<stdio.h>
int main() {
    double cost = 172.53;
    printf("The sales total is : $ %.2lf .\n", 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.

Ans7.

```c
#include <stdio.h>
int main() {
    float rajuFromRaghu = 6.5;
    float rajuFromSheenu = 6.5;
    float rajuFromAkash = 6.5;
    float totalApples = rajuFromRaghu + rajuFromSheenu + rajuFromAkash;
    printf("Raju has a total of %.1f apples without adding them.\n", totalApples);
    return 0;
}
```

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

Ans8.

```c
#include <stdio.h>
int main() {
    double number;
    printf("Enter a floating-point number: ");
    scanf("%lf", &number);
    printf("Exponential format: %.2e\n", number);
    return 0;
}
```

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

Ans9.

```c
#include <stdio.h>

int main() {

    long long int mobileNumber;

    printf("Enter your 10-digit mobile number: ");

    scanf("%lld", &mobileNumber);

    if (mobileNumber >= 1000000000 && mobileNumber <= 9955814580)

 {

   printf("Your mobile number is: %lld\n", mobileNumber);

    }

 else {

        printf("Invalid input. Please enter a 10-digit mobile number.\n");

    }

    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?

Ans10.

```c
#include<stdio.h>

int main() {
```

```c
int initialPopulation = 30000;

    initialPopulation = initialPopulation + (initialPopulation * 0.20);

    initialPopulation = initialPopulation + (initialPopulation * 0.30);

    printf("Population after two years: %d\n", initialPopulation);

    return 0;
}
```

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

Ans11.

```c
#include<stdio.h>

int main() {

char ch;

printf("Enter a character: ");

scanf("%c", &ch);

printf("The ASCII value of %c is: %d\n", ch,ch);

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.

Ans12.

```c
#include<stdio.h>

int main() {

float basicPay = 20000, hra, ta, salary;

    hra = 0.15 * basicPay;
```

```
    ta = 0.20 * basicPay;

    salary = basicPay + hra + ta;


    printf("The salary of the employee is: %.2f\n", 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.

Ans13.

```
#include <stdio.h>

#include <math.h>

int main() {

    double xp, yp, xq, yq;

    printf("Enter the coordinates of point P (xp yp): ");

    scanf("%lf %lf", &xp, &yp);

    printf("Enter the coordinates of point Q (xq yq): ");

    scanf("%lf %lf", &xq, &yq);

    double slope = (yq - yp) / (xq - xp);

    double angle = atan(slope) * 180.0 / M_PI;

    printf("The slope of the line is: %.2lf\n", slope);

    printf("The angle of inclination is: %.2lf degrees\n", angle);

    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:

SPI=i=1kcigii=1kci

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.

Ans14.

```c
#include <stdio.h>
int main() {
    int k = 5;
    float grade_points[] = {21,22.18,20,25};
    int credits[] = {4,3,3,2,1};
    float spi = 0.0;
    int i;
    for (i = 0; i < k; i++) {
        spi += grade_points[i] * credits[i];
    }
    spi /= i;
    printf("SPI for k = %d is %.2f\n", k, spi);
    return 0;
}
```

Q15-Write a program to calculate the frequency (f) of a given wave with wavelength (λ) and speed (c), where c=λ*f.

Ans15.

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

```c
int main() {
    double wavelength, speed, frequency;
    printf("Enter the wavelength (λ) in meters: ");
    scanf("%lf", &wavelength);
    printf("Enter the speed (c) of the wave in meters per second: ");
    scanf("%lf", &speed);
    frequency = speed / wavelength;
    printf("The frequency (f) of the wave is %.2lf Hz\n", frequency);
    return 0;
}
```

Q16-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?

Ans16.

```c
#include <stdio.h>
#include <math.h>
int main()
{
    double initial_velocity = 30.0;
    double acceleration = 5.0;
    double distance = 70.0;
    double final_velocity = sqrt(pow(initial_velocity, 2) + 2 * acceleration * distance);
    printf("The final velocity of the car is %.2lf m/s\n", final_velocity);
    return 0;
}
```

Q17-A horse accelerates steadily from rest at 4 m/s2 for 3s. (a) What is its final velocity? (b) How far has it travelled?

Ans17.

```c
#include <stdio.h>
int main() {
    float initial_velocity = 0;
    float acceleration = 4;
    float time = 3;
    float final_velocity = initial_velocity + (acceleration * time);
    float distance_traveled = (initial_velocity * time) + (0.5 * acceleration * time * time);
    printf("Final velocity (v): %.2f m/s\n", final_velocity);
    printf("Distance traveled (s): %.2f meters\n", distance_traveled);
    return 0;
}
```

Q18-Write a program to find the sum of your four last digit of your university roll number .

Ans18.

```c
#include<stdio.h>
int main()
{
    int rollno, sum=0, temp, i;
    printf("Enter your University Roll no.\n");
    scanf("%d", &rollno);
    for(i=0;i<4;i++)
    {
        temp=rollno%10;
        sum=sum+temp;
        rollno=rollno/10;
```

```
        }
        printf("Sum of last four digit:%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

Ans19.

```c
#include <stdio.h>

#define CM_TO_INCH 0.393701

#define KG_TO_POUND 2.20462

const double height_cm = 180.0;

const double weight_kg = 90.0;

int main() {

    double height_inch = height_cm * CM_TO_INCH;

    double weight_pound = weight_kg * KG_TO_POUND;

    printf("Height: %.2f cm = %.2f inches\n", height_cm,
height_inch);

    printf("Weight: %.2f kg = %.2f pounds\n", weight_kg,
weight_pound);

    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

Ans20.

char option; // A character variable named option

int sum = 0; // An integer variable sum initialized to 0

float product = 1.0; // A floating point variable, product, initialized to 1

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

Ans21.

```c
#include <stdio.h>

int main() {

    int numbers[9];

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

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

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

    }

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

        printf("%d", numbers[i])

        if (i % 3 != 2) {

            printf(", ");

        }
```

```
    else {



       printf("\n");

    }

  }

return 0;

}
```

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

Ans22.

Header files are also known as library files. They contain two essential things: the definitions and prototypes of functions being used in a program. Simply put, commands that you use in C programming are actually functions that are defined from within each header files. Each header file contains a set of functions. For example: stdio.h is a header file that contains definition and prototypes of commands like printf and scanf.

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);
}
```
Ans23. Output= 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);
     }
```

Ans24. `Output- GLA UNIVERSITY13`

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

Ans25.

Library functions are built-in functions that are grouped together and placed in a common location called library.

The four types of library functions are:

1.printf()

2.scanf()

3.gets()

4.strlen()

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);


    }
```

Ans26. `30 36 1e`

Q27.   What   is   the   meaning   of   following   statement?
`printf("%d",scanf("%d%d",&a,&b));`

Ans27. It will give the count of integers.

Q28. What will be the output of following program?

```c
#include <stdio.h>
void main()
{
  printf(" \"C %% FOR %% PLACEMENT\"");
}
```

Ans28. `Output-"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.

Ans29.

```c
#include <stdio.h>

int main() {

    double distanceInKm, timeInHours, speed;

    printf("Enter the distance between GLA University and Delhi (in kilometers): ");

    scanf("%lf", &distanceInKm);

    printf("Enter the time taken to reach Delhi (in hours): ");

    scanf("%lf", &timeInHours);

    speed = distanceInKm / timeInHours;

    printf("The speed of the bus is %.2lf km/h\n", 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.

Ans30.

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

```c
int main() {

    int satyam_marks = 50;

    int suman_marks = 70;

    int shyam_marks = 80;

    float average;

    average = (satyam_marks + suman_marks + shyam_marks) / 3.0;

    printf("Average Marks: %.2f\n", average);

    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.

Ans31.

```c
#include <stdio.h>


int main() {


    int saurav_money, sajal_money;


    printf("Enter the money given to Saurav: ");

    scanf("%d", &saurav_money);

    printf("Enter the money given to Sajal: ");

    scanf("%d", &sajal_money);
```

```c
    int temp = saurav_money;

    saurav_money = sajal_money;

    sajal_money = temp;


    printf("After rectifying the mistake:\n");

    printf("Saurav now has: %d\n", saurav_money);

    printf("Sajal now has: %d\n", sajal_money);


    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.

Ans32.

```c
#include <stdio.h>
int main()
 {
    float speed = 4.0;

    float time = 0.05;

    float distance = speed * time;

    printf("You traveled %.2f kilometers.\n", distance);

    return 0;
}
```

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

Ans33. `printf("Hello\tWorld\n");`

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

Ans34.

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

Ans35. There should be & befopre number because & stores the input in thec upcoming variable i.e, in the 'number'.

Q36. What will be the output?

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

Ans36. No

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

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

Ans37. Invalid variable name-

a. gross-salary INTEREST
b. salary of emp
c. 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.

Ans38.

```c
#include <stdio.h>

int main() {

    float tank_capacity = 175.0; // in gallons

    float drain_rate = 25.0; // in gallons per hour


    // Time required to drain the tank completely

    float time_required = tank_capacity / drain_rate;


    printf("Time required to completely drain the tank: %.2f hours\n", time_required);


    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%?

Ans39.

```c
#include <stdio.h>
int main() {
    float battery_percent = 0.75; // in decimal form


    // Time after which the battery power is at 75%
```

float time = (battery_percent - 1) / -0.2;

    printf("The battery power will be at 75%% after %.2f hours\n", time);

    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

Ans40. a. Compiler

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

a.%0   b.%d

c. %o   d. %e

Ans41. 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

Ans42. b. %.2f

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

a. char

b. array

c. float

d. int

Ans43. b. 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

Ans44. 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

Ans45. d. Garbage,5

Q46. Which of the following is an identifier?

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

Ans46. c. enum

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

Ans47. 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) $(772)_{10} = (?)_7$

Ans48. a) $(365.55)10 = (101101101.1001)2$

b) $(453.65)10 = (1065.52)8$

c) $(5164.12)10 = (142C.1EB8)16$

d) $(23.65)10 = (43.1)5$

e) $(772)10 = (3123)7$

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

Ans49. Ans- a) $(325.54)6 = (1953.24)10$

b) $(1001010110101.1110101)2 = (4797.90625)10$

c) $(742.72)8 = (490.578125)10$

d) $(AC94.C5)16 = (44244.7734375)10$

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

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

Ans50. a) $(DB56.CD4)16 = (1101101101010110.1100110101)2$

b) $(DB56.CD4)16 = (66526632.625)8$

c) $(DB56.CD4)16 = (3326.D25)4$

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

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

Ans51. a) $(473.42)8 = (100111011.100010)2$

 b) $(473.42)8 = (315.625)10$

c) $(473.42)8 = (1DB.84)16$

d) $(473.42)8 = (1324.10101)5$

Q52. Find the value of A?

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

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

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

Ans52. a) $(23)10 = (17)7$

B) $(21)16 = (65)4$

C) $(32)8 = (65)5$

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

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

Ans53. **32770**

Q54:
```
#include <stdio.h>
 int main()
{
 float c = 5.0;
 printf ("Temperature in Fahrenheit is %.2f", (9/5)*c + 32);
 return 0;
}
```

Ans54.

Temperature in Fahrenheit is 41