1.

```
#include <stdio.h>
int main() {
    float originalPrice, taxRate, finalPrice;
    printf("Enter the original price:  ");
    scanf("%f", &originalPrice);
    printf("Enter the sales tax rate (as a decimal): ");
    scanf("%f", &taxRate);
    finalPrice = originalPrice + (originalPrice * taxRate);
    printf("The final price after adding %.2f%% sales tax is: $%.2f\n", taxRate * 100, finalPrice);
    return 0;
}
```

2.

```
#include <stdio.h>
int main() {
    float hourlyWage, hoursWorked, weeklyWages;
    printf("Enter the hourly wage: $");
    scanf("%f", &hourlyWage);
    printf("Enter the number of hours worked in a week: ");
    scanf("%f", &hoursWorked);
    if (hoursWorked <= 30) {
        weeklyWages = hourlyWage * hoursWorked;
    } else {
        float normalHours = 30;
  float overtimeHours = hoursWorked - normalHours;
        weeklyWages = (hourlyWage * normalHours) + (2 * hourlyWage * overtimeHours);
    }
    printf("Weekly wages: $%.2f\n", weeklyWages);

    return 0;

}
```

3.

```
#include <stdio.h>

int main() {

    float applePrice = 50.0;

    float mangoPrice = 35.0;

    float potatoPrice = 10.0;

    float tomatoPrice = 15.0;

    float appleQuantity = 2.0;

    float mangoQuantity = 1.5;

    float potatoQuantity = 2.5;

    float tomatoQuantity = 1.0;

    float totalAppleCost = applePrice * appleQuantity;

    float totalMangoCost = mangoPrice * mangoQuantity;

    float totalPotatoCost = potatoPrice * potatoQuantity;

    float totalTomatoCost = tomatoPrice * tomatoQuantity;

        float totalCost = totalAppleCost + totalMangoCost + totalPotatoCost + totalTomatoCost;

    float amountGiven = 500.0;

    float amountToReturn = amountGiven - totalCost;

    printf("The shopkeeper will return Rs. %.2f to Mr. X.\n", amountToReturn);

return 0;}
```

4.

```
#include <stdio.h>

int main() {

    printf("Name: Your Name\n");
```

```c
    printf("Date of Birth: January 1, 2000\n");
    printf("Mobile Number: +1234567890\n");
    return 0;
}
```

5.

```c
#include <stdio.h>
int main() {
    int integerValue;
    char characterValue;
    float floatValue;
    printf("Enter an integer: ");
    scanf("%d", &integerValue);
    printf("Enter a character: ");
    scanf(" %c", &characterValue);
    printf("Enter a float value: ");
    scanf("%f", &floatValue);
    printf("You entered:\n");
    printf("Integer: %d\n", integerValue);
    printf("Character: %c\n", characterValue);
    printf("Float: %.2f\n", floatValue);
    return 0;
}
```

7.

```c
#include <stdio.h>
int main() {
        float apples_from_raghu = 6.5;
    float apples_from_sheenu = 6.5;
    float apples_from_akash = 6.5;
    float total_apples = apples_from_raghu + apples_from_sheenu + apples_from_akash;
        printf("Raju has a total of %.2f apples without adding them manually.\n", total_apples);
    return 0;
}
```

8.

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

9.

```
#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;
}
```

10.

```c
#include <stdio.h>
int main() {
    int initialPopulation = 30000;
    float growthRateYear1 = 0.20; // 20% growth rate for the first year
    float growthRateYear2 = 0.30; // 30% growth rate for the second year
    int populationYear1 = initialPopulation + (int)(initialPopulation * growthRateYear1);
    int populationYear2 = populationYear1 + (int)(populationYear1 * growthRateYear2);
       printf("Population after two years: %d\n", populationYear2);
    return 0;
}
```

11.

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

12.

```c
#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;
}
```

13.

```c
#include <stdio.h>
#include <math.h>
int main() {
    double xp, yp, xq, yq, slope, angle;
    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);
    slope = (yq - yp) / (xq - xp);
    angle = atan(slope);
    angle = angle * (180.0 / M_PI);
    printf("Slope of the line: %.2lf\n", slope);
    printf("Angle of inclination (in degrees): %.2lf degrees\n", angle);
    return 0;
}
```

14.

```
#include <stdio.h>
int main() {
    int k = 5;      double gradePoints[k], credits[k];
    double totalGradePoints = 0.0, totalCredits = 0.0, spi;
    for (int i = 0; i < k; i++) {
        printf("Enter grade points for course %d: ", i + 1);
        scanf("%lf", &gradePoints[i]);
        printf("Enter credits for course %d: ", i + 1);
        scanf("%lf", &credits[i]);
        totalGradePoints += gradePoints[i];
        totalCredits += credits[i];
    }
    spi = totalGradePoints / totalCredits;
    printf("SPI (Semester Performance Index): %.2lf\n", spi);
    return 0;
}
```

15.

```
#include <stdio.h>
int main() {
    double wavelength, speed, frequency;
    printf("Enter the wavelength (in meters): ");
    scanf("%lf", &wavelength);
    printf("Enter the speed of the wave (in meters/second): ");
    scanf("%lf", &speed);
    frequency = speed / wavelength;
    printf("The frequency of the wave is %.2lf Hz\n", frequency);
    return 0;
}
```

16.

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

int main() {
    double u = 30.0;
    double a = 5.0;
    double s = 70.0;
    double v;
    v = sqrt(u * u + 2 * a * s);
    printf("The final velocity of the car is %.2lf m/s\n", v);
    return 0;
}
```

17.

```
#include <stdio.h>
int main() {
    double u = 0.0;
    double a = 4.0;
    double t = 3.0;
double v, s;
    v = u + (a * t);
    s = (u * t) + (0.5 * a * t * t);
    printf("(a) The final velocity of the horse is %.2lf m/s\n", v);
    printf("(b) The distance traveled by the horse is %.2lf meters\n", s);
    return 0;
}
```

18.

```
#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 = strlen(rollNumber);
    if (length < 4) {
        printf("Error: Roll number must have at least four digits.\n");
        return 1;    }
    for (int i = length - 4; i < length; i++) {
        sum += (rollNumber[i] - '0');
    }
    printf("Sum of the last four digits of your roll number: %d\n", sum);
    return 0;
}
```

19.

```
#include <stdio.h>
int main() {
    double height_cm = 175.0;
    double weight_kg = 70.0;
    const double CM_TO_INCH = 0.393701;
    const double KG_TO_POUND = 2.20462;
    double height_feet = height_cm * CM_TO_INCH / 12.0;
    double weight_pounds = weight_kg * KG_TO_POUND;
    printf("Height in centimeters: %.2lf cm\n", height_cm);

    printf("Height in feet: %.2lf feet\n", height_feet);

    printf("Weight in kilograms: %.2lf kg\n", weight_kg);

    printf("Weight in pounds: %.2lf pounds\n", weight_pounds);

    return 0;

}
```

20.

a. char option;

b. int sum = 0;

c. float product = 1.0;

21.

```
#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 separated by commas:\n");

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

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

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

            printf("\n");

        } else {

                    printf(",");
```

```
      }

    }

    return 0;

}
```

22.

Header files in C programming are files that contain declarations of functions, variables, and other constructs. They serve to:

1. Declare the interface of functions and variables.
2. Provide documentation and comments.
3. Promote code modularity and reusability.
4. Avoid code duplication.
5. Define library interfaces.
6. Handle preprocessor directives.
7. Improve code organization and maintainability.

23. 56   70   38

24. GLA UNIVERSITY14

25.

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.

printf: Used for formatted output. It allows you to print data to the console or other output devices in a specified format.

scanf: Used for formatted input. It allows you to read data from the user or from other input sources based on a specified format.

strlen: Used to calculate the length (number of characters) of a null-terminated string.

malloc: Used for dynamic memory allocation. It allows you to allocate memory on the heap during runtime.

26. 31 37 1F

27. **scanf** returns the number of successfully read items. If it successfully reads both integers, it will return **2**. If it encounters an error while reading, it may return a different value.

printf then prints the value returned by **scanf**, which is either **2** (if both integers were successfully read) or some other value (if there was an error).

So, the **printf** statement will print either **2** (if **scanf** successfully read two integers) or the number of items successfully read by **scanf** (if it encountered an error). The exact output depends on the user's input and whether **scanf** succeeds in reading two integers.

28. "C % FOR % PLACEMENT"

29.

```
#include <stdio.h>

int main() {

    double distance;

   double time

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

    scanf("%lf", &distance);

    time = 4.0; // 4 hours

     double speed = distance / time;

    printf("The speed of the bus is %.2lf kilometers per hour.\n", speed);

    return 0;

}
```

30.

```
#include <stdio.h>

int main() {

    int satyam_marks = 50;

    int suman_marks = 70;

    int shyam_marks = 80;

   double average_marks = (satyam_marks + suman_marks + shyam_marks) / 3.0;

    printf("The average marks of Satyam, Suman, and Shyam is: %.2lf\n", average_marks);
    return 0;
}
```

31.

```
#include <stdio.h>
int main() {
    int saurav_money, sajal_money, temp;
    printf("Enter the amount given to Saurav: ");
    scanf("%d", &saurav_money);
    printf("Enter the amount given to Sajal: ");
    scanf("%d", &sajal_money);
        temp = saurav_money;
    saurav_money = sajal_money;
    sajal_money = temp;
        printf("After rectifying the mistake:\n");
    printf("Amount given to Saurav: %d\n", saurav_money);
    printf("Amount given to Sajal: %d\n", sajal_money);
    return 0;
}
```

32.

```
#include <stdio.h>
int main() {
    float speed_kph = 4.0;
    float time_min = 3.0;
    float time_hr = time_min / 60.0;
    float distance_km = speed_kph * time_hr;
    printf("Distance traveled by you: %.2f kilometers\n", distance_km);
    return 0;
}
```

33.

Yes, you can combine multiple escape sequences in a single line of program code in languages like C and C++. Escape sequences are used to represent special characters or control codes within a string literal.

34.

Comments in a C program are explanatory text that is not executed by the compiler.

```
// This is a single-line comment

int x = 10; // This comment explains the variable initialization
```

35.

This code will not work because we didn’t used & in after “ ”, it will not assign value to variable .

Correct code - scanf(“%d”,&number”).

36.

Output-Yes

37.

gross-salary, salary of emp, avg.

38.

```
#include <stdio.h>

int main() {

    double tank_capacity = 175.0;

    double drainage_rate = 25.0;

       double time_hours = tank_capacity / drainage_rate;

    int hours = (int)time_hours;

    int minutes = (int)((time_hours - hours) * 60);

    printf("Time required to completely clean the tank: %d hours and %d minutes\n", hours, minutes);

    return 0;
}
```

39.

```
#include <stdio.h>

int main() {

    double desired_battery_percentage = 75.0;

    double battery_power_remaining;

    double hours = 0.0; // Initialize hours to 0

    while (battery_power_remaining < desired_battery_percentage) {

        battery_power_remaining = -0.2 * hours + 1;

        hours++;

    }

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

    return 0;

}
```

40. Compiler

41. %o

42. %.2f

43. Array

44. "hellbo"7

45. Garbage, 5

46. Basic_pay

47. c1

48.

a) (365.55)10 = (101101101.011)2 (Binary)

b) (453.65)10 = (750.16)8 (Octal)

c) (5164.12)10 = (220C.E7)16 (Hexadecimal)

d) (23.65)10 = (43.131)5 (Base 5)

e) (772)10 = 2152 (Base 7)

49.

a. (325.54)6 = 125.9444... in decimal (approximately).

b. (1001010110101.1110101)2 = 8193.9990234375 in decimal.

c. (742.72)8 = 482.125 in decimal.

d. (AC94.C5)16 = 44280.9453125 in decimal.

50.

(DB56.CD4)16 is equivalent to:

(11011011011011000110110001100)2 in binary.

(666665148)8 in octal.

2366660 in decimal.

51.

(473.42)8 is equivalent to:

(100111011.100010)2 in binary.

123.202 in decimal.

7B.34 in hexadecimal.

443.012 in base-5.

52. the values of A for the given equations are:

a) A = 4

b) A = 8

c) A ≈ 6.77

53. 32770