Honors Computer Science B
Data Structures

NHS Science Elective

Workload: approximately 20 min reading + 40 min practice per class

COURSE DESCRIPTION/SUMMARY

A college-level computer science course.

This class builds upon the foundation established in AP Computer Science A. There is a brief review of Java basics, with a quick transition into more advanced data structures. The theories and concepts learned will be utilized in several coding projects per semester. Those concepts can be applied to other coding languages besides Java, such as C++ and Python.

```java
20  // instance variable for an AbstractPriorityQueue
21  /** The comparator defining the ordering of keys in the priority queue. */
22  private Comparator<K> comp;
23  /** Creates an empty priority queue using the given comparator to order keys. */
24  protected AbstractPriorityQueue(Comparator<K> c) { comp = c; }
25  /** Creates an empty priority queue based on the natural ordering of its keys. */
26  protected AbstractPriorityQueue( ) { this(new DefaultComparator<K>( )); }
27  /** Method for comparing two entries according to key */
28  protected int compare(Entry<K,V> a, Entry<K,V> b) {
29      return comp.compare(a.getKey( ), b.getKey( ));
30  }
31  /** Determines whether a key is valid. */
32  protected boolean checkKey(K key) throws IllegalArgumentException {
33      try {
34          return (comp.compare(key,key) == 0);  // see if key can be compared to itself
35      } catch (ClassCastException e) {
36          throw new IllegalArgumentException("Incompatible key");
37      }
38  }
39  /** Tests whether the priority queue is empty. */
40  public boolean isEmpty( ) { return size( ) == 0; }
41  }
```

What concepts are learned in Honors Computer Science B?
- Fundamental data structures
- Recursion and algorithm analysis
- Sequential data structures
- Trees
- Priority queues
- Maps, Hash Tables, and Skip Lists
- Search Trees
- Sorting and Selection
- Graph Algorithms

INSTRUCTOR

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You will enjoy this class if you:
- Have coding experience in Java
- Are contemplating a career in computer science and/or engineering
- Want to better understand computer algorithms
- Enjoy solving problems

GRADE DETERMINATION

Essential Standards –	20%
Summative (Projects & Assessments) –	70%
Final Exam –	10%