EEN318
Happy Lucky Test
30th November 2016

No books, phones, calculators, notes, devices, things of any kind, or puppies.

Who are you ?

_____

What is your student number?

_____

"I have neither given nor accepted any aid in this examination": Sign if true.

_____

do not write anything below that line.

Question	5	6	7	8
out of	33%	33%	33%	1%
Score				

5.

Pick two different quicksort partitioning methods.

A.

Describe each of them in enough technical detail that a competent programmer could code them.

B.

For each, give (at least informally) their loop variants and invariants.

C.

Why might one be preferred over the other?

D.

Code one of them in C++.

6.

A.

Give the algorithm for adding a new value to a (min) heap.

B.

Give the algorithm for removing the smallest item from a (min) heap.

C.

Code part B in C++.

7.

The following numbers are to be added to an initially empty 2-3-tree.
Draw the 2-3-tree clearly, as it would be after each individual insertion.
(you may occasionally skip a diagram if it shows no significant change)

   i. 30

   ii. 50

   iii. 80

   iv. 40

   v. 70

   vi. 20

   vii. 90

   viii. 84

   ix. 82

   x. 88

   xi. 86

   xii. 97

   xiii. 35

   xiv. 45

   xv. 10

   xvi. 15

   xvii. 99

8.

Would you rather be a hash table, a 2-3-tree, or a convex hull?
Answer with an illustration.