

HW6 Report

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Screenshots for Lab6.1

Compile

```
3. xiaowei@andromeda-27:~/253p/hw/hw6/Dijkstra (ssh)
$ make
echo      -----compiling dijkstra.cpp to create executable program main-----
-----compiling dijkstra.cpp to create executable program main-----
g++ -ggdb -std=c++11 dijkstra.cpp -o dijkstra
xiaowei@andromeda-27 11:22:05 ~/253p/hw/hw6/Dijkstra
$ 
```

Test 1

```
3. xiaowei@andromeda-27:~/253p/hw/hw6/Dijkstra (ssh)
$ valgrind ./dijkstra
==30655== Memcheck, a memory error detector
==30655== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==30655== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==30655== Command: ./dijkstra
==30655==
input:
2
9
4
output:
2
2
==30655==
==30655== HEAP SUMMARY:
==30655==     in use at exit: 72,704 bytes in 1 blocks
==30655==   total heap usage: 41 allocs, 40 frees, 74,280 bytes allocated
==30655==
==30655== LEAK SUMMARY:
==30655==     definitely lost: 0 bytes in 0 blocks
==30655==     indirectly lost: 0 bytes in 0 blocks
==30655==     possibly lost: 0 bytes in 0 blocks
==30655==     still reachable: 72,704 bytes in 1 blocks
==30655==           suppressed: 0 bytes in 0 blocks
==30655== Rerun with --leak-check=full to see details of leaked memory
==30655==
==30655== For counts of detected and suppressed errors, rerun with: -v
==30655== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaowei@andromeda-27 11:22:44 ~/253p/hw/hw6/Dijkstra
$ 
```

Test 2

```
$ valgrind ./dijkstra
==30730== Memcheck, a memory error detector
==30730== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==30730== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==30730== Command: ./dijkstra
==30730==
input:
1
1
output:
0
==30730==
==30730== HEAP SUMMARY:
==30730==     in use at exit: 72,704 bytes in 1 blocks
==30730==   total heap usage: 10 allocs, 9 frees, 72,804 bytes allocated
==30730==
==30730== LEAK SUMMARY:
==30730==   definitely lost: 0 bytes in 0 blocks
==30730==   indirectly lost: 0 bytes in 0 blocks
==30730==   possibly lost: 0 bytes in 0 blocks
==30730==   still reachable: 72,704 bytes in 1 blocks
==30730==           suppressed: 0 bytes in 0 blocks
==30730== Rerun with --leak-check=full to see details of leaked memory
==30730==
==30730== For counts of detected and suppressed errors, rerun with: -v
==30730== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 11:23:19 ~/253p/hw/hw6/Dijkstra
$
```

Test 3

```
$ valgrind ./dijkstra
==30901== Memcheck, a memory error detector
==30901== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==30901== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==30901== Command: ./dijkstra
==30901==
input:
1
1000
output:
9
==30901==
==30901== HEAP SUMMARY:
==30901==     in use at exit: 72,704 bytes in 1 blocks
==30901==   total heap usage: 2,008 allocs, 2,007 frees, 8,128,740 bytes allocated
==30901==
==30901== LEAK SUMMARY:
==30901==   definitely lost: 0 bytes in 0 blocks
==30901==   indirectly lost: 0 bytes in 0 blocks
==30901==   possibly lost: 0 bytes in 0 blocks
==30901==   still reachable: 72,704 bytes in 1 blocks
==30901==           suppressed: 0 bytes in 0 blocks
==30901== Rerun with --leak-check=full to see details of leaked memory
==30901==
==30901== For counts of detected and suppressed errors, rerun with: -v
==30901== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 11:23:45 ~/253p/hw/hw6/Dijkstra
$
```

Test 4

```
3. xiaoweit@andromeda-27:~/253p/hw/hw6/Dijkstra (ssh)
$ valgrind ./dijkstra
==30963== Memcheck, a memory error detector
==30963== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==30963== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==30963== Command: ./dijkstra
==30963==
input:
4
1
10
100
1000
output:
0
3
7
9
==30963==
==30963== HEAP SUMMARY:
==30963==     in use at exit: 72,704 bytes in 1 blocks
==30963==   total heap usage: 2,251 allocs, 2,250 frees, 8,215,872 bytes allocated
==30963==
==30963== LEAK SUMMARY:
==30963==   definitely lost: 0 bytes in 0 blocks
==30963==   indirectly lost: 0 bytes in 0 blocks
==30963==   possibly lost: 0 bytes in 0 blocks
==30963==   still reachable: 72,704 bytes in 1 blocks
==30963==   suppressed: 0 bytes in 0 blocks
==30963== Rerun with --leak-check=full to see details of leaked memory
==30963==
==30963== For counts of detected and suppressed errors, rerun with: -v
==30963== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 11:24:22 ~/253p/hw/hw6/Dijkstra
$ █
```

Screenshots for Lab6.2

Compile

```
3. xiaoweit@andromeda-27:~/253p/hw/hw6/MST (ssh)
$ make
echo -----compiling mst.cpp to create executable program main-----
-----compiling mst.cpp to create executable program main-----
g++ -ggdb -std=c++11 mst.cpp -o mst
xiaoweit@andromeda-27 11:25:00 ~/253p/hw/hw6/MST
$ █
```

Test 1

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/MST (ssh)
$ valgrind ./mst
==20201== Memcheck, a memory error detector
==20201== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==20201== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==20201== Command: ./mst
==20201==
input:
2
3 3
1 2 5 2 3 3 1 3 1
2 1
1 2 5
output:
4
5
==20201==
==20201== HEAP SUMMARY:
==20201==     in use at exit: 72,704 bytes in 1 blocks
==20201==   total heap usage: 12 allocs, 11 frees, 72,960 bytes allocated
==20201==
==20201== LEAK SUMMARY:
==20201==   definitely lost: 0 bytes in 0 blocks
==20201==   indirectly lost: 0 bytes in 0 blocks
==20201==   possibly lost: 0 bytes in 0 blocks
==20201==   still reachable: 72,704 bytes in 1 blocks
==20201==           suppressed: 0 bytes in 0 blocks
==20201== Rerun with --leak-check=full to see details of leaked memory
==20201==
==20201== For counts of detected and suppressed errors, rerun with: -v
==20201== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:23:55 ~/253p/hw/hw6/MST
$
```

Test 2

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/MST (ssh)
$ valgrind ./mst
==20675== Memcheck, a memory error detector
==20675== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==20675== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==20675== Command: ./mst
==20675==
input:
1
2 1
1 2 1
output:
1
==20675==
==20675== HEAP SUMMARY:
==20675==     in use at exit: 72,704 bytes in 1 blocks
==20675==   total heap usage: 6 allocs, 5 frees, 72,776 bytes allocated
==20675==
==20675== LEAK SUMMARY:
==20675==   definitely lost: 0 bytes in 0 blocks
==20675==   indirectly lost: 0 bytes in 0 blocks
==20675==   possibly lost: 0 bytes in 0 blocks
==20675==   still reachable: 72,704 bytes in 1 blocks
==20675==           suppressed: 0 bytes in 0 blocks
==20675== Rerun with --leak-check=full to see details of leaked memory
==20675==
==20675== For counts of detected and suppressed errors, rerun with: -v
==20675== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:24:50 ~/253p/hw/hw6/MST
$
```

Test 3

```
$ valgrind ./mst
==21093== Memcheck, a memory error detector
==21093== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==21093== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==21093== Command: ./mst
==21093==
input:
1
4 6
1 2 1 1 3 2 1 4 3 2 3 3 2 4 4 3 4 5
output:
6
==21093==
==21093== HEAP SUMMARY:
==21093==     in use at exit: 72,704 bytes in 1 blocks
==21093==   total heap usage: 9 allocs, 8 frees, 73,060 bytes allocated
==21093==
==21093== LEAK SUMMARY:
==21093==   definitely lost: 0 bytes in 0 blocks
==21093==   indirectly lost: 0 bytes in 0 blocks
==21093==   possibly lost: 0 bytes in 0 blocks
==21093==   still reachable: 72,704 bytes in 1 blocks
==21093==   suppressed: 0 bytes in 0 blocks
==21093== Rerun with --leak-check=full to see details of leaked memory
==21093==
==21093== For counts of detected and suppressed errors, rerun with: -v
==21093== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:29:02 ~/253p/hw/hw6/MST
$
```

Test 4

```
$ valgrind ./mst
==21286== Memcheck, a memory error detector
==21286== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==21286== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==21286== Command: ./mst
==21286==
input:
1
10 13
1 2 1 1 4 2 1 6 3 1 8 4 1 10 5 2 3 2 2 5 3 2 7 8 2 9 3 3 5 4 4 7 3 6 10 9 7 9 4
output:
26
==21286==
==21286== HEAP SUMMARY:
==21286==     in use at exit: 72,704 bytes in 1 blocks
==21286==   total heap usage: 10 allocs, 9 frees, 73,400 bytes allocated
==21286==
==21286== LEAK SUMMARY:
==21286==   definitely lost: 0 bytes in 0 blocks
==21286==   indirectly lost: 0 bytes in 0 blocks
==21286==   possibly lost: 0 bytes in 0 blocks
==21286==   still reachable: 72,704 bytes in 1 blocks
==21286==   suppressed: 0 bytes in 0 blocks
==21286== Rerun with --leak-check=full to see details of leaked memory
==21286==
==21286== For counts of detected and suppressed errors, rerun with: -v
==21286== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:31:39 ~/253p/hw/hw6/MST
$
```

Screenshots for Lab5.4

Compile

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/Truck (ssh)
$ make
echo      -----compiling TruckProblem.cpp to create executable program main-----
-----compiling TruckProblem.cpp to create executable program main-----
g++ -ggdb -std=c++11 TruckProblem.cpp -o TruckProblem
xiaoweit@andromeda-27 14:32:22 ~/253p/hw/hw6/Truck
$ 
```

Test 1

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/Truck (ssh)
$ valgrind ./TruckProblem
==21444== Memcheck, a memory error detector
==21444== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==21444== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==21444== Command: ./TruckProblem
==21444==
input:
n:8
time:1 4 4 7 8 10 11 12
position:100 -400 -100 500 -400 700 -200 200
value:800 9000 2500 1000 2200 900 2100 2000
output:
Total Revenue:17800
==21444==
==21444== HEAP SUMMARY:
==21444==     in use at exit: 72,704 bytes in 1 blocks
==21444==   total heap usage: 5 allocs, 4 frees, 72,808 bytes allocated
==21444==
==21444== LEAK SUMMARY:
==21444==   definitely lost: 0 bytes in 0 blocks
==21444==   indirectly lost: 0 bytes in 0 blocks
==21444==   possibly lost: 0 bytes in 0 blocks
==21444==   still reachable: 72,704 bytes in 1 blocks
==21444==           suppressed: 0 bytes in 0 blocks
==21444== Rerun with --leak-check=full to see details of leaked memory
==21444==
==21444== For counts of detected and suppressed errors, rerun with: -v
==21444== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:34:06 ~/253p/hw/hw6/Truck
$ 
```

Test 2

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/Truck (ssh)
$ valgrind ./TruckProblem
==21579== Memcheck, a memory error detector
==21579== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==21579== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==21579== Command: ./TruckProblem
==21579==
input:
n:1
time:1
position:100
value:500
output:
Total Revenue:500
==21579==
==21579== HEAP SUMMARY:
==21579==     in use at exit: 72,704 bytes in 1 blocks
==21579==   total heap usage: 5 allocs, 4 frees, 72,801 bytes allocated
==21579==
==21579== LEAK SUMMARY:
==21579==   definitely lost: 0 bytes in 0 blocks
==21579==   indirectly lost: 0 bytes in 0 blocks
==21579==   possibly lost: 0 bytes in 0 blocks
==21579==   still reachable: 72,704 bytes in 1 blocks
==21579==   suppressed: 0 bytes in 0 blocks
==21579== Rerun with --leak-check=full to see details of leaked memory
==21579==
==21579== For counts of detected and suppressed errors, rerun with: -v
==21579== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:34:56 ~/253p/hw/hw6/Truck
$ █
```

Test 3

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/Truck (ssh)
$ valgrind ./TruckProblem
==21628== Memcheck, a memory error detector
==21628== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==21628== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==21628== Command: ./TruckProblem
==21628==
input:
n:2
time:2 2
position:100 200
value:100 500
output:
Total Revenue:600
==21628==
==21628== HEAP SUMMARY:
==21628==     in use at exit: 72,704 bytes in 1 blocks
==21628==   total heap usage: 5 allocs, 4 frees, 72,802 bytes allocated
==21628==
==21628== LEAK SUMMARY:
==21628==   definitely lost: 0 bytes in 0 blocks
==21628==   indirectly lost: 0 bytes in 0 blocks
==21628==   possibly lost: 0 bytes in 0 blocks
==21628==   still reachable: 72,704 bytes in 1 blocks
==21628==   suppressed: 0 bytes in 0 blocks
==21628== Rerun with --leak-check=full to see details of leaked memory
==21628==
==21628== For counts of detected and suppressed errors, rerun with: -v
==21628== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:35:48 ~/253p/hw/hw6/Truck
$ █
```

Test 4

```
$ valgrind ./TruckProblem
==21844== Memcheck, a memory error detector
==21844== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==21844== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==21844== Command: ./TruckProblem
==21844==

input:
n:2
time:2 2
position:-200 200
value:500 300
output:
Total Revenue:500
==21844==

==21844== HEAP SUMMARY:
==21844==     in use at exit: 72,704 bytes in 1 blocks
==21844==   total heap usage: 5 allocs, 4 frees, 72,802 bytes allocated
==21844==

==21844== LEAK SUMMARY:
==21844==   definitely lost: 0 bytes in 0 blocks
==21844==   indirectly lost: 0 bytes in 0 blocks
==21844==   possibly lost: 0 bytes in 0 blocks
==21844==   still reachable: 72,704 bytes in 1 blocks
==21844==   suppressed: 0 bytes in 0 blocks
==21844== Rerun with --leak-check=full to see details of leaked memory
==21844==

==21844== For counts of detected and suppressed errors, rerun with: -v
==21844== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
xiaoweit@andromeda-27 14:38:08 ~/253p/hw/hw6/Truck
$ █
```

Screenshots for Lab 6.3

Compile

```
$ make
echo -----compiling HeuristicSearch.cpp to create executable program main-----
-----compiling HeuristicSearch.cpp to create executable program main-----
g++ -ggdb -std=c++11 HeuristicSearch.cpp -o HeuristicSearch
xiaoweit@andromeda-27 14:54:03 ~/253p/hw/hw6/Heuristic
$ █
```

Test 1

2. xiaoweit@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)

```
==21985== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==21985== Command: ./HeuristicSearch A E 0
==21985==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with Dijkstra Algorithm
expanding sequence:
A ->K ->B ->J ->C ->D ->F ->L ->H ->I ->G ->E
shortest path:
A ->B ->C ->D ->E
==21985==
==21985== HEAP SUMMARY:
==21985==     in use at exit: 72,704 bytes in 1 blocks
==21985==   total heap usage: 36 allocs, 35 frees, 74,194 bytes allocated
==21985==
==21985== LEAK SUMMARY:
==21985==   definitely lost: 0 bytes in 0 blocks
==21985==   indirectly lost: 0 bytes in 0 blocks
==21985==   possibly lost: 0 bytes in 0 blocks
==21985==   still reachable: 72,704 bytes in 1 blocks
```

```
2. xiaowei@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)
==22109== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==22109== Command: ./HeuristicSearch A E 1
==22109==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with A* Algorithm
expanding sequence:
A ->K ->J ->B ->C ->D ->E
shortest path:
A ->B ->C ->D ->E
==22109==
==22109== HEAP SUMMARY:
==22109==     in use at exit: 72,704 bytes in 1 blocks
==22109==   total heap usage: 35 allocs, 34 frees, 74,130 bytes allocated
==22109==
==22109== LEAK SUMMARY:
==22109==   definitely lost: 0 bytes in 0 blocks
==22109==   indirectly lost: 0 bytes in 0 blocks
==22109==   possibly lost: 0 bytes in 0 blocks
==22109==   still reachable: 72,704 bytes in 1 blocks
```

Test 2

2. xiaoweit@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)

```
--22268== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
--22268== Command: ./HeuristicSearch A I 0
--22268==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with Dijkstra Algorithm
expanding sequence:
A ->K ->B ->J ->C ->D ->F ->L ->H ->I
shortest path:
A ->K ->J ->H ->I
--22268==
--22268== HEAP SUMMARY:
--22268==     in use at exit: 72,704 bytes in 1 blocks
--22268== total heap usage: 36 allocs, 35 frees, 74,194 bytes allocated
--22268==
--22268== LEAK SUMMARY:
--22268==     definitely lost: 0 bytes in 0 blocks
--22268==     indirectly lost: 0 bytes in 0 blocks
--22268==     possibly lost: 0 bytes in 0 blocks
--22268==     still reachable: 72,704 bytes in 1 blocks
```

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)
==22298== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==22298== Command: ./HeuristicSearch A I 1
==22298==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with A* Algorithm
expanding sequence:
A ->K ->J ->B ->H ->I
shortest path:
A ->K ->J ->H ->I
==22298==
==22298== HEAP SUMMARY:
==22298==     in use at exit: 72,704 bytes in 1 blocks
==22298==   total heap usage: 35 allocs, 34 frees, 74,130 bytes allocated
==22298==
==22298== LEAK SUMMARY:
==22298==   definitely lost: 0 bytes in 0 blocks
==22298==   indirectly lost: 0 bytes in 0 blocks
==22298==   possibly lost: 0 bytes in 0 blocks
==22298==   still reachable: 72,704 bytes in 1 blocks
```

Test 3

2. xiaoweit@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)

```
==22406== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==22406== Command: ./HeuristicSearch E L 0
==22406==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with Dijkstra Algorithm
expanding sequence:
E ->D ->C ->B ->F ->A ->K ->J ->L
shortest path:
E ->D ->C ->B ->A ->L
==22406==
==22406== HEAP SUMMARY:
==22406==     in use at exit: 72,704 bytes in 1 blocks
==22406==   total heap usage: 38 allocs, 37 frees, 74,256 bytes allocated
==22406==
==22406== LEAK SUMMARY:
==22406==     definitely lost: 0 bytes in 0 blocks
==22406==     indirectly lost: 0 bytes in 0 blocks
==22406==     possibly lost: 0 bytes in 0 blocks
==22406==     still reachable: 72,704 bytes in 1 blocks
```

```
2. xiaoweit@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)
==22589== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==22589== Command: ./HeuristicSearch E L 1
==22589==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with A* Algorithm
expanding sequence:
E ->D ->C ->B ->A ->L
shortest path:
E ->D ->C ->B ->A ->L
==22589==
==22589== HEAP SUMMARY:
==22589==     in use at exit: 72,704 bytes in 1 blocks
==22589==   total heap usage: 37 allocs, 36 frees, 74,192 bytes allocated
==22589==
==22589== LEAK SUMMARY:
==22589==   definitely lost: 0 bytes in 0 blocks
==22589==   indirectly lost: 0 bytes in 0 blocks
==22589==   possibly lost: 0 bytes in 0 blocks
==22589==   still reachable: 72,704 bytes in 1 blocks
```

Test 4

```
2. xiaowei@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)
==22870== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==22870== Command: ./HeuristicSearch E I 0
==22870==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with Dijkstra Algorithm
expanding sequence:
E ->D ->C ->B ->F ->A ->K ->J ->L ->G ->H ->I
shortest path:
E ->D ->C ->B ->A ->K ->J ->H ->I
==22870==
==22870== HEAP SUMMARY:
==22870==     in use at exit: 72,704 bytes in 1 blocks
==22870==   total heap usage: 44 allocs, 43 frees, 74,447 bytes allocated
==22870==
==22870== LEAK SUMMARY:
==22870==   definitely lost: 0 bytes in 0 blocks
==22870==   indirectly lost: 0 bytes in 0 blocks
==22870==   possibly lost: 0 bytes in 0 blocks
==22870==   still reachable: 72,704 bytes in 1 blocks
```

2. xiaoweit@andromeda-27:~/253p/hw/hw6/Heuristic (ssh)

```
==22729== Using Valgrind-3.13.0 and LibVEX; rerun with -h for copyright info
==22729== Command: ./HeuristicSearch E I 1
==22729==
12
A 4 3
B K L
B 3 4
A C
C 2 4
B D F
D 2 3
C E
E 0 0
D
F 1 5
C G
G 6 4
F H
H 6 2
G I J
I 5 1
H
J 3 2
H K
K 3 3
A J
L 8 3
A
running with A* Algorithm
expanding sequence:
E ->D ->C ->B ->A ->K ->J ->F ->H ->I
shortest path:
E ->D ->C ->B ->A ->K ->J ->H ->I
==22729==
==22729== HEAP SUMMARY:
==22729==     in use at exit: 72,704 bytes in 1 blocks
==22729==   total heap usage: 44 allocs, 43 frees, 74,447 bytes allocated
==22729==
==22729== LEAK SUMMARY:
==22729==   definitely lost: 0 bytes in 0 blocks
==22729==   indirectly lost: 0 bytes in 0 blocks
==22729==   possibly lost: 0 bytes in 0 blocks
==22729==   still reachable: 72,704 bytes in 1 blocks
```