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PPS1

Q1

Aim:

Write a program in C to find the roots of a quadratic equation.

Procedure:

Input:

Coefficients a, b and c

Output:

Roots

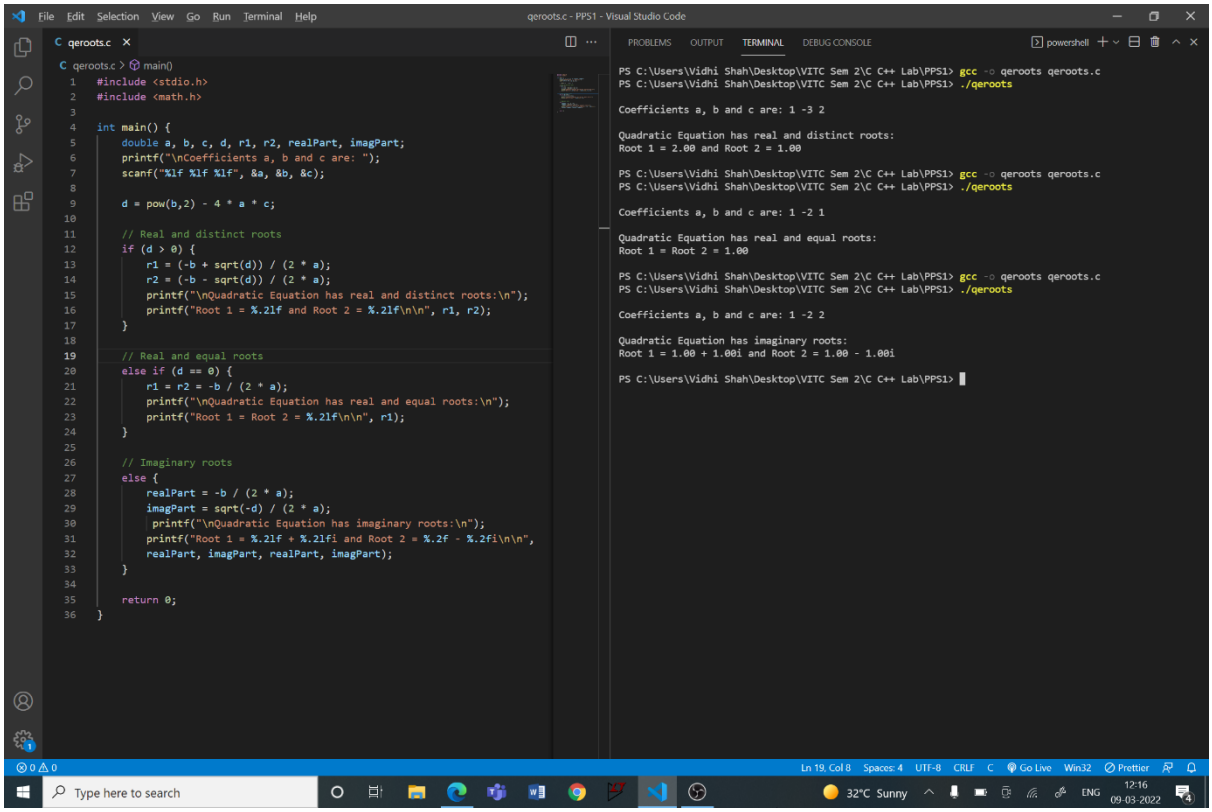
Algorithm:

Step 1: Read a, b and c
Step 2: Discriminant, d = b^2 - 4ac
Step 3: If discriminant is greater than 0
Then roots are real and distinct
Root1 = (-b + sqrt(d))/2a, Root2 = (-b - sqrt(d))/2a
Step 4: If discriminant is equal to 0
Then roots are real and equal
Root1 = Root2 = -b/2a
Step 3: If discriminant is less than 0
Then roots are imaginary
Real Part = -b/2a, Imaginary Part = sqrt(-d)/2a
Root1 = realPart + imagPart(i), Root2 = realPart – imagPart(i)
Step 6: Display the roots

Code:

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

int main() {
    double a, b, c, d, r1, r2, realPart, imagPart;
    printf("\nCoefficients a, b and c are: ");
    scanf("%lf %lf %lf", &a, &b, &c);

    d = pow(b,2) - 4 * a * c;
```

```c
    // Real and distinct roots
    if (d > 0) {
        r1 = (-b + sqrt(d)) / (2 * a);
        r2 = (-b - sqrt(d)) / (2 * a);
        printf("\nQuadratic Equation has real and distinct roots:\n");
        printf("Root 1 = %.2lf and Root 2 = %.2lf\n\n", r1, r2);
    }

    // Real and equal roots
    else if (d == 0) {
        r1 = r2 = -b / (2 * a);
        printf("\nQuadratic Equation has real and equal roots:\n");
        printf("Root 1 = Root 2 = %.2lf\n\n", r1);
    }

    // Imaginary roots
    else {
        realPart = -b / (2 * a);
        imagPart = sqrt(-d) / (2 * a);
         printf("\nQuadratic Equation has imaginary roots:\n");
        printf("Root 1 = %.2lf + %.2lfi and Root 2 = %.2f - %.2fi\n\n",
        realPart, imagPart, realPart, imagPart);
    }

    return 0;
}
```



Q2

Aim:

Write a program in C to create a simple calculator.

Procedure:

Input:

Operator, op

Operands, n1 and n2

Output:

Equation with answer

Algorithm:

Step 1: Read operator and operands, op, n1, n2

Step 2: Use switch case for operator

Case 1 ('+'): Result = n1 + n2

Case 2 ('-'): Result = n1 - n2

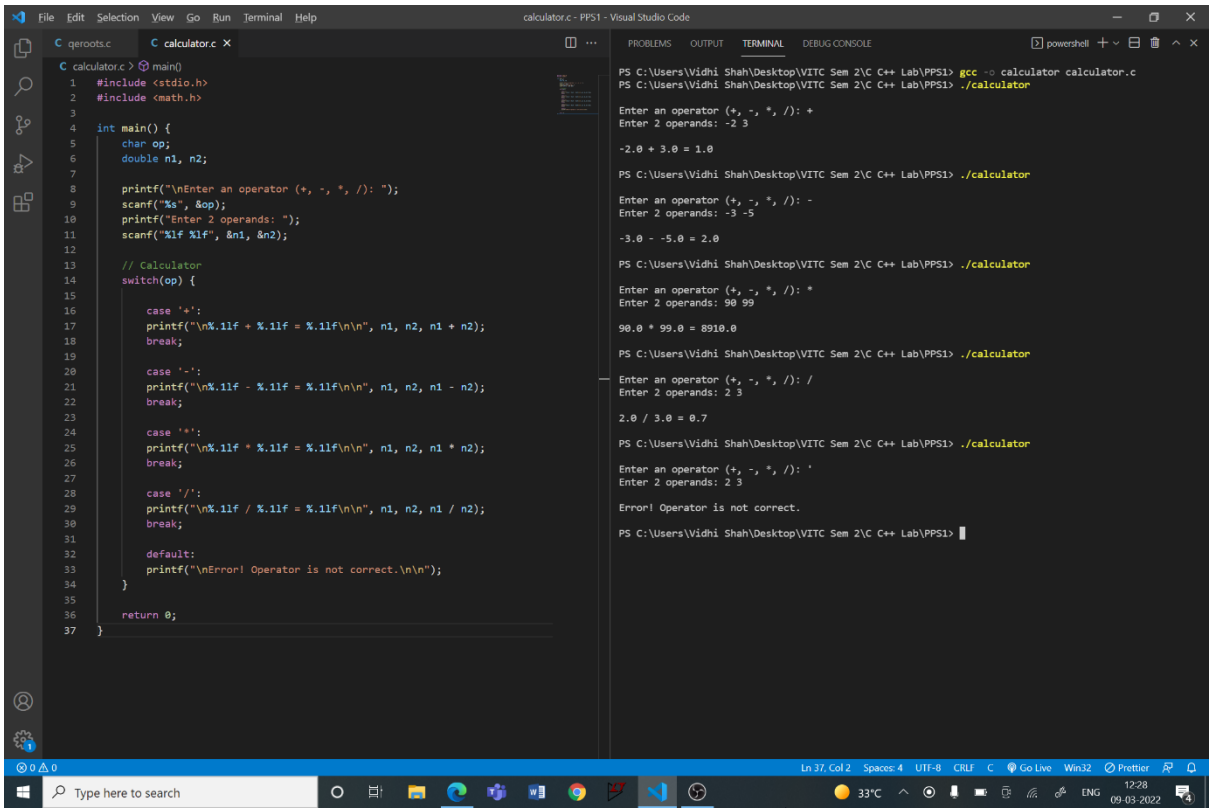
Case 3 ('*'): Result = n1 * n2

Case 4 ('/'): Result = n1 / n2

Default: Error message for invalid input

Step 3: Print the result

Code:



Q3

Aim:

Write a program in C to display the days of the week getting the user input as a character indicating the first letter of the day. Demonstrate the use of Switch case statements.

Procedure:

Input:

Character indicating the first letter of the day, wd

Output:

Day

Algorithm:

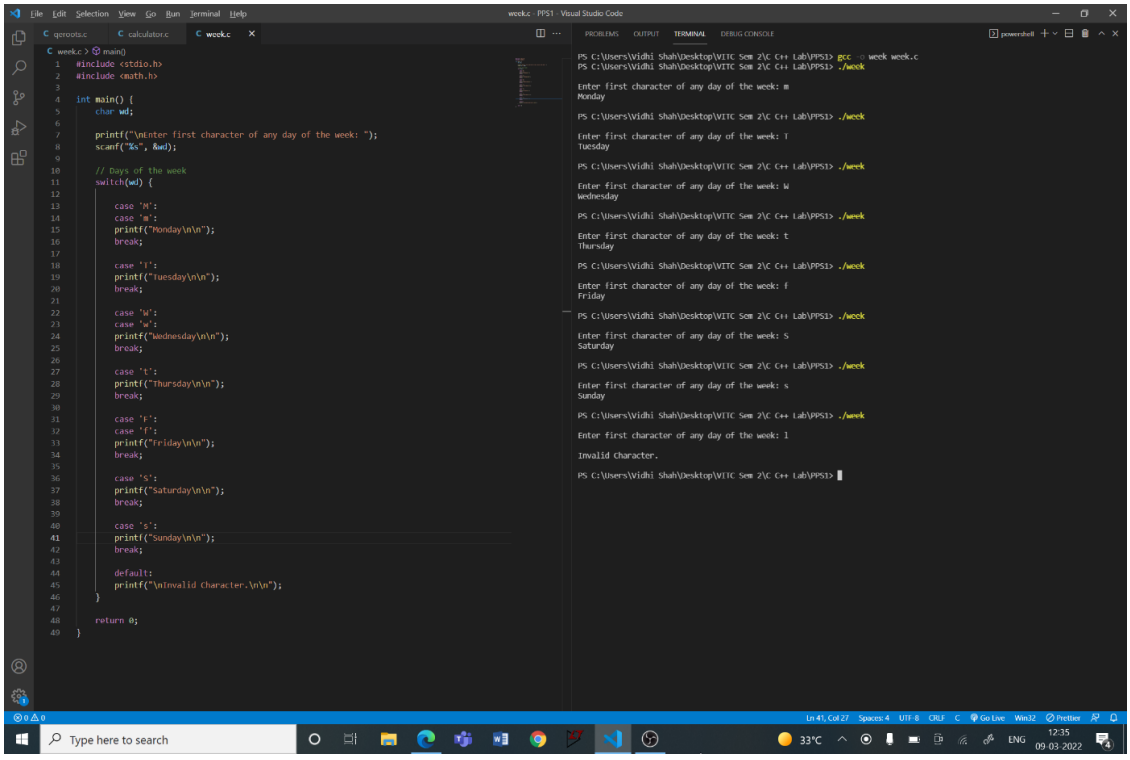
Step 1: Read character, wd

Step 2: Use switch case for character

- Case 1 (‘M’, ‘m’): Day = Monday
- Case 2 (‘T’): Day = Tuesday
- Case 3 (‘W’, ‘w’): Day = Wednesday
- Case 4 (‘t’): Day = Thursday
- Case 5 (‘F’, ‘f’): Day = Friday
- Case 6 (‘S’): Day = Saturday
- Case 7 (‘s’): Day = Sunday
- Default: Error message for invalid input

Step 6: Print the day

Code:



PPS2

Q1

Aim:

Write a program in C using while loop structure to display the sum of first n natural numbers.

Procedure:

Input:

Natural number, n

Output:

Sum of n natural numbers

Algorithm:

Step 1: Read n, initialize i to 1 and sum to 0

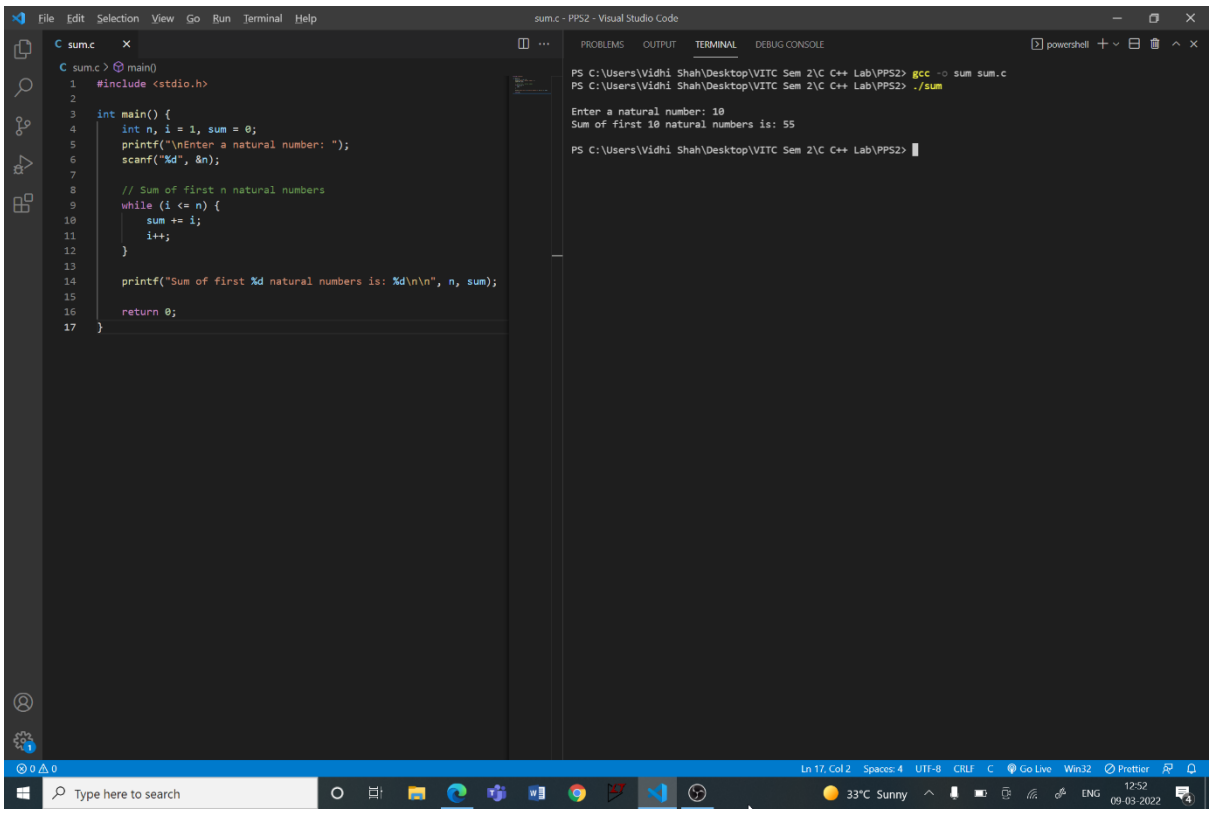
Step 2: Using while loop until i is less than equal to n

Add i to sum

Increment i by 1

Step 3: Print the sum

Code:



Q2

Aim:

Write a program in C using for loop structure to find the sum and average of n numbers.

Procedure:

Input:

Number of elements, n

Next n lines contain n numbers

Output:

Sum of the numbers

Average of the numbers

Algorithm:

Step 1: Read n, initialise sum to 0

Step 2: Using for loop initialise i to one. Until i is less than or equal to n

Read a number

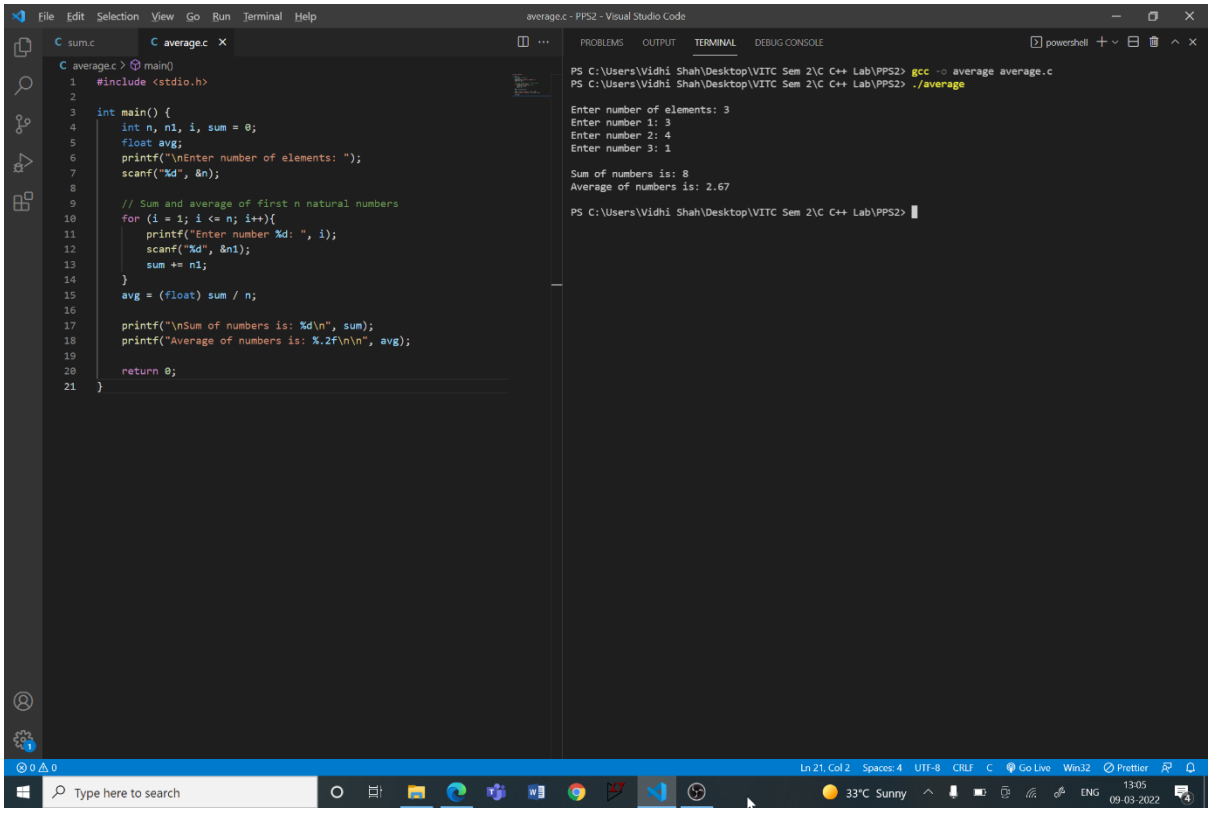
Add the number to sum

Increment i by 1

Step 3: Average = Sum / Number of elements

Step 4: Print sum and average of the numbers in separate line

Code:



Q3

Aim:

Write a program in C using for loops to display the pattern like right angle triangle using an asterisk.

Procedure:

Input:

Height of the triangle, h

Output:

Right angled triangle of height ‘h’ using asterisks

Algorithm:

Step 1: Read h

Step 2: Use for loop until i is less than h. Initialise i to 1. For each iteration:

Step A: Use for loop until j is less than equal to i. Initialise j to 0.

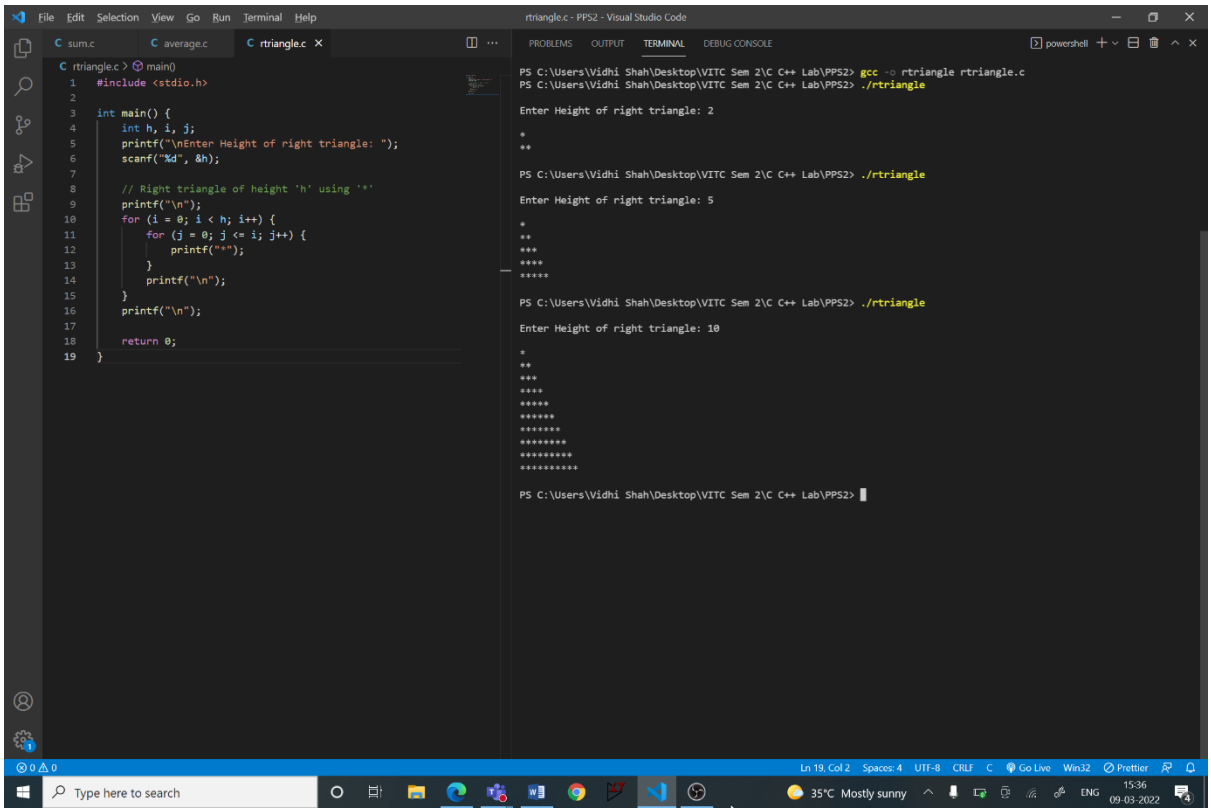
Step i: Print ‘*’ symbol

Step ii: Increment j

Step B: Print a new line

Step C: Increment i

Code:



PPS3

Q1

Aim:

Write a program in C to print the pattern:

```
*
**
***
****
*****
******
*******
********
*********
**********
```

Procedure:

Input:

No input

Output:

Above Pattern

Algorithm:

Step 1: Use for loop until i is less than 10. Initialise i to 1. For each iteration:

Step A: Use for loop until j is less than equal to i. Initialise j to 0.

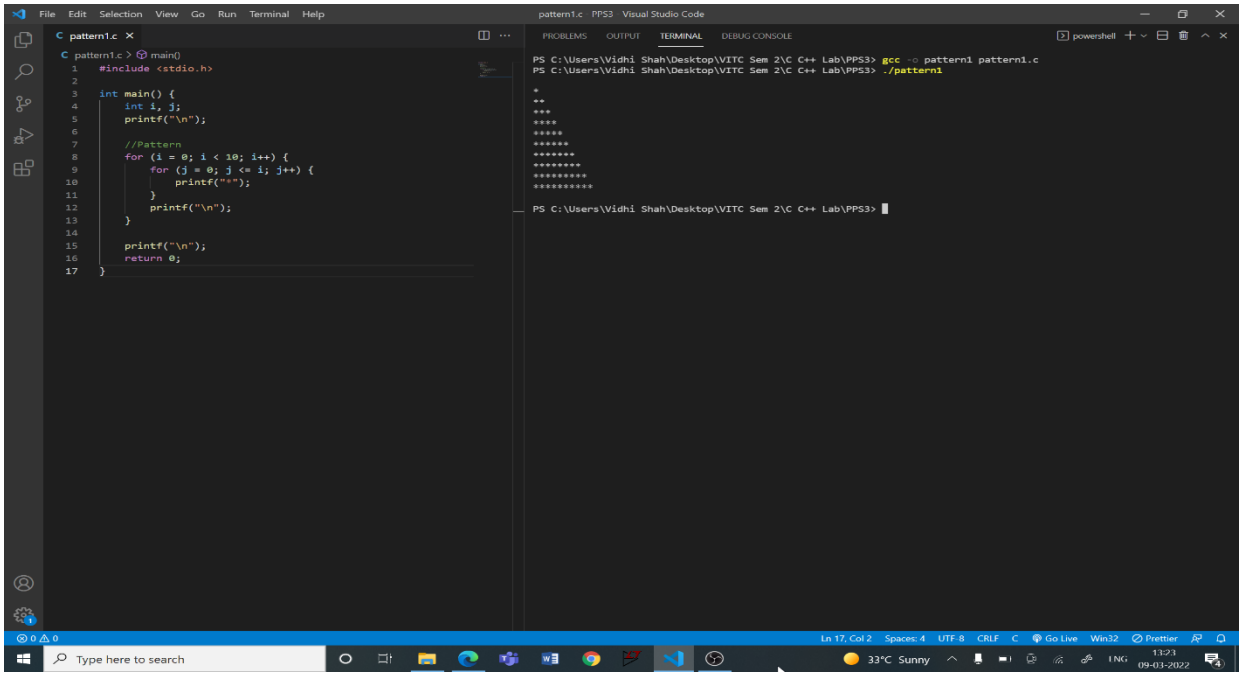
Step i: Print '*' symbol

Step ii: Increment j

Step B: Print a new line

Step C: Increment i

Code:



Q2

Aim:

Write a program in C to print the pattern:

```
**********
*********
********
*******
******
*****
****
***
**
*
```

Procedure:

Input:

No input

Output:

Above Pattern

Algorithm:

Step 1: Use for loop until i is greater than 0. Initialise i to 1. For each iteration:

Step A: Use for loop until j is less than i. Initialise j to 0.

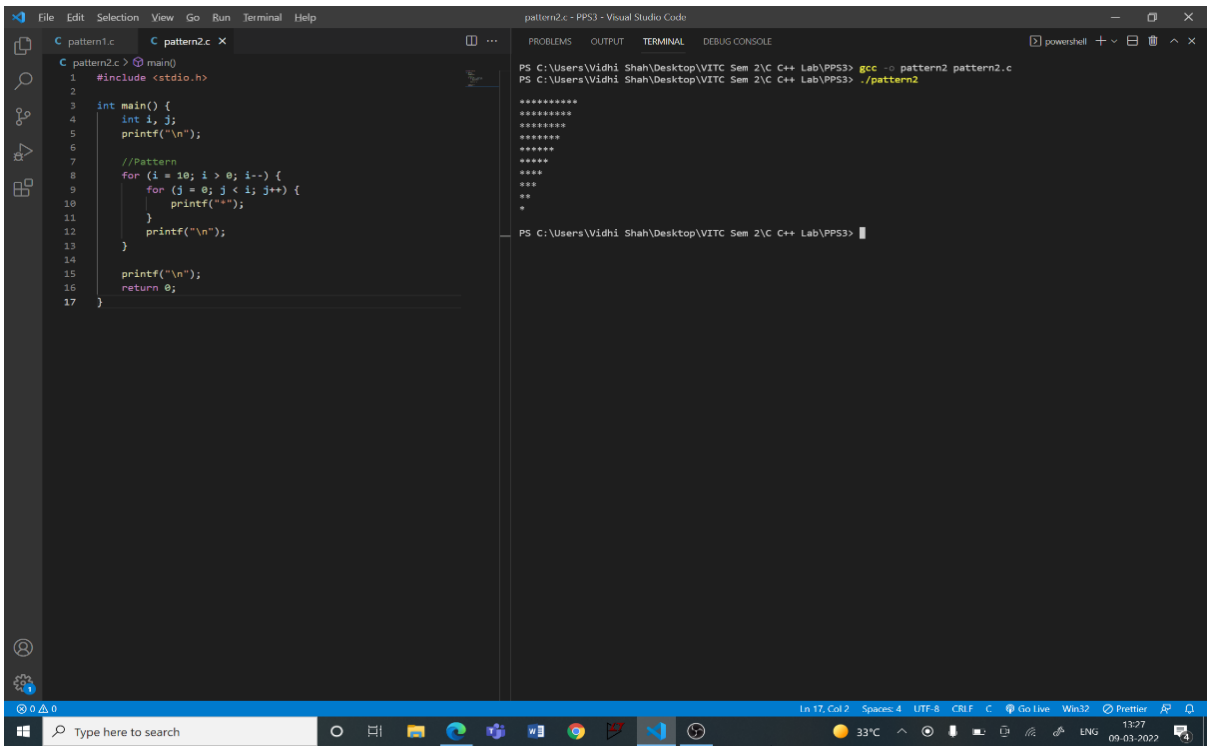
Step i: Print '*' symbol

Step ii: Increment j

Step B: Print a new line

Step C: Increment i

Code:



Q3

Aim:

Write a program in C to print the pattern:

```
   *
  ***
 *****
*******
*********
 *******
  *****
   ***
    *
```

Procedure:

Input:

No input

Output:

Above Pattern

Code:

```c
#include <stdio.h>

int main() {
    int i, j, n = 9;
    printf("\n");

    //Upper Triangle
    for (i = 1; i <= n; i = i + 2) {
        for (j = 0; j < (n-i)/2; j++) {
            printf(" ");
        }

        for (j = 0; j < i; j++) {
            printf("*");
        }

        for (j = 0; j < (n-i)/2; j++) {
            printf(" ");
        }

        printf("\n");
    }

    //Lower Triangle
    for (i = n - 2; i > 0; i = i - 2) {
        for (j = 0; j < (n-i)/2; j++) {
            printf(" ");
        }
```

```c
        for (j = 0; j < i; j++) {
            printf("*");
        }

        for (j = 0; j < (n-i)/2; j++) {
            printf(" ");
        }

        printf("\n");
    }

    printf("\n");
    return 0;
}
```