Java
Assignment 2

Note:

1. The answer to the theory question should be submitted in a text file (DOC, DOCX, TXT, or PDF).
2. In implementing your programs, please use only those language features which have been discussed so far in the class.

Questions:

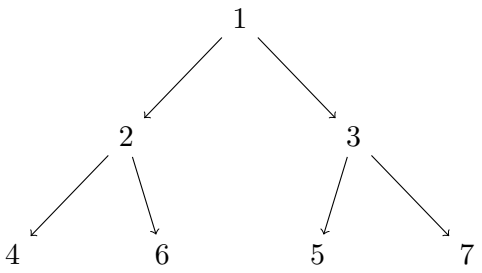
1. Discuss the following (with examples):
   (a) Name clash
   (b) Classes as a mechanism to prevent name clashes
   (c) Static and non-static members
   (d) Constructors and their importance

   (theory.doc)
2. Implement two classes `Circle` and `Square` each with a method `area` that takes a float value as parameter (radius in case of circle and length in case of square), and returns the area. (`Q2.java`)
3. Implement two classes `Circle` and `Square` each with a method `area` that returns the area of the respective shape object. Use a object attributes `radius` in `Circle`, and `length` in `Square`. Set the values of the attributes appropriately in the beginning of the program. (`Q3.java`)
4. Implement two classes `Circle` and `Square` each with a method `area` that returns the area of the respective shape object. Use a object attributes `radius` in `Circle`, and `length` in `Square`. Implement appropriate constructors to initialise the attributes appropriately. (`Q4.java`)
5. Implement a class `BinTree` which elements a binary tree. It has two attributes `left` and `right` representing the left subtree and the right subtree. An additional attribute `value` is an integer. `BinTree` class has a (recursive) method `find` that tells if a value exists in the tree. Implement appropriate constructor to initialise the attributes appropriately. Construct a `BinTree` instance that implements the following binary tree.

Stretch. Implement similar recursive methods like:

1. `numberOfNodes`
2. `totalValue`
3. `isDescendent`
4. `isSibling`
5. `isCousin`
6. `closestCommonAncestor`

Design the methods with appropriate type signatures.



(`Q5.java`)