**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.

#include <stdio.h>

int main() {

float originalPrice, taxRate, totalPrice;

printf("Enter the original price of the product");

scanf("%f", &originalPrice);

printf("Enter the sales tax rate (in percentage)");

scanf("%f", &taxRate);

totalPrice = originalPrice + (originalPrice \* (taxRate / 100.0));

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

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.

#include <stdio.h>

int main() {

float wages\_per\_hour, hours\_worked, weekly\_wages;

printf("Enter wages per hour: ");

scanf("%f", &wages\_per\_hour);

printf("Enter hours worked: ");

scanf("%f", &hours\_worked);

if (hours\_worked <= 30) {

weekly\_wages = wages\_per\_hour \* hours\_worked;

} else {

float base\_pay = wages\_per\_hour \* 30;

float extra\_hours = hours\_worked - 30;

float extra\_pay = wages\_per\_hour \* 2 \* extra\_hours;

weekly\_wages = base\_pay + extra\_pay;

}

printf("Weekly wages: %.2f\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.

#include <stdio.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 = (appleQty \* applePrice) + (mangoQty \* mangoPrice) + (potatoQty \* potatoPrice) + (tomatoQty \* tomatoPrice);

float amountGiven = 500.0;

float amountReturned = amountGiven - totalCost;

if (amountReturned >= 0) {

printf("Amount to be returned: Rs. %.2f\n", amountReturned);

} else {

printf("Mr. X does not have enough money to make the purchase.\n");

}

return 0;

}

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

#include <stdio.h>

int main() {

char name[] = "Abhinav Kumar Jha";

char dob[] = "05/02/2003";

char mobile[] = "111-222-3333";

printf("Name: %s\n", name);

printf("Date of Birth: %s\n", dob);

printf("Mobile Number: %s\n", mobile);

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.

#include <stdio.h>

int main() {

int integerNumber;

char character;

float floatNumber;

printf("Enter an integer: ");

scanf("%d", &integerNumber);

printf("Enter a character: ");

scanf(" %c", &character);

printf("Enter a float: ");

scanf("%f", &floatNumber);

printf("You entered:\n");

printf("Integer: %d\n", integerNumber);

printf("Character: %c\n", character);

printf("Float: %.2f\n", floatNumber);

return 0;

}

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

#include <stdio.h>

int main() {

double cost = 172.53;

printf("The sales total is: %.2f\n", cost);

return 0;

}

The sales total is : $ 172.53

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.

#include<stdio.h>

int main()

{

float appleperperson=6.5;

float total = appleperperson\*3;

printf("total apples with Raju is %.2f without actually adding them up.",total);

}

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

#include <stdio.h>

int main() {

double floatValue = 12345.6789;

printf("%.2e\n", floatValue);

return 0;

}

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

#include <stdio.h>

int main() {

long long int mobileNumber;

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

scanf("%lld", &mobileNumber);

if (mobileNumber >= 1000000000LL && mobileNumber <= 9999999999LL) {

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? (Ans: 46800)

#include <stdio.h>

int main() {

int initialPopulation = 30000;

float growthRateYear1 = 0.20;

float growthRateYear2 = 0.30;

int populationYear1 = initialPopulation + (initialPopulation \* growthRateYear1);

int populationYear2 = populationYear1 + (populationYear1 \* growthRateYear2);

printf("Population after the first year: %d\n", populationYear1);

printf("Population after the second year: %d\n", populationYear2);

return 0;

}

Q11. Write a program to find the 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;

}

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.

#include <stdio.h>

int main() {

float basicPay, hra, ta, salary;

printf("Enter the basic pay: ");

scanf("%f", &basicPay);

hra = 0.15 \* basicPay;

ta = 0.20 \* basicPay;

salary = basicPay + hra + ta;

printf("Salary breakdown:\n");

printf("Basic Pay: %.2f\n", basicPay);

printf("HRA (15%% of Basic Pay): %.2f\n", hra);

printf("TA (20%% of Basic Pay): %.2f\n", ta);

printf("Total Salary: %.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.

#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);

double angle\_degrees = angle \* (180.0 / M\_PI);

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

printf("Angle of inclination in radians: %.2lf\n", angle);

printf("Angle of inclination in degrees: %.2lf\n", angle\_degrees);

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:

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.

#include <stdio.h>

int main() {

int k = 5; // Number of courses

double grades[k]; // Array to store grade points

double credits[k]; // Array to store credits

// 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: ", i + 1);

scanf("%lf %lf", &grades[i], &credits[i]);

}

// Calculate SPI

double spi = 0.0;

double total\_credits = 0.0;

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

spi += (grades[i] \* credits[i]);

total\_credits += credits[i];

}

if (total\_credits == 0) {

printf("Total credits cannot be zero.\n");

} else {

spi /= total\_credits;

printf("SPI: %.2lf\n", 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.

#include <stdio.h>

int main() {

double wavelength, speed, frequency;

printf("Enter the wavelength (λ) in meters: ");

scanf("%lf", &wavelength);

printf("Enter the speed (c) in meters per second: ");

scanf("%lf", &speed);

frequency = speed / wavelength;

printf("The frequency (f) of the wave is: %.2lf Hz\n", frequency);

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]

#include <stdio.h>

#include <math.h>

int main() {

double u = 30.0;

double a = 5.0;

double s = 70.0;

double v = sqrt(u\*u + 2\*a\*s);

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

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 ]

#include <stdio.h>

int main() {

float initial\_velocity = 0;

float acceleration = 4.0;

float time = 3.0;

float final\_velocity = initial\_velocity + (acceleration \* time);

float distance\_traveled = (initial\_velocity \* time) + (0.5 \* acceleration \* time \* time);

printf("Final velocity: %.2f m/s\n", final\_velocity);

printf("Distance traveled: %.2f meters\n", distance\_traveled);

return 0;

}

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

#include <stdio.h>

int main() {

int roll\_number = your\_roll\_number;

int last\_four\_digits = 0;

int sum = 0;

last\_four\_digits = roll\_number % 10000;

while (last\_four\_digits > 0) {

sum += last\_four\_digits % 10;

last\_four\_digits /= 10;

}

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

**#include <stdio.h>**

**#define CM\_TO\_INCH 0.393701**

**#define KG\_TO\_POUND 2.20462**

**const double heightInCm = 175.0;**

**const double weightInKg = 70.0;**

**int main() {**

**double heightInInches = heightInCm \* CM\_TO\_INCH;**

**double heightInFeet = heightInInches / 12.0;**

**double weightInPounds = weightInKg \* KG\_TO\_POUND;**

**printf("Height: %.2f cm\n", heightInCm);**

**printf("Height: %.2f feet\n", heightInFeet);**

**printf("Weight: %.2f kg\n", weightInKg);**

**printf("Weight: %.2f pounds\n", weightInPounds);**

**return 0;**

**}**

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

1. A character variable named option.
2. An integer variable sum initialized to 0
3. 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.

#include <stdio.h>

int main() {

int numbers[9];

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

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

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

}

printf("Numbers in groups of three:\n");

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

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

if ((i + 1) % 3 == 0) {

printf(",\n");

} else {

printf(", ");

}

}

return 0;

}

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

A header file is a file with extension .h which contains C function declarations and macro definitions to be shared between several source files.

There are two types of header files: the files that the programmer writes and the files that comes with your compiler.

Uses –

Header files are used in C++ so that you don't have to write the code for every single thing. It helps to reduce the complexity and number of lines of code. It also gives you the benefit of reusing the functions that are declared in header files to different.

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);

}

#include <stdio.h>

int main() {

int num = 070;

printf("%d\t%o\t%x", num, num, num);

return 0;

}

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

#include <stdio.h>

void main()

{

int x = printf("GLA UNIVERSITY");

printf("%d", x);

}

Answer - GLA University12

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

Library functions in C are also inbuilt functions in C language. These inbuilt functions are located in some common location, and it is known as the library.

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);

}

#include <stdio.h>

void main()

{

int x = printf("C is placement oriented Language") - printf("Hi");

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

}

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

Q28. What will be the output of following program?

#include <stdio.h>

void main()

{

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

}

Answer - " 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.

#include <stdio.h>

int main(){

int m;

printf("Enter the distance btw GLA and Delhi: ");

scanf("%d",&m);

int t=4;

int speed = m/4;

printf("Speed of bus is: %d kmph",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.

#include <stdio.h>

int main() {

int m1=50,m2=70,m3=80;

int avg= (m1+m2+m3)/3;

printf("Avergae marks of all three is: %d",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.

#include <stdio.h>

int main() {

int Sourav\_share=10, Sajal\_share = 20;

int z;

z=Sourav\_share;

Sourav\_share = Sajal\_share;

Sajal\_share=z;

printf("%d is Sourav share,\n %d is Sajal share",Sourav\_share,Sajal\_share);

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.

: #include <stdio.h>

int main()

{

float u= 4;

float t=0.05;

float S=u\*t;

printf("Distance travelled: %.2f kmph",S);

return 0;

}

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

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

The comments in C are human-readable explanations or notes in the source code of a C program.

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

“&” sign is not written before number.

Q36. What will be the output?

#include <stdio.h>

int main()

{

if (sizeof(int) > -1)

printf("Yes");

else

printf("No");

return 0;

}

Answer - Error

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

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

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.

#include <stdio.h>

int main() {

int tankSize = 175;

double drainRate = 25.0;

double timeRequired = tankSize / drainRate;

int hours = (int)timeRequired;

int minutes = (int)((timeRequired - hours) \* 60);

printf("It will take approximately %d hours and %d minutes to completely drain the tank.\n", hours, minutes);

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%?

#include <stdio.h>

int main() {

double y = 0.75;

double x;

x = (1 - y) / 0.2;

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

Answer – a) Compiler

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

a.%0 b.%d

c. %o d. %e

Answer – a) %0

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

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

Answer – b) %f

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

a. char

b. array

c. float

d. int

Answer – 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

Answer – c)

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

Q46. Which of the following is an identifier?

a. &fact b. Basic\_pay c. enum d. 1sum

Answer – b) and c)

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 d. c

Answer – d) c

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

1. (365.55)10 = (?)2
2. (453.65)10 = (?)8
3. (5164.12)10 = (?)16
4. (23.65)10 = (?)5
5. (772)10 = (?)7

Q49. Covert the following numbers to decimal number system-

1. (325.54)6 = (?)10
2. (1001010110101.1110101)2 = (?)10
3. (742.72)8 = (?)10
4. (AC94.C5)16 = (?)10

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

(DB56.CD4)16 = (?)2, (?)8, (?)4

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

(473.42)8 = (?)2, (?)10, (?)16, (?)5

Q52. Find the value of A?

1. (23)10 = (17)A
2. (21)16 = (41)A
3. (32)8 = (101)A

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

void main(){

int a=32770;

printf(“%d”,a);

}

Q54: #include <stdio.h>

int main()

{

float c = 5.0;

printf ("Temperature in Fahrenheit is %.2f", (9/5)\*c + 32);

return 0;

}

Answer –

#include <stdio.h>

int main() {

float c = 5.0;

printf("Temperature in Fahrenheit is %.2f", (9.0/5.0) \* c + 32.0);

return 0;

}