Program 1

```c
#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));

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

    return 0;
}
```

Program 2

```c
#include <stdio.h>

int main() {
    float hourlyWage, weeklyWage;
    int hoursWorked;

    printf("Enter the hourly wage: $");
    scanf("%f", &hourlyWage);

    printf("Enter the number of hours worked in a week: ");
    scanf("%d", &hoursWorked);

    if (hoursWorked > 30) {
        weeklyWage = 30 * hourlyWage;
        weeklyWage += (hoursWorked - 30) * (2 * hourlyWage);
    } else {
        weeklyWage = hoursWorked * hourlyWage;
    }

    printf("The weekly wage is: $%.2f\n", weeklyWage);

    return 0;
}
```

Program3

```c
#include <stdio.h>

int main() {
    float totalCost, amountPaid, amountReturned;

    float applePricePerKg = 50.0;
    float mangoPricePerKg = 35.0;
    float potatoPricePerKg = 10.0;
    float tomatoPricePerKg = 15.0;
    float kgApple = 2.0;
    float kgMango = 1.5;
    float kgPotato = 2.5;
    float kgTomato = 1.0;

    totalCost = (kgApple * applePricePerKg) + (kgMango * mangoPricePerKg) + (kgPotato * potatoPricePerKg) + (kgTomato * tomatoPricePerKg);
    amountPaid = 500.0;
```

```c
    amountReturned = amountPaid - totalCost;

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

    return 0;
}
```

Program 4
```c
#include <stdio.h>

int main() {
    printf("Your Name\n");
    printf("Date of Birth\n");
    printf("Mobile Number\n");

    return 0;
}
```

Program 5
```c
#include <stdio.h>

int main() {
    int integerInput;
    char charInput;
    float floatInput;

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

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

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

    printf("Integer: %d\n", integerInput);
    printf("Character: %c\n", charInput);
    printf("Float: %.2f\n", floatInput);

    return 0;
}
```

Program 6
```c
#include <stdio.h>

int main() {
    float cost = 172.53;
    printf("The sales total is: $ %.2f\n", cost);

    return 0;
}
```

Program 7
```c
#include <stdio.h>

int main() {
    int applesFromRaghu = 6;
    float applesFromSheenu = 0.5;
    int applesFromAkash = 6;

    float totalApples = applesFromRaghu + applesFromSheenu + applesFromAkash;

    printf("Raju has a total of %.1f apples.\n", totalApples);
```

```c
    return 0;
}
```

Program 8
```c
#include <stdio.h>

int main() {
    double floatValue;

    printf("Enter a floating-point value: ");
    scanf("%lf", &floatValue);

    printf("Value in exponential format: %.2e\n", floatValue);

    return 0;
}
```

Program 9
```c
#include <stdio.h>

int main() {
    long long int mobileNumber;

    printf("Enter your 10-digit mobile number: ");
    scanf("%lld", &mobileNumber);

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

    return 0;
}
```

Program 10
```c
#include <stdio.h>

int main() {
    int initialPopulation = 30000;
    float growthRateYear1 = 0.20;
    float growthRateYear2 = 0.30;

    float populationYear1 = initialPopulation + (initialPopulation * growthRateYear1);
    float populationYear2 = populationYear1 + (populationYear1 * growthRateYear2);

    printf("The population after two years is: %.0f\n", populationYear2);

    return 0;
}
```

Program11
```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;
}
```

Program12
```c
#include <stdio.h>
```

```c
int main() {
    float basicPay, HRA, TA, salary;

    printf("Enter the basic pay of the employee: $");
    scanf("%f", &basicPay);

    HRA = 0.15 * basicPay;
    TA = 0.20 * basicPay;

    salary = basicPay + HRA + TA;

    printf("Salary of the employee is: $%.2f\n", salary);

    return 0;
}
```

Program13
```c
#include <stdio.h>
#include <math.h>

int main() {
    float xp, yp, xq, yq, slope, angle;

    printf("Enter the coordinates of point P (xp yp): ");
    scanf("%f %f", &xp, &yp);

    printf("Enter the coordinates of point Q (xq yq): ");
    scanf("%f %f", &xq, &yq);

    slope = (yq - yp) / (xq - xp);
    angle = atan(slope) * 180 / M_PI;

    printf("Slope of the line: %.2f\n", slope);
    printf("Angle of inclination: %.2f degrees\n", angle);

    return 0;
}
```

Program14
```c
#include <stdio.h>

int main() {
    float grades[] = {g1, g2, g3, g4, g5}; // Replace g1, g2, g3, g4, g5 with actual grade points
    float credits[] = {c1, c2, c3, c4, c5}; // Replace c1, c2, c3, c4, c5 with actual credits
    int k = 5; // Number of courses

    float spi = 0;
    float totalCredits = 0;

    for (int i = 0; i < k; i++) {
        spi += (grades[i] * credits[i]);
        totalCredits += credits[i];
    }

    spi /= totalCredits;

    printf("SPI for k = 5: %.2f\n", spi);

    return 0;
```

```
}
```

Program15

```c
#include <stdio.h>

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

    printf("Enter the wavelength (in meters): ");
    scanf("%f", &wavelength);

    printf("Enter the speed of the wave (in meters/second): ");
    scanf("%f", &speed);

    frequency = speed / wavelength;

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

    return 0;
}
```

Program16

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

int main() {
    float initialVelocity = 30.0;
    float acceleration = 5.0;
    float distance = 70.0;
    float finalVelocity;

    finalVelocity = sqrt(initialVelocity * initialVelocity + 2 * acceleration * distance);

    printf("Final velocity of the car: %.2f m/s\n", finalVelocity);

    return 0;
}
```

Program17

```c
#include <stdio.h>

int main() {
    float initialVelocity = 0.0; // Starting from rest
    float acceleration = 4.0;
    float time = 3.0;
    float finalVelocity, distance;

    finalVelocity = initialVelocity + acceleration * time;

    distance = initialVelocity * time + 0.5 * acceleration * time * time;

    printf("(a) Final velocity of the horse: %.2f m/s\n", finalVelocity);
    printf("(b) Distance traveled by the horse: %.2f meters\n", distance);

    return 0;
}
```

Program18

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

```c
int main() {
    int rollNumber = 12345678; // Replace with your university roll number
    int lastFourDigits, sum = 0;

    lastFourDigits = rollNumber % 10000;

    while (lastFourDigits > 0) {
        sum += lastFourDigits % 10;
        lastFourDigits /= 10;
    }

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

    return 0;
}
```

Program19

```c
#include <stdio.h>

int main() {
    float heightInCm = 175.0; // Replace with your height in centimeters
    float weightInKgs = 70.0; // Replace with your weight in kilograms

    float cmToInch = 0.393701;
    float kgToPound = 2.20462;

    float heightInFeet = heightInCm * cmToInch / 12.0;
    float weightInPounds = weightInKgs * kgToPound;

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

    return 0;
}
```

Program20

```c
char option;
int sum = 0;
float product = 1.0;
```

Program21

```c
#include <stdio.h>

int main() {
    int numbers[9];

    // Read nine integers
    for (int i = 0; i < 9; i++) {
        scanf("%d", &numbers[i]);
    }

    // Display three numbers in a line separated by commas
    for (int i = 0; i < 9; i++) {
        printf("%d", numbers[i]);
        if (i % 3 == 2) {
            printf("\n");
        } else {
            printf(", ");
        }
    }
}
```

```
    return 0;
}
```

 Header files in C contain declarations of functions, variables, and macros that are used in your program. They allow you to include pre-written code and libraries in your program. They are included using #include directives.

 The output of the given program is "56 70 38". The value 070 is treated as an octal (base 8) number, so it's equivalent to 56 in decimal, 70 in octal, and 38 in hexadecimal.

 The output of the program is "GLA UNIVERSITY12". The printf function returns the number of characters printed, which in this case is the length of the string "GLA UNIVERSITY," which is 12 characters.

 Library functions in C are pre-written functions provided by the C standard library that can be used to perform common tasks. Four examples of library functions are printf(), scanf(), strlen(), and sqrt().

 The output of the program is "28 34 1c". It subtracts the number of characters printed by the printf("Hi") statement from the number of characters printed by the "C is placement oriented Language" statement and then prints the result in decimal, octal, and hexadecimal.

 The scanf function returns the number of input items successfully matched and assigned. So, printf("%d", scanf("%d%d", &a, &b)); will print the number of successfully scanned integers.

 The output of the program is " "C % FOR % PLACEMENT"" (including the double quotes). The escape sequence %% is used to print a single % character.

Program29
```c
#include <stdio.h>

int main() {
    double distance;
    double time = 4.0; // 4 hours

    printf("Enter the distance in kilometers: ");
    scanf("%lf", &distance);

    double speed = distance / time;

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

    return 0;
}
```

Program30
```c
#include <stdio.h>

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

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

    printf("Average marks of the three participants: %.2lf\n", average_marks);
```

```c
    return 0;
}
```

Program31
```c
#include <stdio.h>

int main() {
    int mohan_money = 100; // Initial amount given to Mohan
    int saurav_money = 50; // Initial amount given to Saurav
    int sajal_money = 75;  // Initial amount given to Sajal

    // Swapping the money between Saurav and Sajal
    int temp = saurav_money;
    saurav_money = sajal_money;
    sajal_money = temp;

    printf("Mohan rectified the mistake.\n");
    printf("Mohan now has %d rupees.\n", mohan_money);
    printf("Saurav now has %d rupees.\n", saurav_money);
    printf("Sajal now has %d rupees.\n", sajal_money);

    return 0;
}
```

Program32
```c
#include <stdio.h>

int main() {
    float speed_kmph = 4.0; // Speed in km/h
    float time_min = 3.0;  // Time in minutes

    // Convert time to hours
    float time_hours = time_min / 60;

    // Calculate distance
    float distance_km = speed_kmph * time_hours;

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

    return 0;
}
```

Q33:
 Yes, you can combine multiple escape sequences in a single line of program code.

Q34:
 Comments in C are used to provide explanations and descriptions within the source code. They are not executed by the compiler. Comments in C can be inserted using /* */ for multiline comments and // for single-line comments.

Q35:
 The statement `scanf("%d", number);` is incorrect because it should be `scanf("%d", &number);` to correctly read an integer and store it in the variable `number`.

Q36:
 The output of the program is "Yes." This is because `sizeof(int)` is always greater than -1, so the "Yes" branch is executed.

For the remaining questions, I'll provide brief answers:

Q37:
 Variable names "gross-salary," "INTEREST," "avg," and "thereisbookinmysoup" are valid in C.

To calculate the time required to completely clean the tank, you can use the formula: `time = (tank_capacity / drain_rate)`, where `tank_capacity` is 175 gallons and `drain_rate` is 25 gallons per hour.

To calculate the time when the battery power is at 75%, you can use the formula: `x = (1 - y) / (-0.2)`, where y is 0.75 (75%).

For the multiple-choice questions (Q40 to Q47), I'll provide the answers:

Q40:

d. Assembler

Q41:

c. %o

Q42:

a. %e

Q43:

b. array

Q44:

c. "hell"8

Q45:

d. Garbage, 5

Q46:

b. Basic_pay

Q47:

a. c1

Program53
-32766
Program54
Temperature in Fahrenheit is 41.00