

מטלה 1 מערכות הפעלה

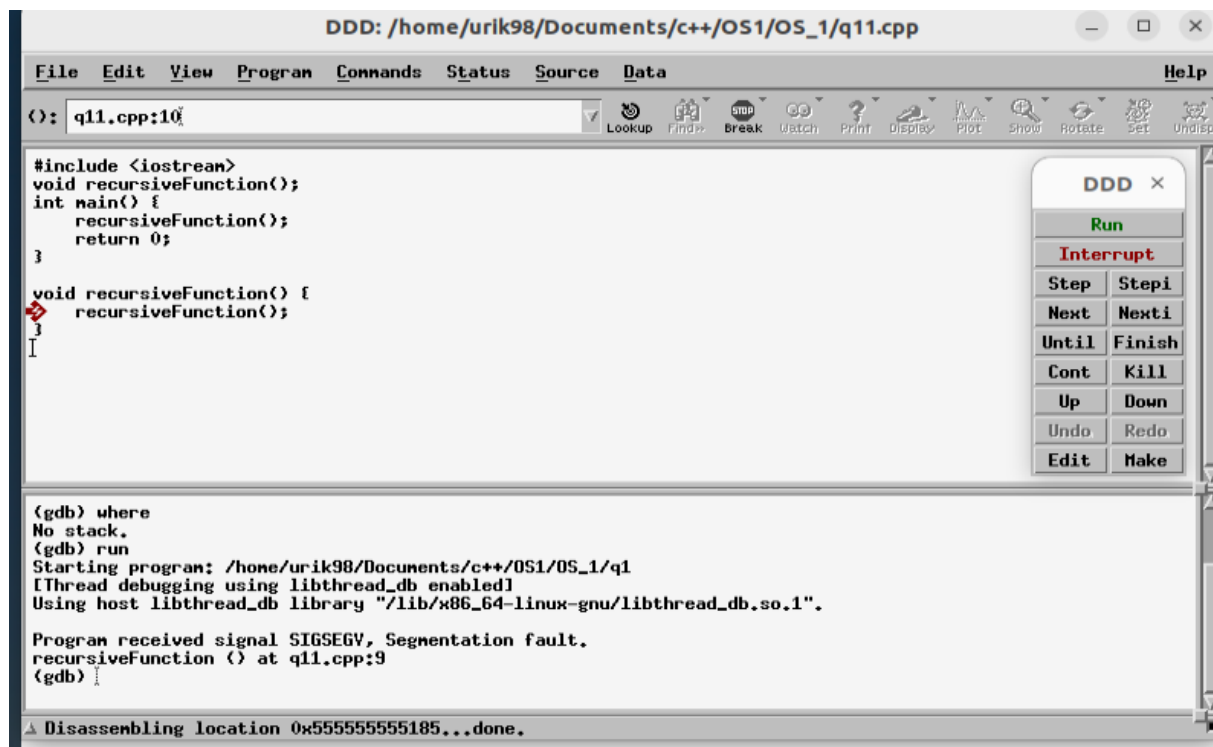
שאלה 1

```
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q1$ gdb -c core. home urik98 Documents c++ OS1 OS_1 q1 q1.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.25385.14767740 q11
GNU gdb (Ubuntu 12.1-0ubuntu1-22.04) 12.1
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This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from q11...

warning: exec file is newer than core file.
[New LWP 25385]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Core was generated by './q11'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0 recursiveFunction () at q11.cpp:9
9 recursiveFunction();
(gdb) display r
Display all 200 possibilities? (y or n)
(gdb) display n
No symbol "n" in current context.
(gdb) ft
Fast tracepoint 1 at 0x58e0eb133185: file q11.cpp, line 9.
(gdb) bt
#0 recursiveFunction () at q11.cpp:9
#1 0x000058e0eb13318a in recursiveFunction () at q11.cpp:9
#2 0x000058e0eb13318a in recursiveFunction () at q11.cpp:9
#3 0x000058e0eb13318a in recursiveFunction () at q11.cpp:9
```

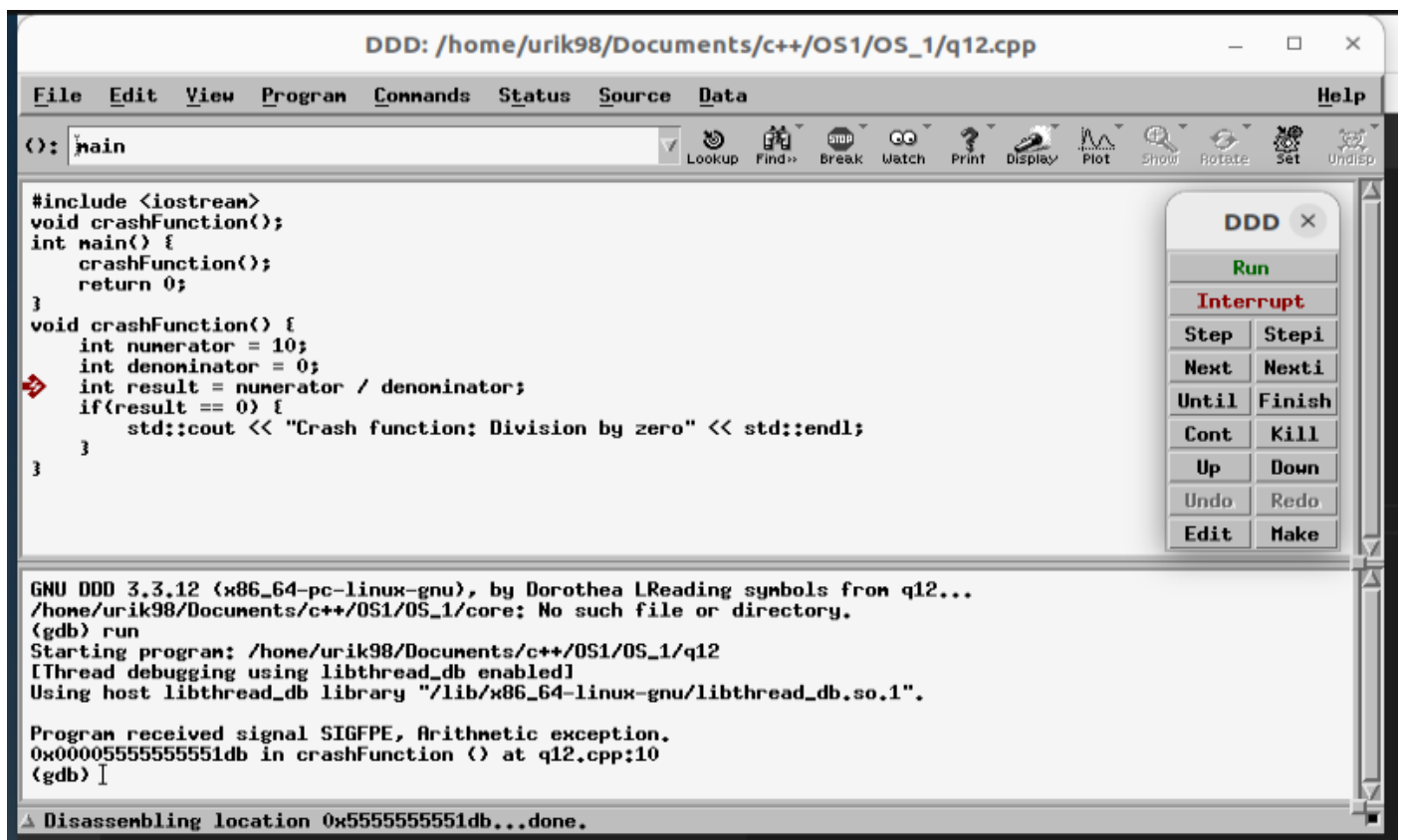
כפי שניתן לראות התוכנית קרסה כיוון שיש קריאה רקורסיבית אינסופית מה שמעמיס על מחסנית הקריאות יתר על המידה



כמו שגם ניתן לראות בddd גם בטרמינל שלו וגם עם החץ האדום באותו אופן q12 הזו קרסה כיוון שניסינו לחלק ב-0 (Arithmetic exception)

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS COMMENTS
core. home urik98 Documents c++ OS1 OS 1 q1 q11.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.25385.14767740 q11 q12.cpp
core. home urik98 Documents c++ OS1 OS 1 q1 q11.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.35096.15448129 q11.cpp q13.cpp
core. home urik98 Documents c++ OS1 OS 1 q1 q12.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.35936.15516354 q12
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q12$ ./q12
Floating point exception (core dumped)
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q12$ ls
core. home urik98 Documents c++ OS1 OS 1 q1 q11.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.25385.14767740 q11.cpp
core. home urik98 Documents c++ OS1 OS 1 q1 q11.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.35096.15448129 q12
core. home urik98 Documents c++ OS1 OS 1 q1 q12.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.35936.15516354 q12.cpp
core. home urik98 Documents c++ OS1 OS 1 q1 q12.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.38765.15758794 q13.cpp
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q12$ gdb -c core. home urik98 Documents c++ OS1 OS 1 q1 q12.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.38765.15758794 q
GNU gdb (Ubuntu 12.1-0ubuntu1-22.04) 12.1
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For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.
For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from q12...
[New LWP 38765]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
--Type <RET> for more, q to quit, c to continue without paging--run
Core was generated by './q12'.
Program terminated with signal SIGFPE, Arithmetic exception.
#0 0x00005a7e955e1db in crashFunction () at q12.cpp:10
10      int result = numerator / denominator;
(gdb) display denominator
1: denominator = 0
(gdb)
```

כנ"ל בddd



באותו אופן כאן התוכנית ניסתה לגשת למקום לא תקין

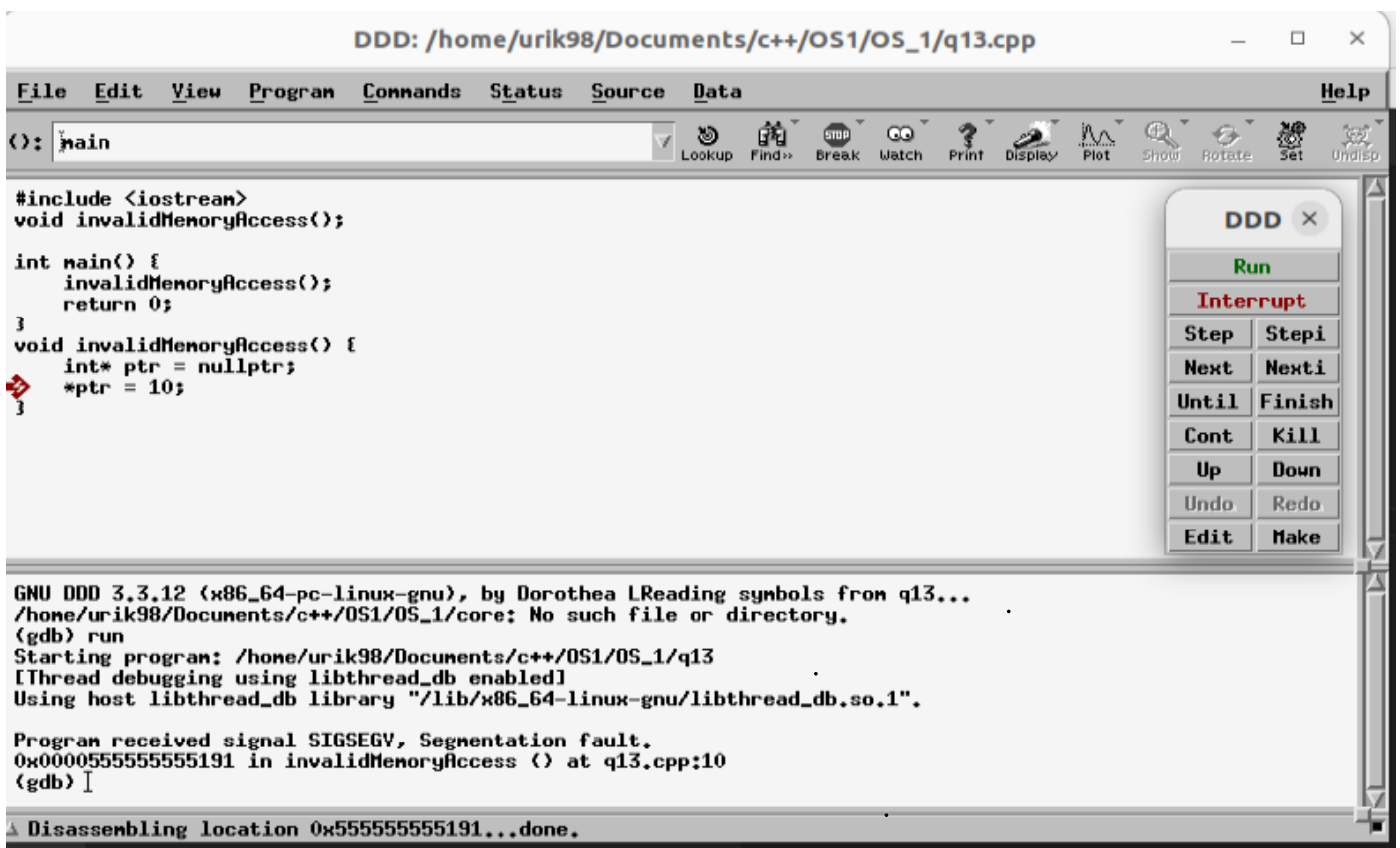
```

urik98@ubuntu:~/Documents/c++/OS1/OS_1/q1$ gdb -c core. home urik98 Documents c++ OS1 OS 1 q1 q13.1000.b3ef28ee-1a18-40ce-9635-7cb7863787de.40026.16365284 q13
GNU gdb (Ubuntu 12.1-0ubuntu1-22.04) 12.1
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This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from q13...
[New LWP 40020]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Core was generated by './q13'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0 0x0000555555555191 in invalidMemoryAccess () at q13.cpp:10
10      *ptr = 10;
(gdb) display ptr
1: ptr = (int *) 0x0
(gdb)

```

כנ"ל בddd



שאלה 2

```

urik98@ubuntu:~/Documents/c++/OS1/OS_1/q2$ make
g++ -Wall -g -Wextra -pedantic -std=c++11 -o q2 q2.cpp
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q2$ ./q2 1 2
Poisson result: 0.270671
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q2$

```

מצ"ב דוגמת הרצה

שאלה 3

```
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q3$ make all
g++ -Wall -g -std=c++11 -c -o q3.o q3.cpp
g++ -Wall -g -std=c++11 -c -fPIC -o libpoisson.so Poisson.cpp
g++ -Wall -g -std=c++11 -o q3 q3.o -L. -lpoisson
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q3$ ./q3
Poisson result for pair (2, 1): 0.270671
Poisson result for pair (2, 10): 3.81899e-05
Poisson result for pair (2, 2): 0.270671
Poisson result for pair (3, 3): 0.224042
Poisson result for pair (100, 3): 6.20013e-39
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q3$
```

מצ"ב דוגמת הרצה

שאלה 4

```
• hila@hila-VirtualBox:~/Desktop/4$ g++ -fPIC -fprofile-arcs -ftest-coverage 4.cpp -o 4 -lm
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 2
Enter the matrix:
0 1 0
Enter the source vertex: 2
Shortest distance from vertex 2 to vertex 0 is: 2147483647
Shortest distance from vertex 2 to vertex 1 is: 2147483647
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 2
Enter the matrix:
0 1 0
Enter the source vertex: 1
Shortest distance from vertex 1 to vertex 0 is: 1
Shortest distance from vertex 1 to vertex 1 is: 0
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: -4
Error: Matrix size must be positive.
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 3
Enter the matrix:
0 -1 2 1 0 3 4 5 0
Error: Negative weight entered.
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 3
Enter the matrix:
1 2 3 4 5 6 7 8 9
Error: Non-zero diagonal entry.
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 3
Enter the matrix:
0 1 1 0 1 1 1 0
Enter the source vertex: 0
Shortest distance from vertex 0 to vertex 0 is: 0
Shortest distance from vertex 0 to vertex 1 is: 1
Shortest distance from vertex 0 to vertex 2 is: 1
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 2
Enter the matrix:
0 1 1 0 1 1 1
Enter the source vertex: Shortest distance from vertex 1 to vertex 0 is: 1
Shortest distance from vertex 1 to vertex 1 is: 0
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 2
Enter the matrix:
0 1 1 0 1 1 1
Enter the source vertex: Error: Expected a single integer for the source vertex.
```

מצ"ב דוגמת הרצה, הכנסנו את כל המקרי קצה מבחינת קלט של מטריצות: גודל מטריצה שלילי, משקלים שלילים לצלעות, האלכסון של הגרף מכיל איברים שהם לא 0 במטריצת השכנויות, יותר מדי צלעות בקלט וקלט לא תקין עבור קודקוד בפונקציית דייקסטרה.

```
• hila@hila-VirtualBox:~/Desktop/4$ ./4
Enter the size of the matrix: 2
Enter the matrix:
0 1

0 0 0
Error: Too few or too many edges entered.
• hila@hila-VirtualBox:~/Desktop/4$ gcov 4
File '4.cpp'
Lines executed:100.00% of 51
Creating '4.cpp.gcov'
```

```
Lines executed:96.11% of 360
```

LCOV - code coverage report

Current view: top level - /home/hila/Desktop/4		Hit		Total	Coverage
Test: coverage.info		Lines:	51	51	100.0 %
Date: 2024-05-15 13:48:38		Functions:	3	3	100.0 %
Filename		Line Coverage \updownarrow		Functions \updownarrow	
4.cpp		100.0 %	51 / 51	100.0 %	3 / 3

Generated by: LCOV version 1.14

LCOV - code coverage report

Current view: top level - home/hila/Desktop/4 - 4.cpp (source / functions)		Hit		Total	Coverage
Test: coverage.info		Lines:	51	51	100.0 %
Date: 2024-05-15 13:48:38		Functions:	3	3	100.0 %

Line data	Source code
1	: #include <iostream>
2	: #include <vector>
3	: #include <limits.h>
4	:
5	: using namespace std;
6	:
7	: // Function prototype
8	: void dijkstra(const std::vector<std::vector<int>>& graph, int size, int src);
9	:
10	: // Utility function to find the vertex with minimum distance value
11	: int minDistance(const std::vector<int>& dist, const std::vector<bool>& sptSet);
12	:
13	: // Function that implements Dijkstra's algorithm
14	4: void dijkstra(const std::vector<std::vector<int>>& graph, int size, int src) {
15	4: std::vector<int> dist(size, INT_MAX);
16	4: std::vector<bool> sptSet(size, false);
17	:
18	4: dist[src] = 0;
19	:
20	9: for (int count = 0; count < size - 1; count++) {
21	5: int u = minDistance(dist, sptSet);
22	5: sptSet[u] = true;
23	:
24	17: for (int v = 0; v < size; v++) {
25	12: if (!sptSet[v] && graph[u][v] && dist[u] != INT_MAX && dist[u] + graph[u][v] < dist[v]) {
26	4: dist[v] = dist[u] + graph[u][v];
27	:
28	}
29	}
30	:
31	: // Output the distances
32	13: for (int i = 0; i < size; i++) {
33	9: std::cout << "Shortest distance from vertex " << src << " to vertex " << i << " is: " << dist[i] << std::endl;
34	}
35	4: }
36	:
37	: // Utility function to find the vertex with minimum distance value
38	5: int minDistance(const std::vector<int>& dist, const std::vector<bool>& sptSet) {

שאלה 5

דוגמת הרצה לאלגוריתם הראשון (n^3) עם קלט 100, 1000, 10000

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS COMMENTS

g++ -Wall -pg -std=c++11 -c -o main.o main.cpp
g++ -Wall -pg -std=c++11 -c -o q51.o q51.cpp
g++ -Wall -pg -std=c++11 -o main q51 main.o q51.o
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q51
Enter seed: 69
Enter n: 100

2315
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q51 gmon.out >n^3 100
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q51
Enter seed: 69
Enter n: 1000

24400
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q51 gmon.out >n^3 1000
urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q51
Enter seed: 69
Enter n: 10000

245042
```

דוגמת הרצה לאלגוריתם השני (n^2) עם קלט 100, 1000, 10000

```

gmon.out  main.cpp  main.o  main_q52  makefile  n 3 100  n 3 1000
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q52
Enter seed: 69
Enter n: 100

2315
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q52 gmon.out>n^2 100
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q52
Enter seed: 69
Enter n: 1000

24400
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q52 gmon.out>n^2 1000
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q52
Enter seed: 69
Enter n: 10000

245042
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q52 gmon.out>n^2 10000

```

דוגמת הרצה לאלגוריתם השלישי (n) עם קלט 100, 1000, 10000

```

• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q53
Enter seed: 69
Enter n: 100
2315
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q53 gmon.out>n^1 100
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q53
Enter seed: 69
Enter n: 1000
24400
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q53 gmon.out>n^1 1000
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ ./main q53
Enter seed: 69
Enter n: 10000
245042
• urik98@ubuntu:~/Documents/c++/OS1/OS_1/q5$ gprof main q53 gmon.out>n^1 10000

```

ניתן לראות את כל פרטי הפרופיילינג בקבצי טקסט שסומנו ע"י זמן ריצה+גודל הקלט בתיקייה

שאלה 6

דוגמאות הרצה עם קלט של שם + שם משפחה, קלט בעל שם אחד בלבד או קלט בעל 3 שמות.
בנוסף נתמוך גם במקף בתוך מספר הטלפון:


```
● daniel@daniel-VirtualBox:~/Desktop/CS/2ND Year/2ND Semester/OS/EX1_q6$ ls
add2PB  add2PB.cpp  findPhone  findPhone.cpp  Makefile  phonebook.txt
● daniel@daniel-VirtualBox:~/Desktop/CS/2ND Year/2ND Semester/OS/EX1_q6$ ./add2PB
Enter name (first and last): Micky Mouse
Enter phone number: 050-9876543
Entry added successfully.
● daniel@daniel-VirtualBox:~/Desktop/CS/2ND Year/2ND Semester/OS/EX1_q6$ ./add2PB
Enter name (first and last): Micky
Enter phone number: 031234567
Entry added successfully.
● daniel@daniel-VirtualBox:~/Desktop/CS/2ND Year/2ND Semester/OS/EX1_q6$ ./add2PB
Enter name (first and last): Uri Hila Daniel
Enter phone number: 1223-37
Entry added successfully.
● daniel@daniel-VirtualBox:~/Desktop/CS/2ND Year/2ND Semester/OS/EX1_q6$ ./findPhone Hila
1223-37
● daniel@daniel-VirtualBox:~/Desktop/CS/2ND Year/2ND Semester/OS/EX1_q6$ ./findPhone Micky
050-9876543
031234567
● daniel@daniel-VirtualBox:~/Desktop/CS/2ND Year/2ND Semester/OS/EX1_q6$ ./findPhone Micky Mouse
050-9876543
031234567
```