Name: *Jonathan Smoley*

Assignment: 8

Complete & Correct:	....	10 / 48
Tests:	....	0 / 0
Format and Comments:	....	6 / 6
Writeup:	....	6 / 6
Total Score:	....	10 / 60

Comments:

1. partial credit only: two of 21 tests passed (everything else seg faulted), error on perf test, valgrind errors

2. (-12) 1-Week late penalty

Unit test output:

```
==656019== Memcheck, a memory error detector
==656019== Copyright (C) 2002-2017, and GNU GPL'd, by Julian Seward et al.
==656019== Using Valgrind-3.15.0 and LibVEX; rerun with -h for copyright info
==656019== Command: ./hw8_test
==656019==
[==========] Running 21 tests from 1 test suite.
[----------] Global test environment set-up.
[----------] 21 tests from BasicBSTMapTests
[ RUN      ] BasicBSTMapTests.EmptyCheck
[       OK ] BasicBSTMapTests.EmptyCheck (11 ms)
[ RUN      ] BasicBSTMapTests.InsertCheck
==656019== Invalid read of size 1
==656019==    at 0x19BACB: BSTMap<char, int>::insert(char const&, int const&) (bstmap.h:265)
==656019==    by 0x189F5B: BasicBSTMapTests_InsertCheck_Test::TestBody() (hw8_test.cpp:31)
==656019==    by 0x1DE97B: void testing::internal::HandleSehExceptionsInMethodIfSupported<testing::Test, void>(testing:
==656019==    by 0x1D67F0: void testing::internal::HandleExceptionsInMethodIfSupported<testing::Test, void>(testing::Te
==656019==    by 0x1AAFF7: testing::Test::Run() (in /home/bowers/svn/bowers/teaching/cpsc223-s22/grading/HW-8/hw8-JT2M0
==656019==    by 0x1ABA6B: testing::TestInfo::Run() (in /home/bowers/svn/bowers/teaching/cpsc223-s22/grading/HW-8/hw8-J
==656019==    by 0x1AC3A0: testing::TestSuite::Run() (in /home/bowers/svn/bowers/teaching/cpsc223-s22/grading/HW-8/hw8-
==656019==    by 0x1BBF20: testing::internal::UnitTestImpl::RunAllTests() (in /home/bowers/svn/bowers/teaching/cpsc223-
==656019==    by 0x1DFEA9: bool testing::internal::HandleSehExceptionsInMethodIfSupported<testing::internal::UnitTestIm
==656019==    by 0x1D7A2E: bool testing::internal::HandleExceptionsInMethodIfSupported<testing::internal::UnitTestImpl,
==656019==    by 0x1BA65F: testing::UnitTest::Run() (in /home/bowers/svn/bowers/teaching/cpsc223-s22/grading/HW-8/hw8-J
==656019==    by 0x19AE4D: RUN_ALL_TESTS() (gtest.h:2497)
==656019==  Address 0x4def980 is 0 bytes inside a block of size 24 free'd
==656019==    at 0x483D1CF: operator delete(void*, unsigned long) (in /usr/lib/x86_64-linux-gnu/valgrind/vgpreload_memo
==656019==    by 0x19BB5C: BSTMap<char, int>::insert(char const&, int const&) (bstmap.h:288)
==656019==    by 0x189F39: BasicBSTMapTests_InsertCheck_Test::TestBody() (hw8_test.cpp:30)
==656019==    by 0x1DE97B: void testing::internal::HandleSehExceptionsInMethodIfSupported<testing::Test, void>(testing:
==656019==    by 0x1D67F0: void testing::internal::HandleExceptionsInMethodIfSupported<testing::Test, void>(testing::Te
==656019==    by 0x1AAFF7: testing::Test::Run() (in /home/bowers/svn/bowers/teaching/cpsc223-s22/grading/HW-8/hw8-JT2M0
==656019==    by 0x1ABA6B: testing::TestInfo::Run() (in /home/bowers/svn/bowers/teaching/cpsc223-s22/grading/HW-8/hw8-J
==656019==    by 0x1AC3A0: testing::TestSuite::Run() (in /home/bowers/svn/bowers/teaching/cpsc223-s22/grading/HW-8/hw8-
==656019==    by 0x1BBF20: testing::internal::UnitTestImpl::RunAllTests() (in /home/bowers/svn/bowers/teaching/cpsc223-
```

```
... etc ...


==656019==
==656019== ERROR SUMMARY: 5110 errors from 773 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 = hash map insert
# Column 5 = bst map insert
# Column 6 = array map erase
# Column 7 = binsearch map erase
# Column 8 = hash map erase
# Column 9 = bst map erase
# Column 10 = array map contains
# Column 11 = binsearch map contains
# Column 12 = hash map contains
# Column 13 = bst map contains
# Column 14 = array map find range
# Column 15 = binsearch map find range
# Column 16 = hash map find range
# Column 17 = bst map find range
# Column 18 = array map next key
# Column 19 = binsearch map next key
# Column 20 = hash map next key
# Column 21 = bst map next key
# Column 22 = array map sorted keys
# Column 23 = binsearch map sorted keys
# Column 24 = hash map sorted keys
# Column 25 = bst map sorted keys
# Column 26 = bst map height shuffled
# Column 27 = log base 2 of input size
0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 terminate called after throwing an instance of 'std::out_of_range'
  what():  Erase(): key not in map
Command terminated by signal 6
0.01user 0.00system 0:00.17elapsed 6%CPU (0avgtext+0avgdata 4600maxresident)k
0inputs+8outputs (0major+645minor)pagefaults 0swaps
```