LAB REPORT

Course Code: CSE 113
Course Title: Programming and Problem Solving
Experiment No: 5
Experiment Name: Basic C program

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1. Write a c program, declare an array with a size of 5. Store 10, 20, 30, 40 and 50 in it and print them as output.

Pseudo Code:

1. Declare an array arr of size 5 and initialize it with values {10, 20, 30, 40, 50}.
2. For each element in arr:
    - Print the element.

Code:

```
#include <stdio.h>

int main() {
   int arr[5] = {10, 20, 30, 40, 50};
   for (int i = 0; i < 5; i++) {
      printf("%d ", arr[i]);
   }
   return 0;
}
```

2. Write a C program to take input from users and store them in an array. Take 4 even years as input.

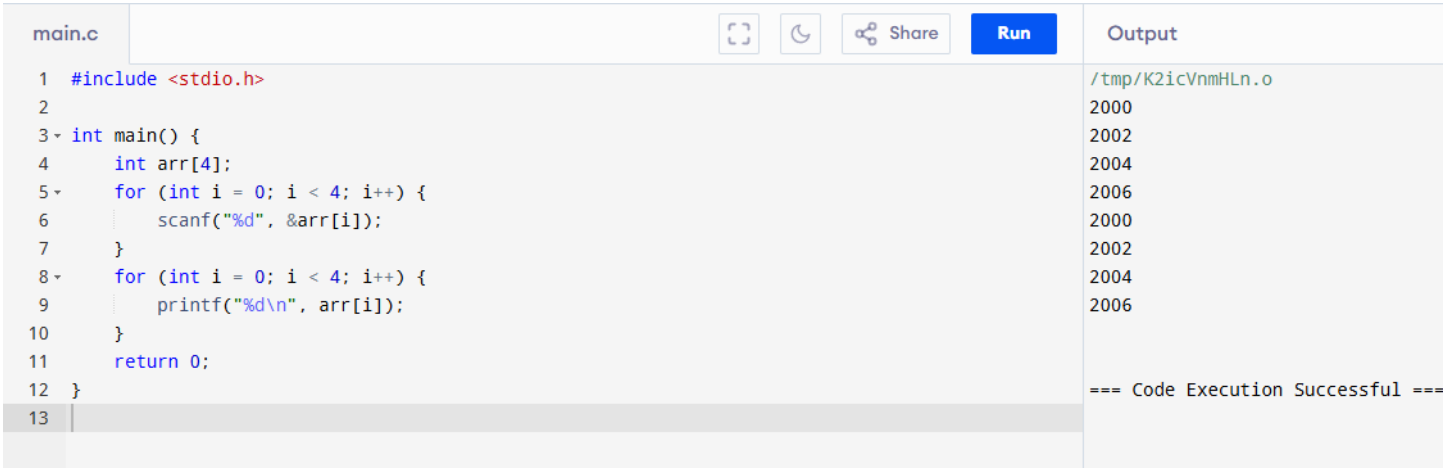
Pseudo Code:

1. Declare an array arr of size 4.
2. For each index in arr:
    - Prompt the user to enter an even year and store it in arr.
3. For each element in arr:
    - Print the element.

Code:

```
#include <stdio.h>

int main() {
   int arr[4];
   for (int i = 0; i < 4; i++) {
      printf("Enter an even year: ");
      scanf("%d", &arr[i]);
   }
   for (int i = 0; i < 4; i++) {
      printf("%d\n", arr[i]);
   }
   return 0;
}
```



3. Write a c program to take input in an array and print it.

Pseudo Code:

1. Prompt the user to enter the array size n.
2. Declare an array arr of size n.
3. For each index in arr:
    - Prompt the user to enter a value and store it in arr.
4. Print each element in arr.

Code:

```
#include <stdio.h>


int main() {
   int n, i;
   printf("Enter array size: ");
   scanf("%d", &n);
   int arr[n];
   for(i = 0; i < n; i++) {
      scanf("%d", &arr[i]);
   }
      printf("Your elements: ");
   for(i = 0; i < n; i++) {
      printf("%d ", arr[i]);
   }
   printf("\n");
   for(i = 0; i < n; i++) {
      printf("a[%d] = %d\n", i, arr[i]);
   }


   return 0;
}
```

main.c

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```c
#include <stdio.h>

int main() {
    int n, i;
    printf("Enter array size: ");
    scanf("%d", &n);

    int arr[n];
    for(i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    printf("Your elements: ");
    for(i = 0; i < n; i++) {
        printf("%d ", arr[i]);
    }
    printf("\n");
    for(i = 0; i < n; i++) {
        printf("a[%d] = %d\n", i, arr[i]);
    }
    return 0;
}
```

Output

```
/tmp/MsaZ1KnIyR.o
Enter array size: 10
9
8
7
6
5
4
3
2
1
0
Your elements: 9 8 7 6 5 4 3 2 1 0
a[0] = 9
a[1] = 8
a[2] = 7
a[3] = 6
a[4] = 5
a[5] = 4
a[6] = 3
a[7] = 2
a[8] = 1
a[9] = 0


=== Code Execution Successful ===
```

4. Write a C program to take 7 values from the user in an array. Use a loop to input those values from the user. As output, print those values.

Pseudo Code:

1. Declare an array arr of size 7.
2. For each index in arr:
    - Prompt the user to enter a value and store it in arr.
3. Print each element in arr.

Code:

```
#include <stdio.h>

int main() {

   int arr[7];

   for (int i = 0; i < 7; i++) {

      printf("Enter value %d: ", i + 1);
```

```
    scanf("%d", &arr[i]);
  }
  printf("Inputted values:\n");
  for (int i = 0; i < 7; i++) {
    printf("%d\n", arr[i]);
  }
  return 0;
}
```

5. Write a C program to take 7 values from the user in an array. Now input values in that array and print the values in reverse order

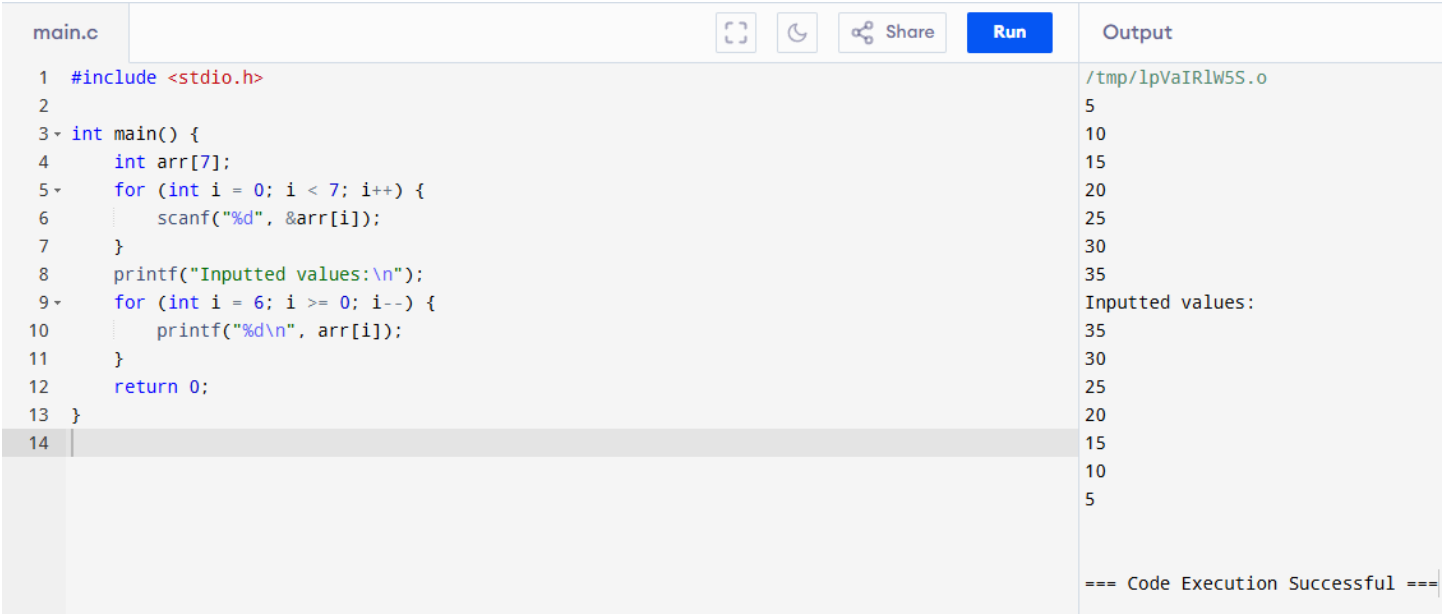
Pseudo Code:

1. Declare an array arr of size 7.
2. For each index in arr:
    - Prompt the user to enter a value and store it in arr.
3. For each element in arr, starting from the last element to the first:
    - Print the element.

Code:

```
#include <stdio.h>

int main() {
   int arr[7];
   for (int i = 0; i < 7; i++) {
      printf("Enter value %d: ", i + 1);
      scanf("%d", &arr[i]);
   }
   printf("Values in reverse order:\n");
   for (int i = 6; i >= 0; i--) {
      printf("%d\n", arr[i]);
   }
   return 0;
}
```



6. Write a c program to take input n times. Here the value of n will be user defined.

As output, print the inputted values.

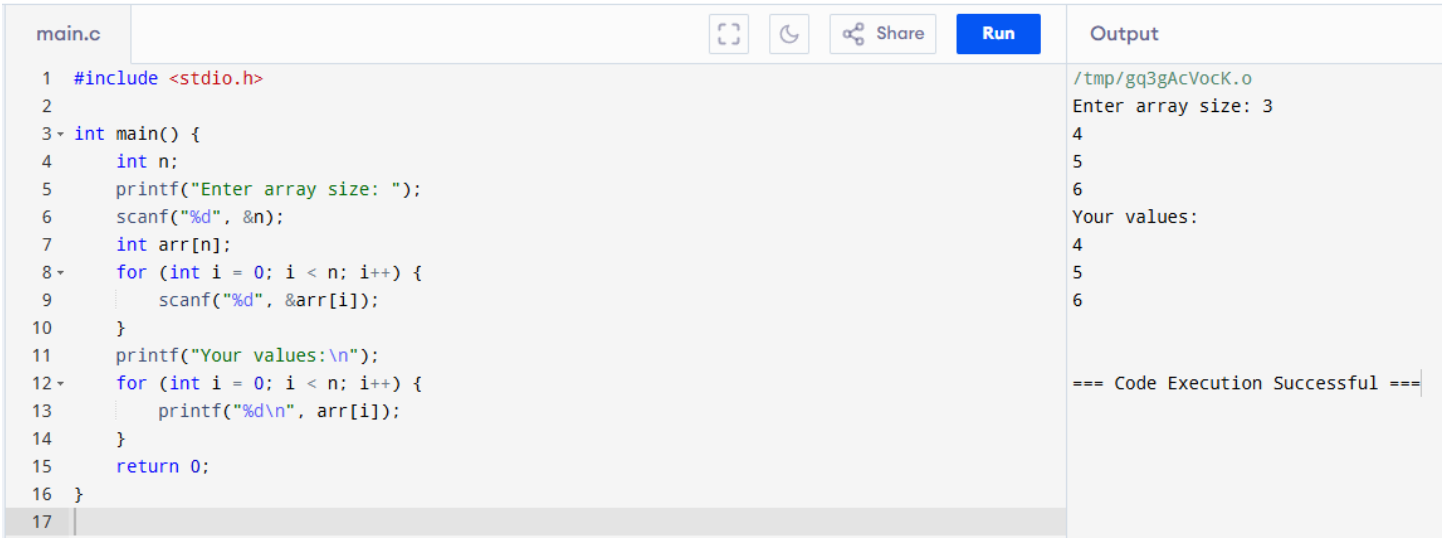
Pseudo Code:

1. Prompt the user to enter the array size n.
2. Declare an array arr of size n.
3. For each index in arr:
    - Prompt the user to enter a value and store it in arr.
4. Print each element in arr.

Code:

```
#include <stdio.h>

int main() {
   int n;
   printf("Enter array size: ");
   scanf("%d", &n);
   int arr[n];
   for (int i = 0; i < n; i++) {
      scanf("%d", &arr[i]);
   }
   printf("Your values:\n");
   for (int i = 0; i < n; i++) {
      printf("%d\n", arr[i]);
   }
   return 0;
}
```



7. Write a c program to take 10 user input in an array and print the sum of those 10 values

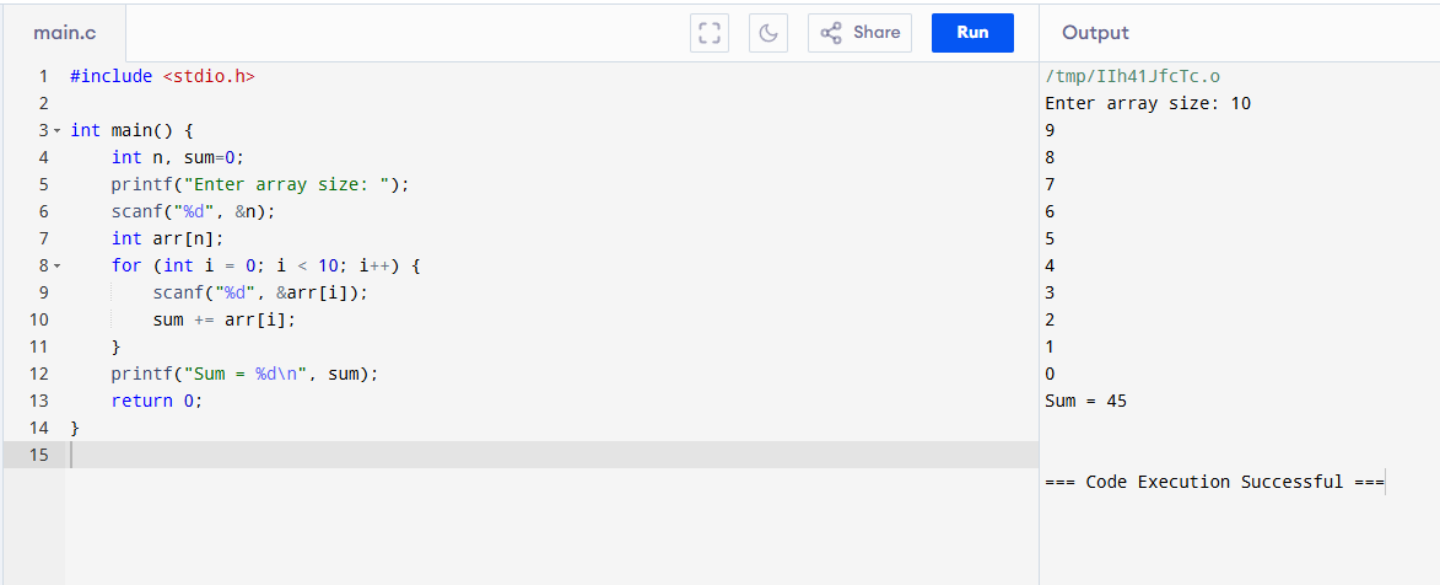
Pseudo Code:

1. Declare an array arr of size 10 and a variable sum initialized to 0.
2. For each index in arr:
    - Prompt the user to enter a value and store it in arr.
    - Add the value to sum.
3. Print sum.

Code:

```
#include <stdio.h>
int main() {
   int arr[10], sum = 0;
   for (int i = 0; i < 10; i++) {
      scanf("%d", &arr[i]);
      sum += arr[i];
   }
   printf("Sum = %d\n", sum);
```

```
    return 0;
}
```



8. Write a C program that would calculate the average of all the elements in an array.

Pseudo Code:

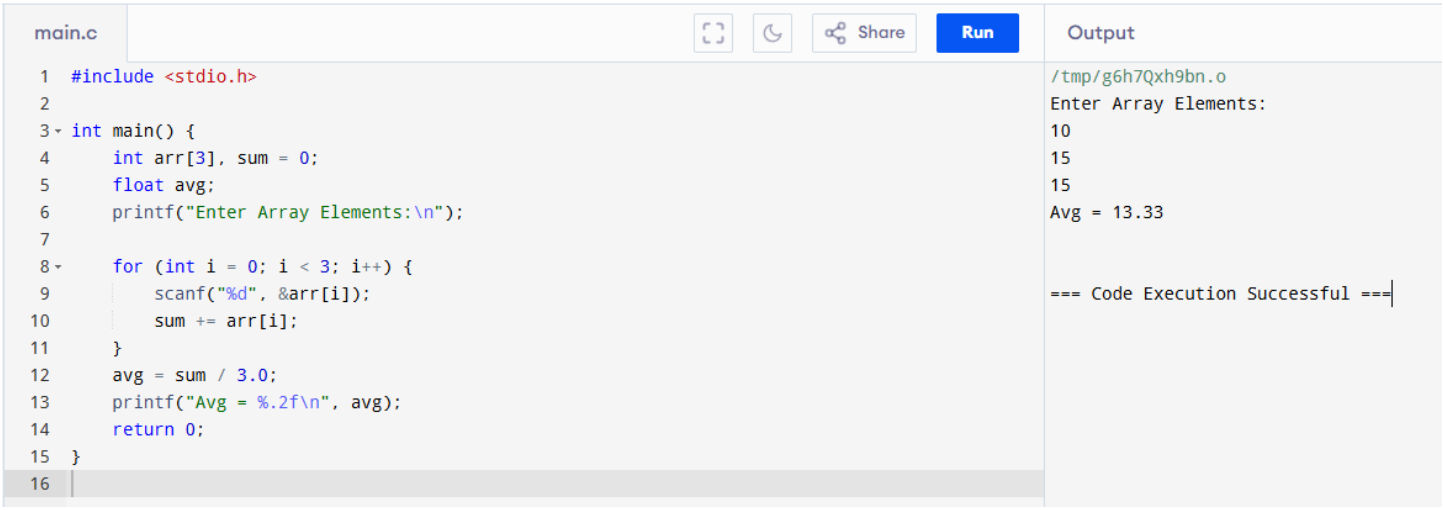
1. Declare an array arr of size 10 and a variable sum initialized to 0.
2. For each index in arr:
    - Prompt the user to enter a value and store it in arr.
    - Add the value to sum.
3. Calculate the average by dividing sum by 10.
4. Print the average.

Code:

```
#include <stdio.h>

int main() {
    int arr[10], sum = 0;
    float avg;
```

```
    for (int i = 0; i < 10; i++) {
        printf("Enter value %d: ", i + 1);
        scanf("%d", &arr[i]);
        sum += arr[i];
    }
    avg = sum / 10.0;  // Calculating the average
    printf("Average = %.2f\n", avg);
    return 0;
}
```



9. Write a C program to find the maximum value in an array

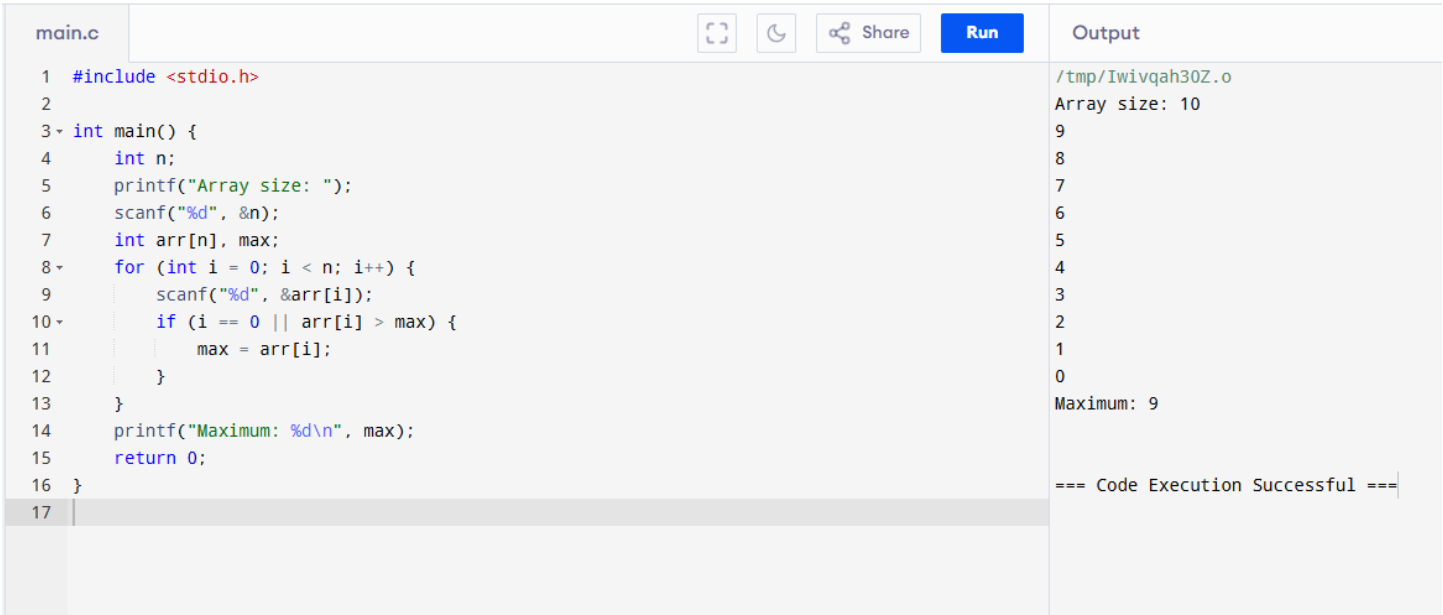
Pseudo Code:

1. Declare an array arr of size 10.
2. For each index in arr:
    - Prompt the user to enter a value and store it in arr.
3. Set max to the first element of arr.
4. For each element in arr:
    - If the element is greater than max, update max.
5. Print max.

Code:

```
#include <stdio.h>

int main() {
   int arr[10], max;
   printf("Enter 10 values:\n");
   for (int i = 0; i < 10; i++) {
      scanf("%d", &arr[i]);
      if (i == 0 || arr[i] > max) {
         max = arr[i];
      }
   }
   printf("Maximum: %d\n", max);
   return 0;
}
```



10. Finding Maximum Element in a 2D Array

Task: Write a program to find the maximum value in a 3x3 array.

Pseudo Code:

1. Declare a 3x3 matrix matrix.
2. For each element in matrix:
    - Prompt the user to enter a value and store it in matrix.
3. Set max to the first element in matrix.
4. For each element in matrix:
    - If the element is greater than max, update max.
5. Print max.

Code:

```
#include <stdio.h>

int main() {
   int matrix[3][3], max;
   printf("Enter 9 elements:\n");
   for (int i = 0; i < 3; i++) {
      for (int j = 0; j < 3; j++) {
         scanf("%d", &matrix[i][j]);
         if ((i == 0 && j == 0) || matrix[i][j] > max) {
            max = matrix[i][j];
         }
      }
   }
   printf("Maximum element = %d\n", max);
   return 0;
}
```

11: Finding Maximum Element in a 2D Array

Task: Write a program to find the maximum value in a row, column array.

Pseudo Code:

1. Declare a 3x3 matrix matrix.
2. For each element in matrix:
    - Prompt the user to enter a value and store it in matrix.
3. Set max to the first element in matrix.
4. For each element in matrix:
    - If the element is greater than max, update max.
5. Print max.

Code:

```
#include <stdio.h>
int main() {
  int matrix[3][3], max;
  printf("Enter 9 elements:\n");
  for (int i = 0; i < 3; i++) {
    for (int j = 0; j < 3; j++) {
      scanf("%d", &matrix[i][j]);
```

```
            if ((i == 0 && j == 0) || matrix[i][j] > max) {
                max = matrix[i][j];
            }
        }
    }
    printf("Maximum element = %d\n", max);
    return 0;
}
```

12: Transposing a Matrix

Task: Transpose a 2x3 matrix and print the result as a 3x2 matrix.

Pseudo Code:

1. Declare a 2x3 matrix matrix and a 3x2 matrix transpose.
2. For each element in matrix:
    - Prompt the user to enter a value and store it in matrix.
3. For each element in matrix:
    - Set the corresponding element in transpose to its transposed position.
4. Print each element in transpose.

Code:

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

```
int main() {
   int matrix[2][3], transpose[3][2];
   printf("Enter 6 elements:\n");
   for (int i = 0; i < 2; i++) {
      for (int j = 0; j < 3; j++) {
         scanf("%d", &matrix[i][j]);
         transpose[j][i] = matrix[i][j];
      }
   }
   printf("Transpose:\n");
   for (int i = 0; i < 3; i++) {
      for (int j = 0; j < 2; j++) {
         printf("%d ", transpose[i][j]);
      }
      printf("\n");
   }
   return 0;
}
```

13: Matrix Addition

Task: Write a program to add two 2x2 matrices and print the result

Pseudo Code:

1. Declare two 2x2 matrices A and B and a 2x2 matrix result.
2. For each element in A:
    - Prompt the user to enter a value and store it in A.
3. For each element in B:
    - Prompt the user to enter a value and store it in B.
4. For each element in A and B:
    - Set the corresponding element in result as the sum of A and B.
5. Print each element in result.

Code:

```
#include <stdio.h>
int main() {
   int A[2][2], B[2][2], result[2][2];
   printf("Enter elements for Matrix A:\n");
   for (int i = 0; i < 2; i++) {
      for (int j = 0; j < 2; j++) {
         scanf("%d", &A[i][j]);
      }
   }
   printf("Enter elements for Matrix B:\n");
   for (int i = 0; i < 2; i++) {
      for (int j = 0; j < 2; j++) {
         scanf("%d", &B[i][j]);
         result[i][j] = A[i][j] + B[i][j];
      }
   }
   printf("Resultant Matrix:\n");
```

```
    for (int i = 0; i < 2; i++) {
        for (int j = 0; j < 2; j++) {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

main.c

Share Run

```c
#include <stdio.h>

int main() {
    int A[2][2], B[2][2], result[2][2];
    printf("Matrix A:");
    for (int i = 0; i < 2; i++)
        for (int j = 0; j < 2; j++)
            scanf("%d", &A[i][j]);

    printf("Matrix B:");
    for (int i = 0; i < 2; i++)
        for (int j = 0; j < 2; j++)
            scanf("%d", &B[i][j]);

    for (int i = 0; i < 2; i++)
        for (int j = 0; j < 2; j++)
            result[i][j] = A[i][j] + B[i][j];

    printf("Resultant Matrix:\n");
    for (int i = 0; i < 2; i++) {
        for (int j = 0; j < 2; j++) {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

Output

```
/tmp/7r19lUOZOP.o
Matrix A:1 2
3 4
Matrix B:5 6
7 8
Resultant Matrix:
6 8
10 12


=== Code Execution Successful ===
```

14: Grading System - Average Marks Calculation

Task: Write a program to calculate the average marks of 4 students in 3 subjects

Pseudo Code:

1. Declare a 2D array marks with 4 rows (students) and 3 columns (subjects).
2. For each student:
    - Initialize sum to 0.
    - For each subject:
        - Prompt the user to enter the marks and store it in marks.
        - Add marks to sum.
    - Calculate the average by dividing sum by 3.
    - Store the average in an array avg.
3. Print each student's average from avg.

Code:

```
#include <stdio.h>

int main() {
   int marks[4][3];
   float avg[4];
   for (int i = 0; i < 4; i++) {
      int sum = 0;
      for (int j = 0; j < 3; j++) {
         scanf("%d", &marks[i][j]);
         sum += marks[i][j];
      }
      avg[i] = sum / 3.0;
   }
   for (int i = 0; i < 4; i++) {
      printf("Average marks for student %d: %.2f\n", i + 1, avg[i]);
   }
   return 0;
```

}

main.c

Share Run

```c
#include <stdio.h>

int main() {
    int marks[4][3];
    float avg[4];
    for (int i = 0; i < 4; i++) {
        printf("Marks of student %d: ", i + 1);
        int sum = 0;
        for (int j = 0; j < 3; j++) {
            scanf("%d", &marks[i][j]);
            sum += marks[i][j];
        }
        avg[i] = sum / 3.0;
    }
    for (int i = 0; i < 4; i++) {
        printf("Average marks for student %d: %.2f\n", i + 1, avg[i]);
    }
    return 0;
}
```

Output

```
/tmp/wemce9tAKg.o
Marks of student 1: 70 80 90
Marks of student 2: 60 75 85
Marks of student 3: 95 80 70
Marks of student 4: 50 65 75
Average marks for student 1: 80.00
Average marks for student 2: 73.33
Average marks for student 3: 81.67
Average marks for student 4: 63.33


=== Code Execution Successful ===
```

Thank You