BBM203 SOFTWARE LABORATORY I

Experiment 1

Subject: Data Structures and Algorithms
Submission Date : 22.10.2018
Deadline : 04.11.2018 23:59:59
Programming Language : C

Emre Hancı - 21604552
Advisor: R.A. Alaettin UÇAN

-What was the problem?

In this assignment our advisors expect to teach us “How can I use dynamic arrays?”, ”How can I use file input-output functions?”, ”How can I use recursion function?” with a treasure game. Program about a treasure map and key map, those map has not a constant lenght and height, they are changing according to files, and our teachers expect that all the maps must be dynamic arrays. After loading the maps into program, the program starting search on treasure map starting left-top of the map and dot product of map and sum of all the dot product. If the result mod by 5 is 0, it is meaning that you found teasure and program stop working. If the result mod by 5 is 1, it is meaning that go up on the map and keep searching. If the result mod by 5 is 2, it is meaning that go down on the map and keep searching. If the result mod by 5 is 3, it is meaning that go right on the map and keep searching. If the result mod by 5 is 4, it is meaning that go left on the map and keep searching. But there is an exclusive situration about program, if you are already on the end of right side and the result says that you need to go right then program should be go the reverse direction. That is the all point of the assignment.

-My Solution

For the solving this program firstly I open the treasure map file and load it to a two-dimension array which is define as dynamicly with malloc, then I close the file. After that I open the key map file and load it to another two-dimension array, which is also define as dynamicly with malloc, then I close this file to. After that I send the treasure map, key map, searching positon on map, total row,col number of treasure map, the row & col number of key map which is equal eachother and the output file. In search function I start to dot product of matched number on treasure map and key map and I assign it to a variable and I calculate the mod of result by 5 and start a switch-case part.

If the mod result is equal to zero that is meaning that you found treasure then I send the middle point of searching area, result of dot product and the output file to an other function which is used for print the result line to the output file. This function is open output file for append and write the line on to output file then close the file.

If the mod result is not equal to zero than program need to keep searching but before the sending next positon on the map we need to check new positon is outbound on the map or not if it is outbound we send the reverse direction of next positon.

After exit the recursion function, I make free the malloced area on the memory.

-The functions are implemented

As I reported on the part of my solution, I used two function. One for searching recursively on the treasure map and one for printing the line on to output file.

Search Function: This function is start matching the treasure map and key map according the dot product. Then when the for loop catch a match it start to calculate the result of it. After exit the matching loop, I need a variable for calculate the middle point of map. I make a formula for that because the row and col number of key map is not constant and it must to be odd number. The formula is (c-1)/2 , c is representation of key map row & col number. After that I calculate the mod of result by 5, after that program comes to switch-case part of function. If mod result is equal to zero program send middle point, result and file information to print function which is created for print a line to output file. If result of mod is not equal to zero function print the current positon and result to output file with same print funciton, after print the line to output file function check the next positon on the map is valid or non-valid, (non-valid means that out of the map.) if it is non-valid program send the reverse positon of next positon to search function that is for make this function recursively.

Prt Function: This function misson is print a result line to output file, firstly this function open the output file for append after that function print the line to file and then function close the output file.