

Name: *Jonathan Smoley*

Assignment: 6

Complete & Correct:	46 / 48
Tests:	0 / 0
Format and Comments:	6 / 6
Writeup:	6 / 6

Total Score:	57 / 60
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Comments:

1. Can tell something is wrong with your find keys function given the graph
2. (-3) in particular, you want to be inserting at the *end* of the array seq, otherwise it becomes very expensive

Unit test output:

```

==943056== Memcheck, a memory error detector
==943056== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==943056== Using Valgrind-3.15.0 and LibVEX; rerun with -h for copyright info
==943056== Command: ./hw6_test
==943056==
[=====] Running 12 tests from 1 test suite.
[-----] Global test environment set-up.
[-----] 12 tests from BasicBinSearchMapTests
[ RUN      ] BasicBinSearchMapTests.EmptyCheck
[      OK  ] BasicBinSearchMapTests.EmptyCheck (12 ms)
[ RUN      ] BasicBinSearchMapTests.InsertCheck
[      OK  ] BasicBinSearchMapTests.InsertCheck (6 ms)
[ RUN      ] BasicBinSearchMapTests.RValueAccessCheck
[      OK  ] BasicBinSearchMapTests.RValueAccessCheck (4 ms)
[ RUN      ] BasicBinSearchMapTests.LValueAccessCheck
[      OK  ] BasicBinSearchMapTests.LValueAccessCheck (3 ms)
[ RUN      ] BasicBinSearchMapTests.SimpleContainsCheck
[      OK  ] BasicBinSearchMapTests.SimpleContainsCheck (3 ms)
[ RUN      ] BasicBinSearchMapTests.MoreInvolvedContainsCheck
[      OK  ] BasicBinSearchMapTests.MoreInvolvedContainsCheck (2 ms)
[ RUN      ] BasicBinSearchMapTests.EraseCheck
[      OK  ] BasicBinSearchMapTests.EraseCheck (6 ms)
[ RUN      ] BasicBinSearchMapTests.KeyRangeCheck
[      OK  ] BasicBinSearchMapTests.KeyRangeCheck (8 ms)
[ RUN      ] BasicBinSearchMapTests.SortedKeyCheck
[      OK  ] BasicBinSearchMapTests.SortedKeyCheck (6 ms)
[ RUN      ] BasicBinSearchMapTests.InvalidKeyCheck
[      OK  ] BasicBinSearchMapTests.InvalidKeyCheck (31 ms)
[ RUN      ] BasicBinSearchMapTests.NextKeyCheck
[      OK  ] BasicBinSearchMapTests.NextKeyCheck (7 ms)
[ RUN      ] BasicBinSearchMapTests.PrevKeyCheck
[      OK  ] BasicBinSearchMapTests.PrevKeyCheck (6 ms)
[-----] 12 tests from BasicBinSearchMapTests (107 ms total)

[-----] Global test environment tear-down

```

```
[=====] 12 tests from 1 test suite ran. (146 ms total)
[ PASSED ] 12 tests.
==943056==
==943056== HEAP SUMMARY:
==943056==      in use at exit: 0 bytes in 0 blocks
==943056==    total heap usage: 456 allocs, 456 frees, 135,348 bytes allocated
==943056==
==943056== All heap blocks were freed -- no leaks are possible
==943056==
==943056== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

Performance test output:

```
# All times in milliseconds (msec)
# Column 1 = input data size
# Column 2 = array map insert
# Column 3 = binsearch map insert
# Column 4 = array map erase
# Column 5 = binsearch map erase
# Column 6 = array map contains
# Column 7 = binsearch map contains
# Column 8 = array map find range
# Column 9 = binsearch map find range
# Column 10 = array map next key
# Column 11 = binsearch map next key
# Column 12 = array map sorted keys
# Column 13 = binsearch map sorted keys
0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
5000 0.00 0.02 0.04 0.02 0.02 0.00 0.03 0.00 0.03 0.00 0.55 0.07
10000 0.00 0.03 0.09 0.04 0.04 0.00 0.07 0.00 0.06 0.00 1.15 0.14
15000 0.00 0.05 0.13 0.05 0.06 0.00 0.10 0.21 0.09 0.00 1.80 0.19
20000 0.00 0.06 0.17 0.06 0.08 0.00 0.12 0.00 0.12 0.00 2.44 0.28
25000 0.00 0.12 0.40 0.12 0.20 0.00 0.32 0.63 0.21 0.00 4.18 0.57
30000 0.00 0.08 0.25 0.08 0.12 0.00 0.19 0.78 0.17 0.00 3.74 0.38
35000 0.00 0.16 0.29 0.16 0.14 0.00 0.20 0.00 0.20 0.00 6.85 0.89
40000 0.00 0.16 0.34 0.17 0.17 0.00 0.25 2.78 0.30 0.00 7.79 0.83
45000 0.00 0.20 0.40 0.18 0.19 0.00 0.29 3.93 0.54 0.00 10.79 1.45
50000 0.00 0.10 0.43 0.10 0.20 0.00 0.30 2.14 0.27 0.00 6.56 0.69
13.47user 0.00system 0:13.47elapsed 99%CPU (0avgtext+0avgdata 5428maxresident)k
0inputs+40outputs (0major+2738minor)pagefaults 0swaps
```