॥वसुधैव कुटुम्बकम्॥
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Assignment No.: 07	
Course Name	Programming in C Lab
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Branch	CSE
Class	C-1
Academic Year & Semester	2023-2024 & Semester 2
Date of Performance	23/02/2024
Assignment Title (Full):	Write a C program to perform matrix operations like addition, subtraction and transpose.

Theory: (Note: According to the assignment title, please write the background information as an introduction, then write the steps/logic/process/algorithm of the C program in the Journal Notebook, and add its screenshot in the below theory response.)

Theory Response:

1. Declare matrices `a`, `b`, and `c`.
2. Use nested loops to add corresponding elements of matrices `a` and `b` and store the result in matrix `c`.
3. Print matrices `a` and `b`.
4. Print the sum of matrices `a` and `b` (matrix `c`).
5. Print the difference of matrices `a` and `b`.
6. Print the transpose of matrix `a`.

Output: (Note: Execute the C program as per the assignment title, take an input code and output result screenshot with the date and time from your computer, and add its screenshot in the below output response.)

Output Response:

```c
#include <stdio.h>

int main(){
    int a[2][2] = {{1,2},{3,4}};
    int b[2][2] = {{5,6},{7,8}};
    int c[2][2];
    for (int i=0; i<2; i++){
        for (int j=0; j<2; j++){
            c[i][j] = a[i][j] + b[i][j];
        }
    }
    printf("\nMatrix A:\n");
    for (int i=0; i<2; i++){
        for (int j=0; j<2; j++){
            printf("%d ", a[i][j]);
        }
        printf("\n");
    }
    printf("\nMatrix B:\n");
    for (int i=0; i<2; i++){
        for (int j=0; j<2; j++){
            printf("%d ", b[i][j]);
        }
        printf("\n");
    }

    // Addition of matrices:
    printf("\nMatrix C (A+B):\n");
    for (int i=0; i<2; i++){
        for (int j=0; j<2; j++){
            printf("%d ", c[i][j]);
        }
        printf("\n");
    }

    // Subtraction of matrices:
    printf("\nMatrix C (A-B):\n");
    for (int i=0; i<2; i++){
        for (int j=0; j<2; j++){
            printf("%d ", a[i][j]-b[i][j]);
        }
        printf("\n");
    }

    // Transpose of a matrix:
    printf("\nMatrix A (Transpose):\n");
    for (int i=0; i<2; i++){
        for (int j=0; j<2; j++){
            printf("%d ", a[j][i]);
        }
        printf("\n");
    }
    return 0;
}
```

```
Matrix A:
1 2
3 4

Matrix B:
5 6
7 8

Matrix C (A+B):
6 8
10 12

Matrix C (A-B):
-4 -4
-4 -4

Matrix A (Transpose):
1 3
2 4
(base) fahee@Faheems-MacBook-Pro Programming_in_C %
```

Conclusion: (Note: Write the key findings or outcome from this assignment, enlist their potential real-world applications in Journal Notebook, and add its screenshot in the below conclusion response.)

Conclusion Response:

The code performs basic matrix operations - addition, subtraction, and transpose. It initializes matrices `a` and `b`, computes the sum and difference, and prints the original matrices along with the results of these operations. The transpose of matrix `a` is also calculated and displayed. The code demonstrates fundamental matrix manipulation in C.

Please note that assignment content can be readable.

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