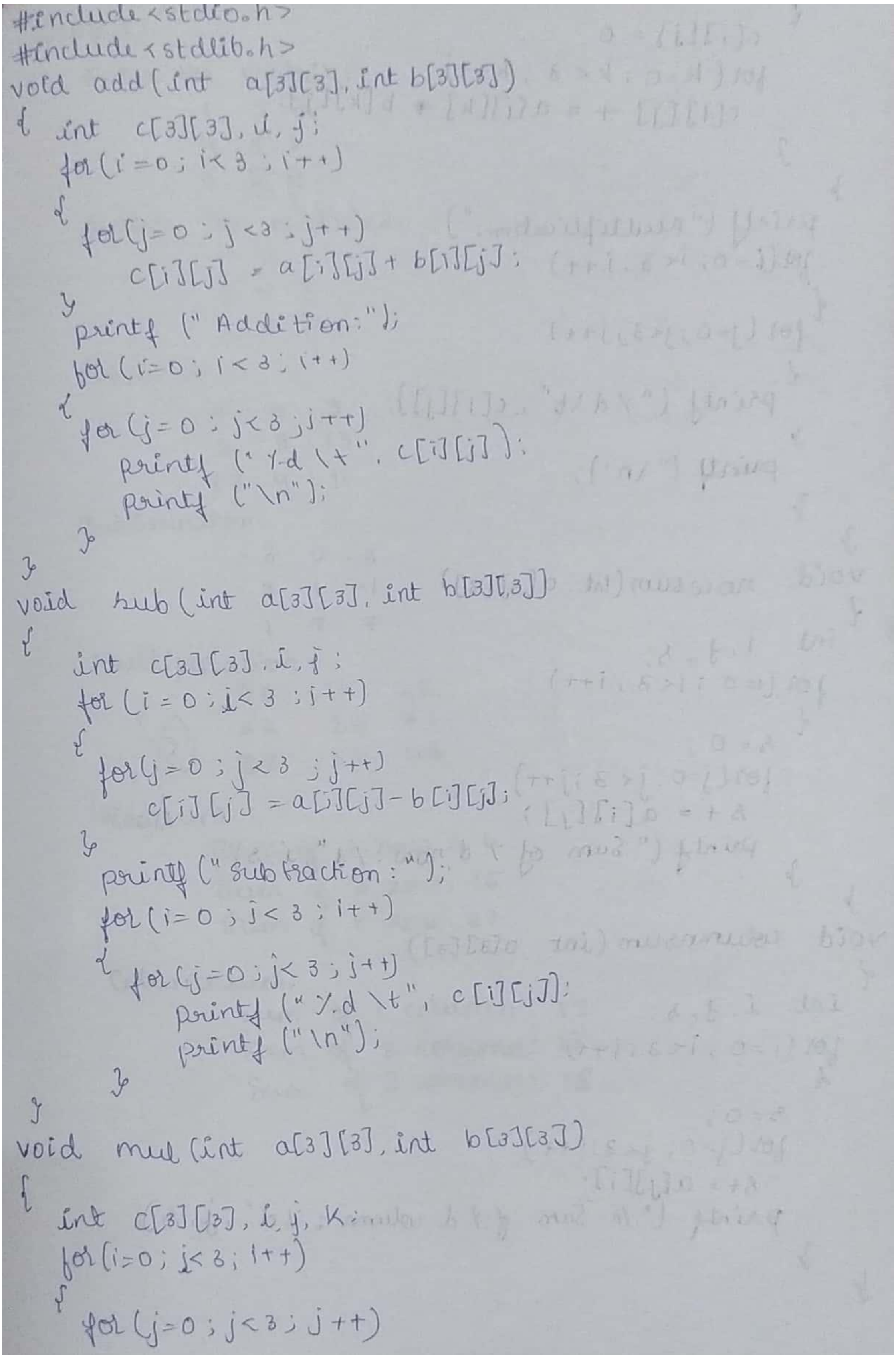
WEEK 1

MATRIX MULTIPLICATION PROGRAM



```
#include<stdio.h>
#include<stdlib.h>
void add(int  a[3][3], int b[3][3])
{ int  c[3][3], i, j;
   for(i=0; i<3 ; i++)
   {
    for(j=0 ; j<3 ; j++)
         c[i][j] = a[i][j] + b[i][j];
   }
   printf ("Addition:");
   for (i=0; i<3; i++)
   {
    for (j=0 ; j<3 ;j++)
         printf ("%d \t", c[i][j]);
         printf ("\n");
    }
}
void  sub (int a[3][3], int b[3][3])
{
   int  c[3][3], i, j;
   for (i = 0 ; i< 3 ; i++)
   {
    for(j=0 ; j<3 ; j++)
         c[i][j] = a[i][j]- b[i][j];
   }
    printf ("subtraction:");
    for (i=0 ; j< 3 ; i++)
    {  for (j=0 ; j< 3 ; j++)
          printf ("%d \t", c[i][j]);
          printf ("\n");
     }
 }
void  mul (int  a[3][3], int  b[3][3])
{
  int  c[3][3], i, j, k;
  for(i=0; j<3; i++)
  {
   for (j=0 ; j<3 ; j++)
```

```
      {
        c[i][j] = 0
        for(k=0 ; k< 3 ; k++)
          c[i][j] + = a[i][k] * b[k][j];
      }
   }
    printf ("multiplication:");
    for(i=0; i<3 ; i++)
    {
     for(j=0;j<3;j++)
      {
       printf ("%d \t", c[i][j]);
      }
       printf ("\n");
      }
   }
   void   rowsum(int a[3][3])
   {
    int  i,j,s;
    for (i=0 ;i<3 ; i++)
     {
        s = 0 ;
        for(j=0 ; j< 3 ;j++)
          s + = a[i][j];
         printf (" Sum of %d row : %d", i,s);
     }
   }
  void  columnsum (int  a[3][3])
  {
   int  i, j, s;
   for (i=0 ; i<3 ; i++)
    {
       s=0;
       for(j=0; j<3;j++)
         s+= a[j][i];
       printf ("/n Sum of %d column : %d", j, s);
    }
  }
```

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Output:

```
Enter the matrix1:
        1  2  3
        4  5  6
        7  8  9
Enter the matrix2:
        4  2  6
        2  4  7
        6  1  2
Addition:
        5   4   9
        6   9   13
        13  9   11
Subtraction:
          -3  0  -3
           2  1  -1
           1  7   7
Multiplication:
          26   13   26
          62   34   71
          98   55   116
Rowsum:
       Sum of 1 row: 6
       Sum of 2 row: 15
       Sum of 3 row: 27
Columnsum:
        Sum of 1 column: 12
        Sum of 2 column: 15
        Sum of 3 column: 18
```

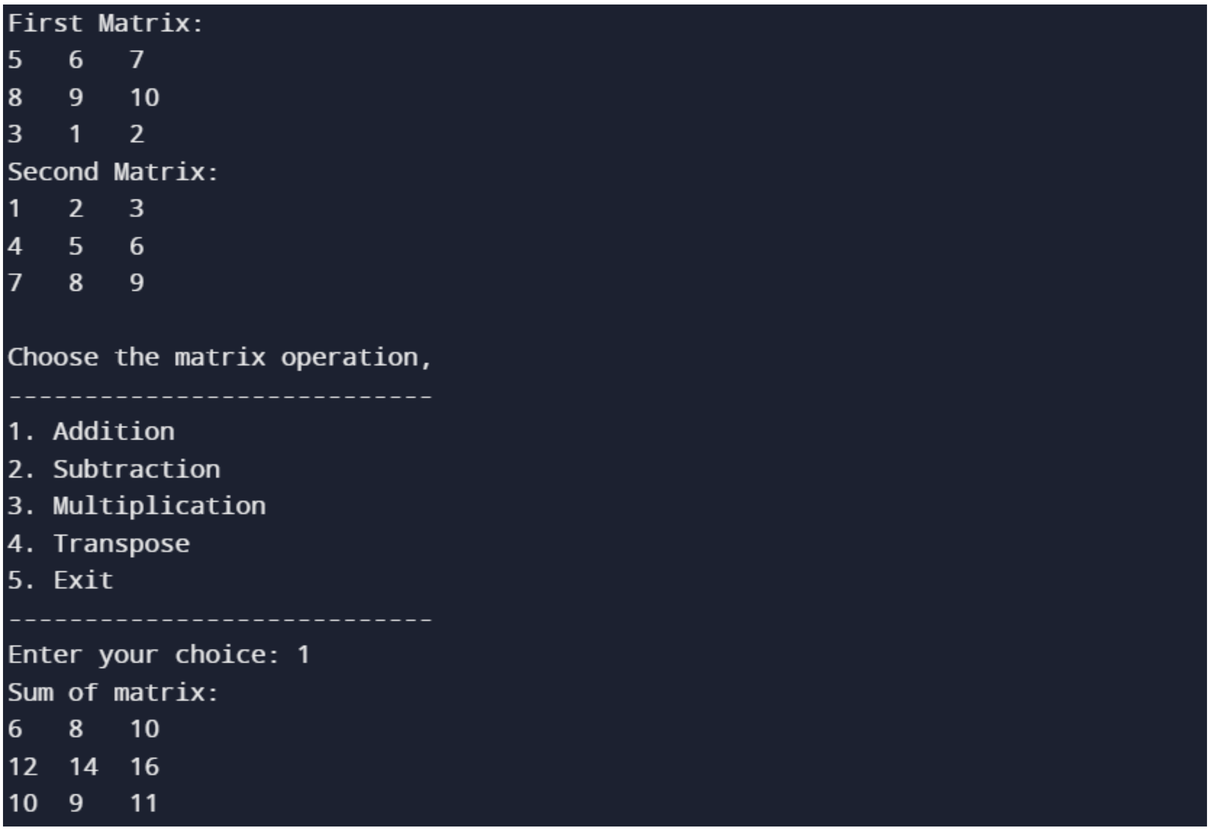
C Program code:

```
#include<stdio.h>

#include<stdlib.h>

void add(int m[3][3], int n[3][3], int sum[3][3])

{

  for(int i=0;i<3;i++)

    for(int j=0;j<3;j++)

      sum[i][j] = m[i][j] + n[i][j];

}

void subtract(int m[3][3], int n[3][3], int result[3][3])

{

  for(int i=0;i<3;i++)

    for(int j=0;j<3;j++)

      result[i][j] = m[i][j] - n[i][j];

}

void multiply(int m[3][3], int n[3][3], int result[3][3])

{

  for(int i=0; i < 3; i++)

  {

    for(int j=0; j < 3; j++)

    {

      result[i][j] = 0;

      for (int k = 0; k < 3; k++)

      result[i][j] += m[i][k] * n[k][j];

    }

  }

}

void transpose(int matrix[3][3], int trans[3][3])

{

  for (int i = 0; i < 3; i++)

    for (int j = 0; j < 3; j++)
```

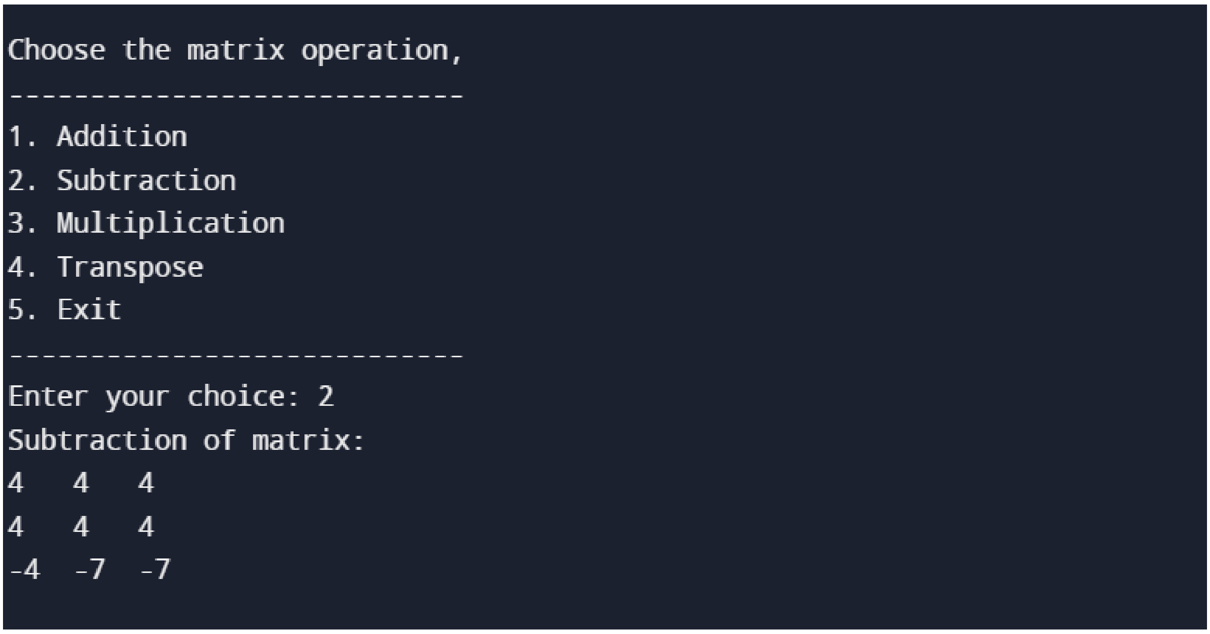
```
      trans[i][j] = matrix[j][i];
}
void display(int matrix[3][3])
{
  for(int i=0; i<3; i++)
  {
    for(int j=0; j<3; j++)
      printf("%d\t",matrix[i][j]);
    printf("\n");
  }
}
int main()
{
  int a[][3] = { {5,6,7}, {8,9,10}, {3,1,2} };
  int b[][3] = { {1,2,3}, {4,5,6}, {7,8,9} };
  int c[3][3];
  printf("First Matrix:\n");
  display(a);
  printf("Second Matrix:\n");
  display(b);
  int choice;
  do
  {
    printf("\nChoose the matrix operation,\n");
    printf("----------------------------\n");
    printf("1. Addition\n");
    printf("2. Subtraction\n");
    printf("3. Multiplication\n");
    printf("4. Transpose\n");
    printf("5. Exit\n");
    printf("----------------------------\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);
    switch (choice) {
      case 1:
        add(a, b, c);
        printf("Sum of matrix: \n");
        display(c);
        break;
      case 2:
        subtract(a, b, c);
        printf("Subtraction of matrix: \n");
        display(c);
        break;
      case 3:
        multiply(a, b, c);
        printf("Multiplication of matrix: \n");
        display(c);
        break;
      case 4:
        printf("Transpose of the first matrix: \n");
        transpose(a, c);
        display(c);
        printf("Transpose of the second matrix: \n");
        transpose(b, c);
        display(c);
        break;
      case 5:
        printf("Thank You.\n");
        exit(0);
      default:
        printf("Invalid input.\n");
```

```
        printf("Please enter the correct input.\n");
    }
  }while(1);
  return 0;
}
```

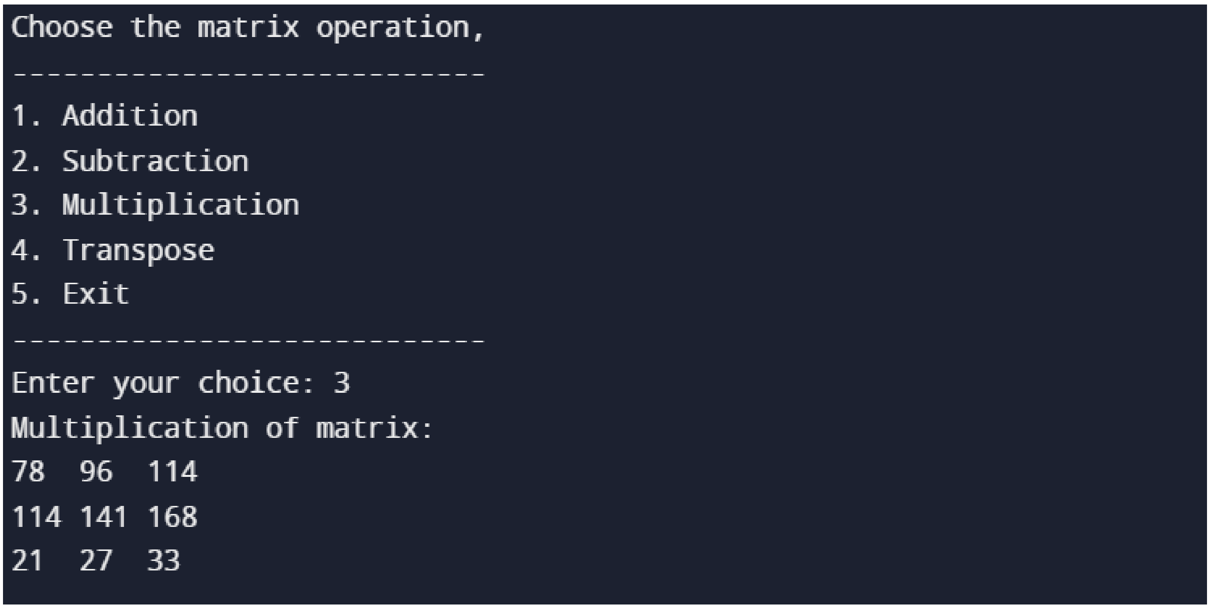
OUTPUT:



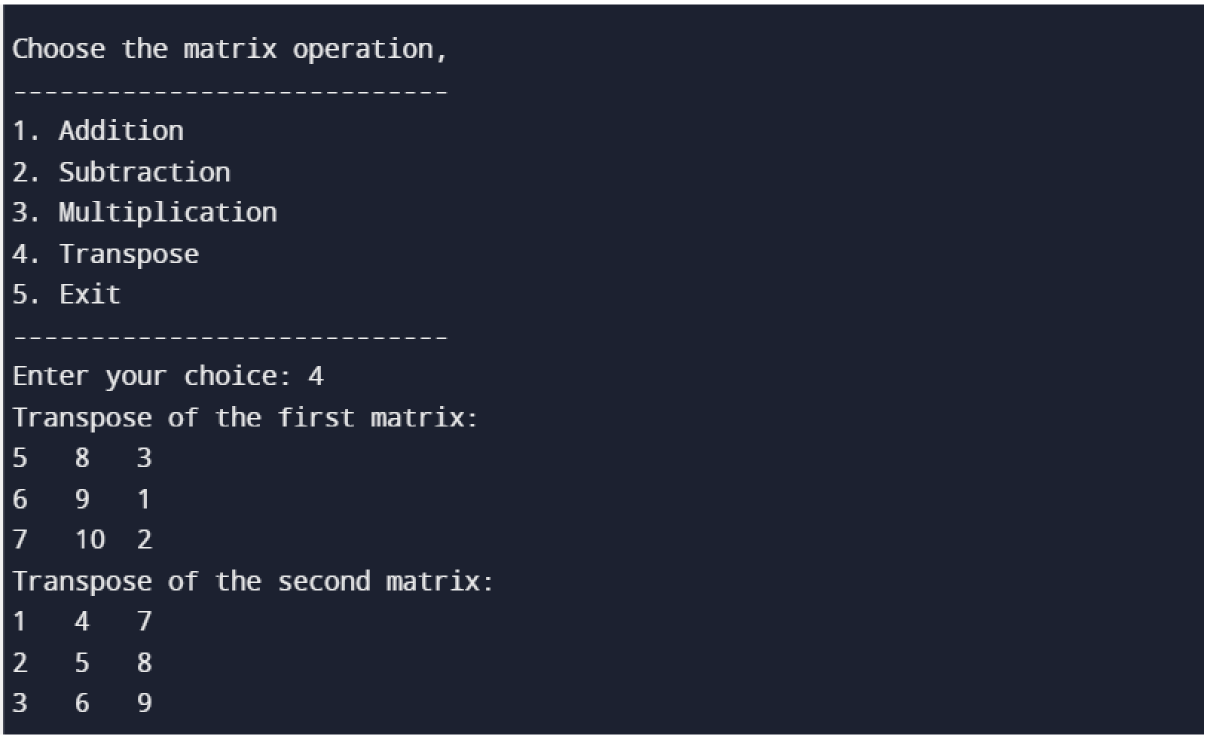
```
First Matrix:
5   6   7
8   9   10
3   1   2
Second Matrix:
1   2   3
4   5   6
7   8   9

Choose the matrix operation,
----------------------------
1. Addition
2. Subtraction
3. Multiplication
4. Transpose
5. Exit
----------------------------
Enter your choice: 1
Sum of matrix:
6   8   10
12  14  16
10  9   11
```



```
Choose the matrix operation,
----------------------------
1. Addition
2. Subtraction
3. Multiplication
4. Transpose
5. Exit
----------------------------
Enter your choice: 2
Subtraction of matrix:
4   4   4
4   4   4
-4  -7  -7
```



```
Choose the matrix operation,
----------------------------
1. Addition
2. Subtraction
3. Multiplication
4. Transpose
5. Exit
----------------------------
Enter your choice: 3
Multiplication of matrix:
78  96  114
114 141 168
21  27  33
```



```
Choose the matrix operation,
----------------------------
1. Addition
2. Subtraction
3. Multiplication
4. Transpose
5. Exit
----------------------------
Enter your choice: 4
Transpose of the first matrix:
5   8   3
6   9   1
7   10  2
Transpose of the second matrix:
1   4   7
2   5   8
3   6   9
```