OOP Lab Assignment 7

Abstract Classes

1. Create a **Class Student** with the following
   a. Int rollno
   b. String firstName
   c. String lastName
   d. Getter-Setters
   e. **Override toString** method to nicely print the student data
2. Create an **Abstract Class StudentRecords** with the following
   a. Array for storing student records
   b. addStudent method which adds a student to the array
   c. **Abstract method searchStudentByFname**, which takes first-name as argument and searches for a student and if found, returns the student object
   d. **Abstract method searchStudentByLname**, which takes last-name as argument and searches for a student and if found, returns the student object
3. Create the following two concrete classes
   a. **Class SimpleSortStudentRecords** which extends the abstract class and provides a simple search mechanism
      i. SelectionSort or BubbleSort of the array (make copy as necessary) and **binary search** implementation for the two abstract methods.
   b. **Class QuickSortStudentRecords** which extends the abstract class and provides a quick-sort search implementation for the two abstract methods
      Note: implement quick-sort from **scratch**. Do not use it from a library.
      i. Quick sort of the array (make copy as necessary) and **binary search** implementation for the two abstract methods.
4. Create **public class S2020xxxxroll_StudentRecordsTestMain** (note: your full roll_no should be used)
   a. Create 10 student objects (use your name and friends names).
   b. Create an instance of SimpleSortStudentRecords and use addStudent to populate the array with the 10 students.
   c. Search for any two students, just to show that the implementation works.
      i. The search will return a student reference. Pass the reference as-is to System.out.println, just to show that the overriden toString works
   d. Create an instance of QuickSortStudentRecords and use addStudent to populate the array with (the same) 10 students.
   e. Search for any two students, just to show that the implementation works.
      i. The search will return a student reference. Pass the reference as-is to System.out.println, just to show that the overriden toString works

Turn in the following:
   1. java file with the name **S2020xxxxroll_StudentRecordsTestMain.java**
      a. The file should contain all classes

2. One or two PNG/JPG file(s) of the output