

Practice Set 5

Theory

1. What is a set and why is it useful?
2. Name the most important similarity and difference between a Dictionary/Hashtable and Hashset?
3. What is a nested type and why is it useful?
4. What are indexers?

Programming

- A. Implement class **GradeBook** which implements the Dictionary ADT, with the value *Count* and operations *Insert(k, x)*, *Search(k)* and *Delete(k)*. This will first require implementing class **GradeBookData** with values *id : int* and *grade : double*, to be used as nodes for the linked lists in the dictionary's table. Use the division method to implement the hash function with $m = 101$, which will be the length of your table.
- B. Implement classes **PhoneBook** and **PhoneBookData** following the requirements from part A, with the following additions:
 - a. The keys of this dictionary are of type *name : string* and the values are of type *phoneNumber : int*
 - b. Define a prehash function to be able to convert from a name key to a natural number for hashing
 - c. Instead of using the division approach for hashing, use the multiplication approach. Pick any reasonable A and m of your choice