

C PROGRAM ASSIGNMENT

Q.1- Write a c program to calculate price of a product after adding sales tax to its original price. Where rate of price and tax is inputted by the use.

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

float originalprice, taxrate, totalprice;

//input original price and original tax rate

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

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

//calculate total price including tax
totalprice = originalprice*(originalprice*taxrate/100);

printf("The total price after adding %.2f%% tax is :%.2f\n",taxrate,totalprice);

return 0;
}
```

Q.2- - Write a c program to calculate the weekly wages of an employee. The pay depend on wages per hours and no. of hours worked. Moreover, if the employee has worked for more than 30 hours, then he or she get twice the wages per hours, for every extra hour that he or she worked.

```
#include<stdio.h>

int main() {
int hourlywages;
int hoursworked;

//Input hourlywages hoursworked
printf("Enter the hourlywages: ");
scanf("%d",&hourlywages);

printf("Enter the hoursworked: ");
scanf("%d",&hoursworked);

int regularPay = 0;
int extraPay = 0;

if(hoursworked <= 30){
regularPay = hourlywages*hoursworked;
}
```

```

else{
    regularPay = hourlywages*30;
    extraPay = (hoursworked-30)*(hourlywages*2);
}

//total weekly wages
int totalwages=regularPay+extraPay;

printf("weekly wages:%.2d\n",totalwages);
return 0;
}

```

Q.3- Mr. X goes to market for buying some fruits and vegetables. He having a currency of 500 rs with him for marketing. From a shop he purchase 2.0kg apple priced rs 50.0 per kg, 1.5 kg mango priced rs 35.0 per kg 2.5 kg potato priced rs 10 per kg, and 1.0 kg tomato priced rs 15 per kg. He gave the currency of rs 500 to the shopkeeper. Find the amount shopkeeper X return by writing a c program.

```

#include<stdio.h>
int main() {
    float balance=500.0;

    float apple_price=50.0;
    float mango_price=35.0;
    float potato_price=10.0;
    float tomato_price=15.0;

    float apple_bought=2.0;
    float mango_bought=1.5;
    float potato_bought=2.5;
    float tomato_bought=1.0;

    //calculate total cost of each item
    float
total_cost=(apple_bought*apple_price)+(mango_bought*mango_price)+(potato_bought*potato_price)+(tomato_bought*tomato_price);

    balance-=total_cost;
    printf("Amount returned by the shopkeeper:%.2f rupees\n",balance);
    return 0;
}

```

Q.4- Write c program to print your name, date of birth and mobile no. in 3 different lines.

```

#include<stdio.h>
int main() {
    //print your name
    printf("Name:Nitin Kumar Khare\n");

    //print your date of birth
    printf("Date of birth: June 20,2006\n");

    //print your mobile no.
    printf("Mobile number:8176944347");

    return 0;
}

```

Q.5- 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.

```
#include<stdio.h>
int main() {
    int integer;
    char character;
    float floating;

    printf("Enter an integer: ");
    scanf("%d", &integer);

    printf("Enter a character: ");
    scanf("%c", &character);

    printf("Enter a float value: ");
    scanf("%f", &floating);

    printf("\n");
    printf("integer:%d\n",integer);
    printf("character:%c\n",character);
    printf("float:%f\n",floating);
    return 0;
}
```

Q.6- Write the program to print the following line(Assume the total value is contained in a variable named cost).The sale total is:\$172.53

```
#include<stdio.h>
int main() {
    // assume the cost is stored in a variable named 'cost'
    float cost=172.53;
    printf("The sale is $ %.2f\n",cost);
    return 0;
}
```

Q.7- Raju got 6 and half apples from eaach of Raghu,Sheenu and Akash.He want to know how many apples he has in total without adding them.Write a program which could help Raju in doing this.

```
#include<stdio.h>

int main() {
    float apples_from_each=6.5;
    //number of apples from each person
    int num_people=3;
    //number of people (Raghu,Sheenu and Akash);

    float total_apples=(apples_from_each*num_people);

    printf("Raju has %.2f apples in total without adding them.\n",total_apples);
    return 0;
}
```

Q.8- Write a program that prints the floating point value in exponential format correct to two decimal places.

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

```

float floatvalue=123.456789;
printf("%.2f\n",floatvalue);
return 0;
}

```

Q.9- Write a program to input and print your mobile no.(i.e. of 10 digits).

```

#include<stdio.h>
int main() {
    int mobile_number;
    printf("Enter your 10 digit mobile number : ");
    scanf("%d",&mobile_number);
return 0;
}

```

Q.10- The population of a city is 30000.It increases by 20% during first and 30% by second year.Write a program to find the population after 2 years?

```

#include<stdio.h>
int main() {
    int population=30000;

    int increase1=population*0.20;
    population=population+increase1;

    int increase2=population*0.30;
    population=population+increase2;

    printf("population after 2 years:%d\n",population);
return 0;
}

```

Q.11- Write a program to find ASCII value of a character.

```

#include<stdio.h>
int main() {
    char character;

    printf("Enter a character: ");
    scanf("%c",&character);

    printf("ASCII value of  %c is %d\n",character,character");

return 0;
}

```

Q.12- 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.

```

#include<stdio.h>
int main() {
    float basicpay,HRA,TA,salary;

    printf("Enter the basicpay: ");
    scanf("%f",&basicpay);

    HRA=0.15*basicpay;
    TA=0.20*basicpay;

    salary=basicpay+HRA+TA;
    printf("salary=%.2f\n",salary);
}

```

```
return 0;
}
```

Q.13-Write a program to find the slope of a line and a angle of inclination that passes through two points P and Q with coordinates(xp,yp)and(xq,yq) respectively.

```
#include <stdio.h>

#include <math.h>

int main() {
    double xp, yp, xq, yq;

    // Input coordinates of points P and Q
    printf("Enter the x-coordinate of point P: ");
    scanf("%lf", &xp);
    printf("Enter the y-coordinate of point P: ");
    scanf("%lf", &yp);
    printf("Enter the x-coordinate of point Q: ");
    scanf("%lf", &xq);
    printf("Enter the y-coordinate of point Q: ");
    scanf("%lf", &yq);

    // Calculate the slope
    double slope;
    if (xq - xp == 0) {
        // Handling the case when the line is vertical (undefined slope)
        printf("The slope of the line passing through P and Q is undefined (vertical line).\n");
    } else {
        slope = (yq - yp) / (xq - xp);
        printf("The slope of the line passing through P and Q is: %.2lf\n", slope);
    }

    // Calculate the angle of inclination in degrees
    double angle_rad = atan(slope);
    double angle_deg = angle_rad * 180 / M_PI;

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

    return 0;
}
```

Q.14- 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 point associated with the letter grade awarded to students are g1,g2,g3,.....gk etc. and the corresponding credits are c1,c2,c3,.....ck,the SPI is given by where k is no. of courses for which the candidates remains registered for during the semester/trimester.write aa c program to calculate SPI for k=5.

```
#include <stdio.h>

int main() {
    int k = 5; // Number of courses
    double grade_points[k];
    int credits[k];
    double spi = 0.0;
```

```

// Input grade points and credits for each course
printf("Enter grade points and credits for each course:\n");
for (int i = 0; i < k; i++) {
    printf("Course %d - Grade Point: ", i + 1);
    scanf("%lf", &grade_points[i]);
    printf("Course %d - Credits: ", i + 1);
    scanf("%d", &credits[i]);
}

// Calculate SPI
double total_weighted_points = 0.0;
int total_credits = 0;

for (int i = 0; i < k; i++) {
    total_weighted_points += grade_points[i] * credits[i];
    total_credits += credits[i];
}

if (total_credits > 0) {
    spi = total_weighted_points / total_credits;
    printf("SPI for the semester/trimester is: %.2lf\n", spi);
} else {
    printf("Invalid input: Total credits should be greater than zero.\n");
}

return 0;
}

```

Q.15- Write a program to calculate the frequency(f) of a given wave with wavelength (w) and speed (C),where $c=w \cdot p$.

```

#include <stdio.h>

int main() {
    double wavelength, speed, frequency;

    // Input wavelength and speed
    printf("Enter the wavelength (in meters): ");
    scanf("%lf", &wavelength);
    printf("Enter the speed of the wave (in meters per second): ");
    scanf("%lf", &speed);

    // Calculate the frequency
    if (wavelength > 0 && speed > 0) {
        frequency = speed / wavelength;
        printf("The frequency of the wave is: %.2lf Hz\n", frequency);
    } else {
        printf("Invalid input: Wavelength and speed should be greater than zero.\n");
    }

    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?

```

#include <stdio.h>

#include <math.h>

int main() {
    double initial_velocity = 30.0; // Initial velocity in m/s
    double acceleration = 5.0; // Acceleration in m/s^2
    double distance = 70.0; // Distance in meters
    double final_velocity;
}

```

```

// Calculate the final velocity using the kinematic equation
final_velocity = sqrt(initial_velocity * initial_velocity + 2 * acceleration * distance);

printf("The final velocity of the car is: %.2lf m/s\n", final_velocity);

return 0;
}

```

Q.17- A horse accelerates steadily from rest at 4 m/s² for 3 s.(a)what is its final velocity? (b)How far has it travelled?

```

#include <stdio.h>

int main() {
    double initial_velocity = 0.0; // Initial velocity in m/s (starting from rest)
    double acceleration = 4.0; // Acceleration in m/s^2
    double time = 3.0; // Time in seconds
    double final_velocity, distance;

    // Calculate the final velocity using v_f = v_i + at
    final_velocity = initial_velocity + acceleration * time;

    // Calculate the distance traveled using s = v_i * t + (1/2) * a * t^2
    distance = initial_velocity * time + 0.5 * acceleration * time * time;

    printf("(a) The final velocity of the horse is: %.2lf m/s\n", final_velocity);
    printf("(b) The distance traveled by the horse is: %.2lf meters\n", distance);

    return 0;
}

```

Q.18- Write a program to find sum of your last four digit of your university roll.no.

```

#include <stdio.h>
#include <string.h>

int main() {
    char rollNumber[20];
    int length, sum = 0;

    printf("Enter your university roll number: ");
    scanf("%s", rollNumber);

    length = (rollNumber);

    if (length < 4) {
        printf("Invalid roll number: It should have at least 4 digits.\n");
        return 1;
    }

    for (int i = length - 4; i < length; i++) {
        if (rollNumber[i] >= '0' && rollNumber[i] <= '9') {
            sum += rollNumber[i] - '0';
        }
    }

    printf("Sum of the last four digits of your roll number: %d\n", sum);

    return 0;
}

```

Q.19- Write a program to initialize your height and weight in cm. and kgs respectively demonstrating compile time initialization and convert them in feet and pounds respectively.(Note:- 1cm=0.393701 inch,1 kg=2.20462)

```
#include <stdio.h>

#define CM_TO_FEET 0.0328084
#define KG_TO_POUNDS 2.20462

const double heightInCm = 175.0;
const double weightInKg = 70.0;

int main() {

    int heightInFeet = heightInCm * CM_TO_FEET;
    int weightInPounds = weightInKg * KG_TO_POUNDS;

    printf("Height in feet: %.2d\n", heightInFeet);
    printf("Weight in pounds: %.2d\n", weightInPounds);

    return 0;
}
```

Q.20- Code the variable declaration 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

```
(a) char option;
(b) int sum = 0;
(c) float product = 1.0;
```

Q.21- Write a program that reads nine integers. Display these number by printing three numbers in a line separated by commas.

```
#include <stdio.h>

int main() {
    int numbers[9];

    // Read nine integers
    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;
}

```

Q.22- What are header files and what are its use in c programming?

Header files in C programming are files that contain declarations and sometimes definitions of functions, variables that can be shared across multiple source code files. These files typically have a '.h' extension.

Q.23- What is the output of the following program.

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

```
Int main() {
```

```
Int num=070;
```

```
Printf(“%d\t%o\t%x”,num,num,num);
```

```
}
```

➤ Output = 56 70 38

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

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

```
Void main() {
```

```
Int x=printf(“GLA UNIVERSITY”);
```

```
Printf(“%d”,x);}
```

➤ GLA UNIVERSITY14

Q.25- What are library functions ?List any four library functions.

functions, also known as standard library functions, are pre-written and pre-compiled functions provided by the C standard library or other libraries. These functions perform common tasks, such as input/output operations, string manipulation, mathematical calculations, memory management, and more .

(1)Printf

(2)scanf

(3)strlen

(4)rand

Q.26-What will be the output of the following program?

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

```
Void main() {
```

```
Int x=printf("c is placement orientation language")-printf("Hi");
```

```
Printf("%d",scanf("%d%d",&a,&b));
```

```
}
```

➤ c is placement orientation languageHi30

➤ 2

Q.27-What is the meaning of following program?

```
Printf("%d",scanf("%d%d",&a,&b));
```

. 1. It waits for the user to input two integers, separated by whitespace.

2. It stores these two integers in the variables a and b.

3. It then prints the return value of scanf, which is 2, using printf.

So, if the user enters two integers separated by whitespace, the program will print 2 to the console

Q.28-What will be the output of the following program?

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

```
Void main() {
```

```
Printf("\nC%%FOR%%PLACEMENT");
```

```
}
```

➤ "C%%FOR%%PLACEMENT"

Q.29-Suppose distance between GLA UNIVERSITY and Delhi is m km(to be entered by the user),by bus you can reach delhi in 4 hours .Develop a c program to calculate speed of bus.

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

```
int main() {  
    double distance, time, speed;
```

```

// Prompt the user for the distance in kilometers
printf("Enter the distance from GLA UNIVERSITY to Delhi in kilometers: ");
scanf("%lf", &distance);

// Given time in hours
time = 4.0; // 4 hours

// Calculate speed in kilometers per hour (km/h)
speed = distance / time;

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

return 0;
}

```

Q.30- 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 participant.

```

#include <stdio.h>

int main() {
    int satyam_marks = 50;
    int suman_marks = 70;
    int shyam_marks = 80;
    int total_marks;
    float average_marks;

    total_marks = satyam_marks + suman_marks + shyam_marks;

    average_marks = (float)total_marks / 3;

    printf("The average marks of Satyam, Suman, and Shyam are: %.2f\n", average_marks);

    return 0;
}

```

Q.31- 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.

```

int main() {
    double saurav_money, sajal_money, temp;

    printf("Enter the amount of money given to Saurav: ");
    scanf("%lf", &saurav_money);
    printf("Enter the amount of money given to Sajal: ");
    scanf("%lf", &sajal_money);

    temp = saurav_money;
    saurav_money = sajal_money;
    sajal_money = temp;
}

```

```

printf("After rectifying the mistake:\n");
printf("Amount of money given to Saurav: %.2lf\n", saurav_money);
printf("Amount of money given to Sajal: %.2lf\n", sajal_money);

return 0;
}

```

Q.32- One day when I was going for a lunch suddenly rain started I was very hungry so started running with speed 4km/h and it took 3 min to reach mess.Help me to develop c program to calculate distance travelled by me.

```

#include <stdio.h>

int main() {
    double speed_kmph = 4.0;
    double time_minutes = 3.0;
    double time_hours = time_minutes / 60.0;

    double distance_km = speed_kmph * time_hours;

    printf("Distance traveled: %.2lf kilometers\n", distance_km);

    return 0;
}

```

Q.33-Can two or more escape sequences such as \n and \t be combined in a single line of a program code.

Yes, you can combine multiple escape sequences in a single line of a C program code

Q.34-what are comments and how do you insert it in a c program.

Comments in a C program are text annotations that are not executed as code. They are used to add explanations, documentation, or notes within your source code to make it more readable and understandable for both yourself and others who may read or maintain the code in the future.

Single-line comments:

- Single-line comments begin with `//`.
- Anything after `//` on the same line is considered a comment and is ignored by the compiler

Q.35-What is wrong in this statement?scanf("%d",number);

The statement `scanf("%d", number);` appears to be incorrect because we need to provide the address of the variable using the `&` operator. Here's the corrected statement:

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

Q.36-what will be the output?

```

#include<stdio.h>
int main() {
if (size(int)>-1)
printf("yes");
else

```

```
printf("no");
return 0;
}
```

Output = yes

Q.37- Point out which of the following variables names are invalid: gross-salary INTEREST, salary of emp, avg., thereisbookinmysoup.

- gross-salary - Valid: Variable names can include hyphens.
- INTEREST - Valid: Variable names can be in all uppercase letters.
- salary of emp - Invalid: Variable names cannot have spaces.
- avg. - Invalid: Variable names cannot include periods (.) as part of the name.
- thereisbookinmysoup - Valid: This variable name consists of alphanumeric characters and is valid.

So, the invalid variable names are "salary of emp" and "avg.".

Q.39-The percent y(in decimal form) of battery power remaining x hours after you turn on a laptop computer is $y = -0.2x + 1$. Develop a c program to calculate after how many hours the battery power is at 75%?

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

int main() {
    float batteryPower = 0.75;
    float x;

    x = (batteryPower - 1) / -0.2;

    printf("It takes approximately %.2f hours for the battery power to reach 75%.\n", x);

    return 0;
}
```

Q.40-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

a. compiler

Q.41- What is the format specifier for an octal number?

a. %0 b. %d c. %o d. %e

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

d. %2e

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

a. char b. array c. float d. int

b. array

Q.44- What is the output of the 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

a. hello7

Q.45- What is the output of the 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

d. Garbage, 5

Q.46- Which of the following is an identifier?

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

b. Baic_pay

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

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

```
Void()
```

```
{
```

```
Char x,a='c';
```

```
x=printf("%c",a);
```

```
printf("%d",x);
```

```
}
```

a. c1 b. cgarbage c. 1c d. c

a. c1

Q.48- 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) $(772)_{10} = (?)_7$

a) $(365.55)_{10} = (101101101.100011)_2$

b) $(453.65)_{10} = (705.2)_8$

c) $(5164.12)_{10} = (1434.1)_{16}$

d) $(23.65)_{10} = (43.113)_5$

e) $(772)_{10} = (2034)_7$

Q.49- Convert the following number to decimal number system-

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

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

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

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

- a) $(325.54)_6 \approx 125.9444$
- b) $(1001010110101.1110101)_2 = 9215.875$
- c) $(742.72)_8 = 482.125$
- d) $(AC94.C5)_{16} \approx 44180.765625$

Q.50- Perform the following conversion from Hexadecimal to other number as directed-

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

Q.51- Perform the following conversion from octal to other number as directed-

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

Q.52- Find the value of A?

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

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

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

Q.53- What will be the output of the following program? Assume integer is of 2 bytes.

```
Void main() {
    Int a=32770;
    Printf("%d",a);
}
```

➤ -32766

Q.54- #include<stdio.h>

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

Temperature in Fahrenheit is 41.000000

