4-Stage Pipeline Performance Measurement

EXP NO: 36

AIM:

To write a C program to simulate a 4-stage pipeline for basic arithmetic operations and measure its performance.

ALGORITHM:

1. **Start**
2. **Initialize** variables:
    - counter to track the number of cycles.
    - input, num1, num2, op, res, ins, and performance_measure for various inputs and calculations.
3. **Prompt the user** for the first operand (num1), second operand (num2), and the operation to perform.
    - Increment counter for each input operation.
4. **Perform the selected operation** based on user input:
    - **Addition:** res = num1 + num2
    - **Subtraction:** res = num1 - num2
    - **Multiplication:** res = num1 * num2
    - **Division:** Check if num2 is zero; otherwise, perform res = num1 / num2
    - Increment counter after the operation.
5. **Handle invalid cases** by incrementing the counter by 3.
6. **Display the number of cycles** used.
7. **Prompt the user** for the number of instructions (ins).
8. **Calculate the performance measure** as ins / counter.
9. **Display the performance measure**.
10. **End**

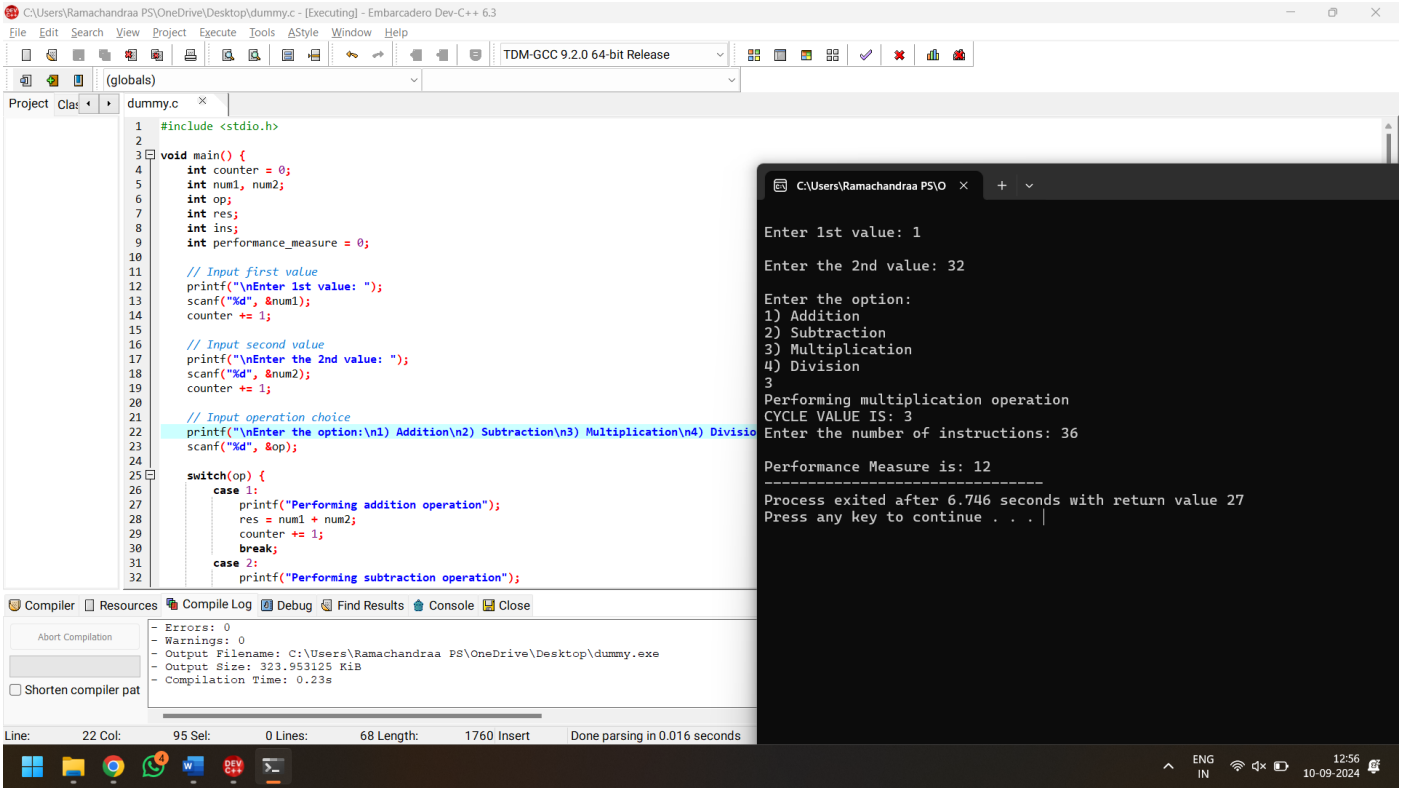
PROGRAM:

```
#include <stdio.h>


void main() {
   int counter = 0;
   int num1, num2;
   int op;
   int res;
   int ins;
   int performance_measure = 0;
```

```
// Input first value
printf("\nEnter 1st value: ");
scanf("%d", &num1);
counter += 1;

// Input second value
printf("\nEnter the 2nd value: ");
scanf("%d", &num2);
counter += 1;

// Input operation choice
printf("\nEnter the option:\n1) Addition\n2) Subtraction\n3) Multiplication\n4) Division");
scanf("%d", &op);

switch(op) {
   case 1:
      printf("Performing addition operation");
      res = num1 + num2;
      counter += 1;
      break;
   case 2:
      printf("Performing subtraction operation");
      res = num1 - num2;
      counter += 1;
      break;
   case 3:
      printf("Performing multiplication operation");
      res = num1 * num2;
      counter += 1;
      break;
   case 4:
      if (num2 == 0) {
         printf("\nDenominator can't be zero");
      } else {
```

```
            printf("Performing division operation");
            res = num1 / num2;
            counter += 1;
        }
        break;
    default:
        printf("Invalid case...");
        counter += 3;
        break;
  }

  printf("\nCYCLE VALUE IS: %d", counter);

  // Input number of instructions
  printf("\nEnter the number of instructions: ");
  scanf("%d", &ins);

  // Calculate performance measure
  performance_measure = ins / counter;

  // Display performance measure
  printf("\nPerformance Measure is: %d", performance_measure);
}
```

INPUT & OUTPUT:



RESULT: Thus, the program was executed successfully using DevC++