Matrix Operations (Addition, Subtraction, Transpose) Solutions in C

Matrix Addition

Solution Code:

```
#include <stdio.h>

int main() {
    int rows, cols;
    printf("Enter the number of rows and columns: ");
    scanf("%d %d", &rows, &cols);

    int matrix1[rows][cols], matrix2[rows][cols], result[rows][cols];

    printf("Enter elements of first matrix:\n");
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            printf("Enter element [%d][%d]: ", i+1, j+1);
            scanf("%d", &matrix1[i][j]);
        }
    }

    printf("Enter elements of second matrix:\n");
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            printf("Enter element [%d][%d]: ", i+1, j+1);
            scanf("%d", &matrix2[i][j]);
        }
    }

    // Performing matrix addition
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
```

```
            result[i][j] = matrix1[i][j] + matrix2[i][j];
        }
    }

    printf("Resultant Matrix after Addition:\n");
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Matrix Subtraction

Solution Code:

```
#include <stdio.h>

int main() {
    int rows, cols;
    printf("Enter the number of rows and columns: ");
    scanf("%d %d", &rows, &cols);

    int matrix1[rows][cols], matrix2[rows][cols], result[rows][cols];

    printf("Enter elements of first matrix:\n");
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            printf("Enter element [%d][%d]: ", i+1, j+1);
            scanf("%d", &matrix1[i][j]);
        }
    }
```

```
    printf("Enter elements of second matrix:\n");
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            printf("Enter element [%d][%d]: ", i+1, j+1);
            scanf("%d", &matrix2[i][j]);
        }
    }

    // Performing matrix subtraction
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            result[i][j] = matrix1[i][j] - matrix2[i][j];
        }
    }

    printf("Resultant Matrix after Subtraction:\n");
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            printf("%d ", result[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Matrix Transpose

Solution Code:

```
#include <stdio.h>

int main() {
    int rows, cols;
```

```
    printf("Enter the number of rows and columns: ");
    scanf("%d %d", &rows, &cols);

    int matrix[rows][cols], transpose[cols][rows];

    printf("Enter elements of the matrix:\n");
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            printf("Enter element [%d][%d]: ", i+1, j+1);
            scanf("%d", &matrix[i][j]);
        }
    }

    // Performing transpose
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            transpose[j][i] = matrix[i][j];
        }
    }

    printf("Transpose of the Matrix:\n");
    for(int i = 0; i < cols; i++) {
        for(int j = 0; j < rows; j++) {
            printf("%d ", transpose[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```