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Course **:** BBM203 PROGRAMMING LAB

Subject **:** Data Structures and Algorithms

Experiment :Gain knowledge on C

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Data Due **: 04.11.2018 23:59:59**

Main Program **:findtreasure**

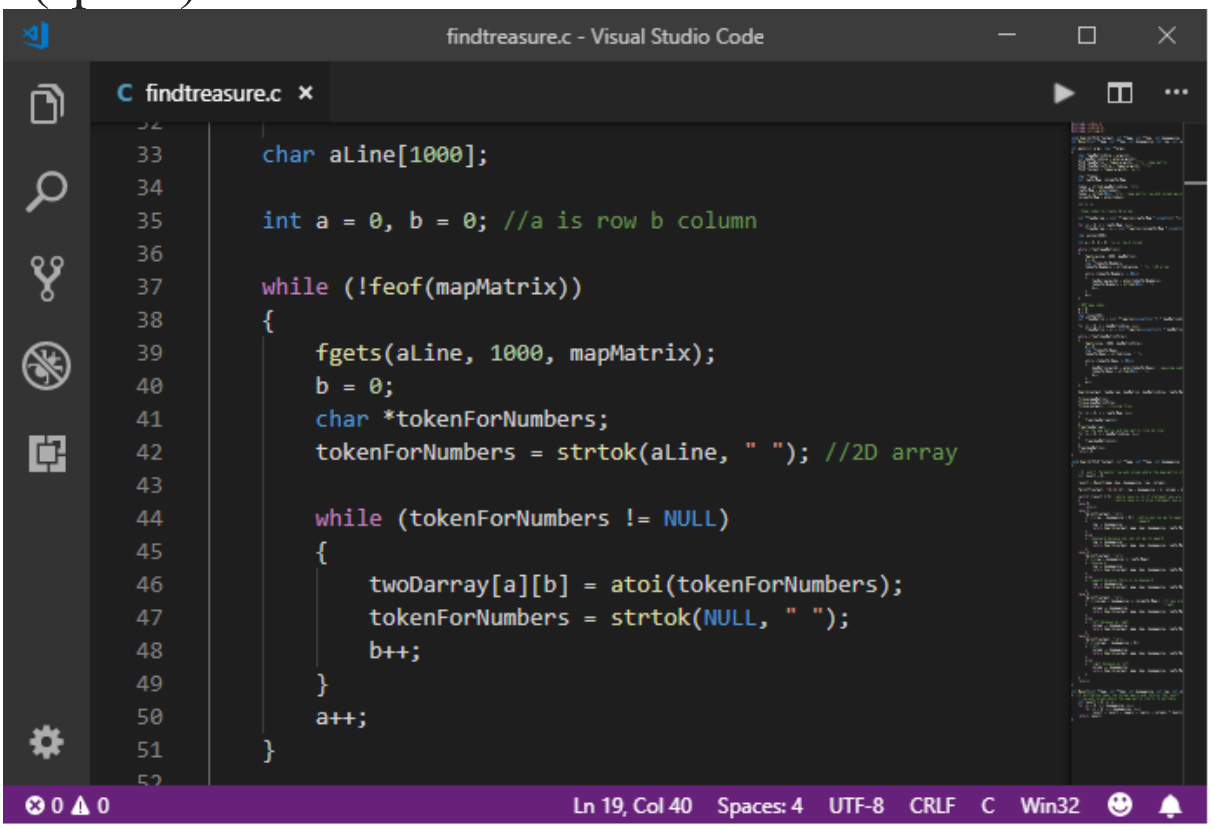
PROBLEMS:

- Finding a treasure with some number operation.
- Taking files from command line as arguments.
- Making 2D array to store matrix numbers.

  without static array.
- Parsing numbers.
- Creating a recursive function to find treasure.
- Multiplying same row-column pairs on key matrix and sub-matrix and taking mode.
- Checking can estimated direction be final direction .
- Printing the result to the output.
- Checking also heap summary and leak summary.

SOLUTIONS: (ALGORITHM)

- argv[1] taken as char then parsing from “x” with strtok funtion then storing as rowForMap and columnForMap .
- argv[2] taken as int using atoi function.
- fopen functions are used to open the files as argv[3-4-5].
- 2D array created dynamic then members of map matrix passing them after they parsing from “(space)” with strtok function.



- Key matrix was created same as map matrix.

My recursion function called Search:

- Search returns void.
- Takes 8 parameters.
  1-Output file
  2-2D map matrix
  3-2D key matrix
  4-Key map size (row=column)
  5-Row for big map
  6-Column for big map
  7 and 8-starting row and column numbers where the matrices start to multiply.

- Result function multiplies same row-column numbers of map and key matrices and returns the results integer.

- After finding result, function writes to output file with fprintf function.

- Then taking mode 5 of result in switch Function, it goes to cases
  Case 0: directly stops.
  Case 1:After substraction if you are within the borders you can go to estimated direction. Otherwise final direction will be reverse estimated direction.
- This recursion works same in other case.

FINALLY

- After recursion works and find the treasure, files close with fclose function

- Finally function free the 2D map matrix and key matrix line by line

- Before free the matrices

b21526681@rdev:~/public_html/a

```
[b21526681@rdev ~]$ d public_html
-bash: d: command not found
[b21526681@rdev ~]$ cd public_html
[b21526681@rdev public_html]$ cd a
[b21526681@rdev a]$ dir
findtreasure  findtreasure.c  keymatrix.txt  Makefile  mapmatrix.txt
[b21526681@rdev a]$ dir
findtreasure.c  keymatrix.txt  Makefile  mapmatrix.txt
[b21526681@rdev a]$ make
gcc -std=c99 -o findtreasure findtreasure.c
[b21526681@rdev a]$ valgrind --leak-check=yes --leak-check=full --show-leak-kind
s=all ./findtreasure 12x18 3 mapmatrix.txt keymatrix.txt output.txt
==6280== Memcheck, a memory error detector
==6280== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==6280== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==6280== Command: ./findtreasure 12x18 3 mapmatrix.txt keymatrix.txt output.txt
==6280==
==6280==
==6280== HEAP SUMMARY:
==6280==     in use at exit: 1,020 bytes in 17 blocks
==6280==   total heap usage: 20 allocs, 3 frees, 2,724 bytes allocated
==6280==
==6280== 36 bytes in 3 blocks are indirectly lost in loss record 1 of 4
==6280==    at 0x4C29C23: malloc (vg_replace_malloc.c:299)
==6280==    by 0x40099A: main (in /mnt/ogrenci/ogr/b21526681/public_html/a/findt
reasure)
==6280==
==6280== 60 (24 direct, 36 indirect) bytes in 1 blocks are definitely lost in lo
ss record 2 of 4
==6280==    at 0x4C29C23: malloc (vg_replace_malloc.c:299)
==6280==    by 0x400967: main (in /mnt/ogrenci/ogr/b21526681/public_html/a/findt
reasure)
==6280==
==6280== 864 bytes in 12 blocks are indirectly lost in loss record 3 of 4
==6280==    at 0x4C29C23: malloc (vg_replace_malloc.c:299)
==6280==    by 0x400884: main (in /mnt/ogrenci/ogr/b21526681/public_html/a/findt
reasure)
==6280==
==6280== 960 (96 direct, 864 indirect) bytes in 1 blocks are definitely lost in
loss record 4 of 4
==6280==    at 0x4C29C23: malloc (vg_replace_malloc.c:299)
==6280==    by 0x400851: main (in /mnt/ogrenci/ogr/b21526681/public_html/a/findt
reasure)
==6280==
==6280== LEAK SUMMARY:
==6280==    definitely lost: 120 bytes in 2 blocks
==6280==    indirectly lost: 900 bytes in 15 blocks
==6280==      possibly lost: 0 bytes in 0 blocks
==6280==    still reachable: 0 bytes in 0 blocks
==6280==         suppressed: 0 bytes in 0 blocks
==6280==
==6280== For counts of detected and suppressed errors, rerun with: -v
==6280== ERROR SUMMARY: 2 errors from 2 contexts (suppressed: 0 from 0)
[b21526681@rdev a]$
```

- After free the matrices