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Course : BBM 203
Experiment : ASSIGNMENT 1
Subject : Data Structures and Algorithms
Due Date : 04.11.2018 23:59:59
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Programming Language : C

2. Software Using Documentation

2.1. Software Usage

I used eclipse for this assignment.My assignment takes 5 command line arguments and writes output to a .txt file.I use dynamic memory allocation for matrix and array since size of matrix are taken from command line.Our software's aim is to find the treasure using map matrix and key matrix.Then writes the center of the sub matrix (map matrix's sub matrix) and result of the matrix multiplication to the .txt file.(name of the file is taken from command line).

3.Software Design Notes

3.1. Description of the program

3.1.1. Problem

We have two matrix.One matrix is key and the other one is map matrix.We start from left corner of map matrix.We multiply key matrix and map matrix's sub matrix but not matrix multiplication, every integer is multiplied with another matrix element which is in the same location.We take the mod 5 of the result and we determine our way with result.If result is 1 then we must go up if we can't then we must go down.If result is 2 then we must go down if we can't we must go up.If result is 3 then we must go right if we can't we must go left.If the result is 4 then we must go left if we can't then we must go right. If the mod 5 is 0 then we find the treasure.

3.2. System Chart

INPUT	PROGRAMS	OUTPUT
mapmatrix.txt	findtreasure	output.txt
keymatrix.txt		

Name of the inputs and output can change since we take the name of the input and outputs from the command line.

3.3. Main Data Structures

I used matrix and arrays in this assignment.I also used dynamic memory allocation for array and matrix.

3.4. Algorithm

Firstly I open files which are readable and writable and their names are taken from command line.After that I take map and key matrix sizes from command line arguments using sscanf function and assign them into mapline , mapcolumn and keysize variables.Then make dynamic memory allocation for arrays with mapline, mapcolumn and keysize. Array names are arrayy for mapmatrix and arrayy2 for keymatrix.Then I make dynamic memory allocation for matrix with malloc using mapline, mapcolumn and keysize.Matrix names are matrix and matrix2. Then I read input files using fscanf and assign elements to arrays, one for map and one for key.After that I send the elements which are in the arrays to matrix again one for map and one for key.Then I make a function declaration which is named findtreasure for finding the treasure.It takes 8 arguments which are two for matrix (matrix, matrix2), one for key size (keysize), two for sub matrix location (line, column), two for map matrix sizes (mapline, mapcolumn), one for output file (file3).I declare a variable which is named result for keeping result.After that I declare a variable which is named difference for determining the center of the submatrix(normally line and column variables saves the left corner of the submatrix) when you add the difference variable to line and column variable you can find the center of the submatrix.Then I printf the center of the submatrix to the output file.Then I make the multiplication sub matrix with key matrix and save the result in the result variable.Then I take the mod 5 of result.After that we determine our way with result and if can’t go that way we must go opposite of it.