Introduction to Soft Computing Assignment 1

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Q: Write a C program to compute multiplication of two given interval matrices [A] and [B] by extending the basic multiplication of intervals.

A:

```
#include <stdio.h>
#include <stdlib.h>
float max(float num1, float num2)
{
    return (num1 > num2) ? num1 : num2;
}
float min(float num1, float num2)
{
    return (num1 > num2) ? num2 : num1;
}
int main()
{
    printf("Enter the number of rows and columns in interval matrices [A] and [B]\n");
    int row, col;
    printf("row: ");
    scanf("%d", &row);
    printf("col: ");
    scanf("%d", &col);
    float (*Al)[row] = malloc(sizeof(float[row][col]));
    float (*Au)[row] = malloc(sizeof(float[row][col]));
```

```
float (*Bl)[row] = malloc(sizeof(float[row][col]));
float (*Bu)[row] = malloc(sizeof(float[row][col]));
float (*Cl)[row] = malloc(sizeof(float[row][col]));
float (*Cu)[row] = malloc(sizeof(float[row][col]));
printf("\nEnter the lower (Al) bound of first interval matrix [A]:\n");
for(int i = 0; i < row; i++) {
	for(int j = 0; j < col; j++) {
		scanf("%f", &Al[i][j]);
	}
}
printf("\nEnter the upper (Au) bound of first interval matrix [A]:\n");
for(int i = 0; i < row; i++) {
	for(int j = 0; j < col; j++) {
		scanf("%f", &Au[i][j]);
	}
}
printf("\nEnter the lower (Bl) bound of second interval matrix [B]:\n");
for(int i = 0; i < row; i++) {
	for(int j = 0; j < col; j++) {
		scanf("%f", &Bl[i][j]);
	}
}
printf("\nEnter the upper (Bu) bound of second interval matrix [B]:\n");
for(int i = 0; i < row; i++) {
	for(int j = 0; j < col; j++) {
		scanf("%f", &Bu[i][j]);
```

```
            }
        }
        for(int i = 0; i < row; i++) {
            for(int j = 0; j < col; j++) {
                Cl[i][j] = min(min(Al[i][j] * Bl[i][j], Al[i][j] * Bu[i][j]), min(Au[i][j] *
Bl[i][j], Au[i][j] * Bu[i][j]));
                Cu[i][j] = max(max(Al[i][j] * Bl[i][j], Al[i][j] * Bu[i][j]), max(Au[i][j]
* Bl[i][j], Au[i][j] * Bu[i][j]));
            }
        }
        printf("\nThe multiplication of two interval matrices [A] and [B] is [C] = [A] *
[B]:\n");
        for(int i = 0; i < row; i++) {
            for(int j = 0; j < col; j++) {
                printf("[%f, %f]", Cl[i][j], Cu[i][j]);
            }
            printf("\n");
        }
        return 0;
}
```

The input and output of the program, on page 20 and 22, the inputs are the same:

Input:
Enter the number of rows and columns in interval matrices [A] and [B]
2 2
Enter the lower (Al) bound of first interval matrix [A]:
4 5
6 4
Enter the upper (Au) bound of first interval matrix [A]:
6 8
7 5
Enter the lower (Bl) bound of second interval matrix [B]:
2 -2
-1 2
Enter the upper (Bu) bound of second interval matrix [B]:
4 1
1 4

Input:
Enter the lower bound of interval matrix [A]: [4 5;6 4]
Enter the upper bound of interval matrix [A]: [6 8;7 5]
Enter the lower bound of interval matrix [B]: [2 -2;-1 2]
Enter the upper bound of interval matrix [B]: [4 1;2 4]

Figure1: Input of page 20 and 22

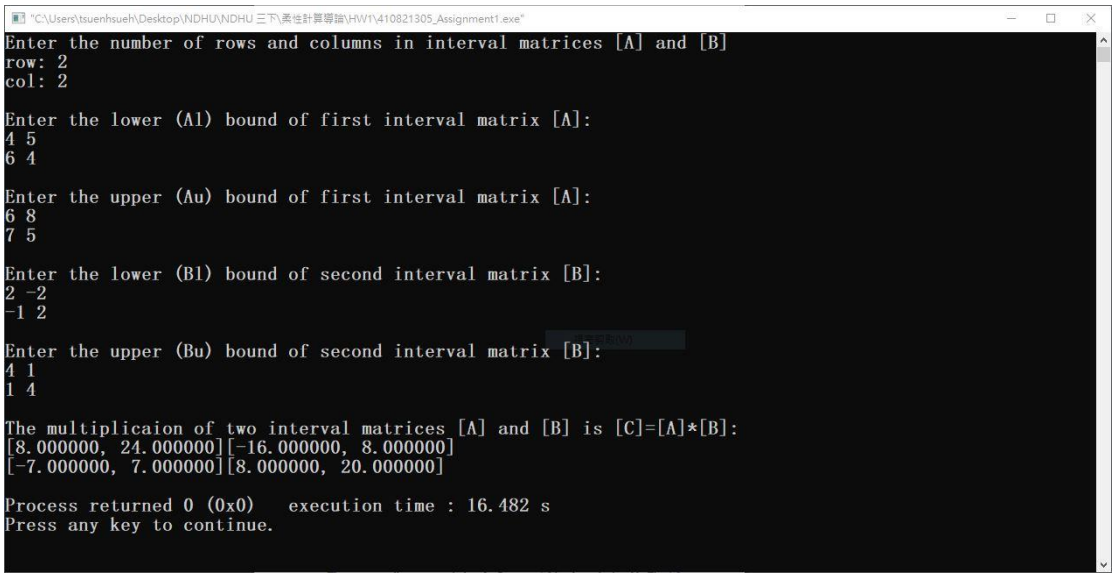

Figure2: Input and output of my program