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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.

Sol.

```
#include<stdio.h>
int main() {
   float price, taxRate, finalPrice;
   printf("Enter price: ");
   scanf("%f", &price);
   printf("Enter tax rate: ");
   scanf("%f", &taxRate);
   finalPrice = price + (price * taxRate / 100);
   printf("Final price: %.2f", 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.

Sol.

```
#include <stdio.h>
int main() {
   float wage, hours, total;
   printf("Enter hourly wage: ");
   scanf("%f", &wage);
   printf("Enter hours worked: ");
   scanf("%f", &hours);
   if(hours > 30) {
      total = (30 * wage) + ((hours - 30) * 2 * wage);
   } else {
```

```
        total = hours * wage;
    }
    printf("Total wage: %.2f", total);
  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.

Sol.

```
#include <stdio.h>
int main() {
    float apple = 2.0 * 50.0;
    float mango = 1.5 * 35.0;
    float potato = 2.5 * 10.0;
    float tomato = 1.0 * 15.0;
    float total = apple + mango + potato + tomato;
    float change = 500.0 - total;
    printf("Change to be returned: Rs. %.2f", change);
    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>
int main() {
    printf("Name:Shoaib Siddiqui\n");
    printf("Born: 19 March 2004\n");
    printf("Mobile Number: 73********4\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.

Sol.

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

```
    int i;
    char c;
    float f;
    printf("Enter an integer: ");
    scanf("%d", &i);
    printf("Enter a character: ");
    scanf(" %c", &c);
    printf("Enter a float: ");
    scanf("%f", &f);
    printf("Integer: %d\nCharacter: %c\nFloat: %.2f", i, c, f);
    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>
int main() {
    float 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>
int main() {
    float applesPerPerson = 6.5;
    int totalPersons = 3;
    float totalApples = applesPerPerson * totalPersons;
    printf("Raju has %.1f apples in total.", totalApples);
    return 0;
}
```

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

Sol.

```c
#include <stdio.h>
int main() {
    float value = 123.456;
    printf("Exponential format: %.2e", value);
    return 0;
}
```

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

Sol.

```c
#include <stdio.h>

int main() {
    long long mobileNumber;
    printf("Enter your mobile number: ");
    scanf("%lld", &mobileNumber);
    printf("Your mobile number is: %lld", mobileNumber);
    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.

```c
#include <stdio.h>

int main() {
    float population = 30000;
    population *= 1.2; // After first year
    population *= 1.3; // After second year
    printf("Population after two years: %.0f", population);
    return 0;
}
```

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

Sol.

```c
#include <stdio.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>
int main() {
    float basicPay, HRA, TA, salary;
    printf("Enter basic pay: ");
    scanf("%f", &basicPay);
    HRA = 0.15 * basicPay;
    TA = 0.20 * basicPay;
    salary = basicPay + HRA + TA;
    printf("Total salary: %.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 <math.h>
int main() {
    float xp, yp, xq, yq, slope, angle;
    printf("Enter coordinates for P(xp, yp): ");
    scanf("%f %f", &xp, &yp);
    printf("Enter coordinates for Q(xq, yq): ");
    scanf("%f %f", &xq, &yq);
    slope = (yq - yp) / (xq - xp);
    angle = atan(slope) * (180.0 / 3.14159);
    printf("Slope: %.2f\nAngle of inclination: %.2f degrees", slope, 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:

$$SPI = \frac{\sum_{i=1}^{k} \quad - \ -}{\sum_{=1^{\wedge}} \quad i}$$

ere, 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>
int main() {
   int k = 5;
   float grades[5], credits[5], total = 0, creditSum = 0;
   for(int i = 0; i < k; i++) {
      printf("Enter grade and credit for course %d: ", i+1);
      scanf("%f %f", &grades[i], &credits[i]);
      total += grades[i] * credits[i];
      creditSum += credits[i];
   }
   printf("SPI: %.2f", total / creditSum);
   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>
int main() {
   float wavelength, speed, frequency;
   printf("Enter wavelength and speed: ");
   scanf("%f %f", &wavelength, &speed);
   frequency = speed / wavelength;
   printf("Frequency: %.2f", 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]

Sol.

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

```
int main() {
   float u = 30, a = 5, s = 70, v;
   v = sqrt((u * u) + (2 * a * s));
   printf("Final Velocity: %.2f m/s", 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]

Sol.

```
#include <stdio.h>
int main() {
   float u = 0, a = 4, t = 3, v, s;
   v = u + a * t;
   s = u * t + 0.5 * a * t * t;
   printf("Final Velocity: %.2f m/s\n", v);
   printf("Distance Travelled: %.2f 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>
int main() {
   int rollNumber, digit, sum = 0;
   printf("Enter your roll number: ");
   scanf("%d", &rollNumber);
   for(int i = 0; i < 4; i++) {
      digit = rollNumber % 10;
      sum += digit;
      rollNumber /= 10;
   }
   printf("Sum of last four digits: %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>
int main() {
   float height_cm = 180, weight_kg = 70;
   float height_inch = height_cm * 0.393701;
   float weight_pound = weight_kg * 2.20462;
   float height_feet = height_inch / 12
   printf("Height in feet: %.2f\n", height_feet);
   printf("Weight in pounds: %.2f", 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

Sol.

```
#include <stdio.h>
int main() {
   char option;
   int sum = 0;
   float product = 1.0;
   printf("Variables declared!");
   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>
int main() {
   int numbers[9];
   printf("Enter 9 integers: ");
   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("\n");
```

```
        else printf(", ");
    }
    return 0;
}
```

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

Sol. Header files in C contain function declarations and macro definitions. They're used to share info between multiple source files.

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);
}
```

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);
 }
```

Output: "GLA UNIVERSITY14"

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

Ans. Library functions are pre-defined functions provided by the C standard library, like printf(), scanf(), strcat(), and sqrt().

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);
}
```

Output:

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

Ans. This statement reads two integers and returns the count of successfully read items. So, it prints "2" if both inputs are integers.

Q28. What will be the output of following program?

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

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

Output: The output will be " "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>
void main()
{
  int m;
  printf("Enter distance in km: ");
  scanf("%d", &m);
  printf("Speed of bus: %d km/hr", m/4);
}
```

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>
void main()
{
  int satyam = 50, suman = 70, shyam = 80;
  printf("Average marks: %d", (satyam + suman + shyam)/3);
}
```

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>
void main()
{
  int saurav, sajal, temp;
  printf("Enter money given to Saurav: ");
  scanf("%d", &saurav);
  printf("Enter money given to Sajal: ");
  scanf("%d", &sajal);
  temp = saurav;
  saurav = sajal;
  sajal = temp;
  printf("Money now with Saurav: %d\nMoney now with Sajal: %d", saurav, sajal);
}
```

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>
void main()
{
  int speed = 4;
  float time = 3.0/60;
  printf("Distance travelled: %.2f km", speed * time);
}
```

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

Ans. Yes, we can combine escape sequences like \n and \t in a single line.

For example: printf("Hello\n\tWorld");

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

Ans. Comments are notes in your code, not read by the compiler. Use /* for multi-line or // for single-line comments.

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

Ans. The scanf function needs the address of the variable.

Correct it to: scanf("%d", &number);

Q36. What will be the output?

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

Ans. No.

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

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

Ans. "gross-salary", "salary of emp", "avg.", and "thereisbookinmysoup" are invalid. Only "INTEREST" is valid.

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>
int main() {
   int tankSize = 175;
   float rate = 25.0;
   float time = tankSize / rate;
   printf("Time required: %.2f hours", 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>
int main() {
   float y = 0.75;
   float x = (y - 1) / -0.2;
   printf("Battery will be at 75%% after %.2f hours", 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

Ans. Compiler

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

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

Ans. %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

Ans. %.2e

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

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

Ans. 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

Ans. hello7

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

Ans. Garbage, 5

Q46. Which of the following is an identifier?

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

Ans. 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

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

Ans. $(365.55)_{10} = (101101101.10001100110011001100)_2$

$(453.65)_{10} = (705.502314814814814814 81)_8$

$(5164.12)_{10} = (1434.1E147AE147AE147AE14)_{16}$

$(23.65)_{10} = (43.322)_5$

$(772)_{10} = (2211)_7$

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

Ans. $(325.54)_6 = (209.66667)_{10}$

$(1001010110101.1110101)_2 = (4745.82031)_{20}$

$(742.72)_8 = (482.90625)_{20}$

$(AC94.C5)_{16} = (44180.76953)_{20}$

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

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

Ans. $(DB56.CD4)_{16} = (1101101101010110.110011010100)_2, (333126.63120)_8, (31231220.31210)_4$

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

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

Ans. $(473.42)_8 = (100111011.1001)_2, (315.53125)_{10}, (13B.88)_{16}, (2330.14)_5$

Q52. Find the value of A?

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

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

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

Ans. For $(23)_{10} = (17)_A$, A = 8

For $(21)_{16} = (41)_A$, A = 5

For $(32)_8 = (101)_A$, A = 2

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

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

Ans. 32770

Q54:
```
#include <stdio.h>
 int main()
{
 float c = 5.0;
 printf ("Temperature in Fahrenheit is %.2f", (9/5)*c + 32);
 return 0;
}
```
Ans. Temperature in Fahrenheit is 37.00