Computer Science 145/148

Final Exam—Fall 2019

1. Provide multiple-word example identifiers for the following using standard Java conventions:
   (a) a class name
   (b) a method name
   (c) a variable name

2. In the following code, declare the following:
   (a) A parameter named `i` of type `int`.
   (b) A local variable named `s` of type `String`.
   (c) A private instance variable named `b` of type `boolean`.

```
public class Thing {


  public Thing(                    ) {



  }
}
```

3. For what reasons do we use the keyword `this`? Check zero or more.
   (a) To qualify instance variable names.
   (b) To access instance variables from within a `static` method.
   (c) To invoke one constructor from another.
   (d) To return an instance of an object from a constructor.

4. For what reasons do we use the keyword `private`? Check zero or more.
   (a) Because Java requires it.
   (b) To give an object's methods access to its instance variables.
   (c) To prevent outside code from violating the state of our objects.
   (d) To hide an object's implementation details.

5. What is the type of the following expression?

```
new Raffle()
```

6. Complete the following truthtable. Feel free to write intermediate steps in the blank space.

a	b		a || !(a || b)
F	F		(a) _____
F	T		(b) _____
T	F		(c) _____
T	T		(d) _____

7. Enumerate the contents of the array `letters` after the following code is executed.

```
char[] letters = {'z', 'm', 'k', 'd', 'p', 'y'};
int offset = letters.length / 2;
for (int i = 0; i < offset; i += 1) {
  char tmp = letters[i];
  letters[i] = letters[i + offset];
  letters[i + offset] = tmp;
}
```

8. When designing an object in Java, what must we consider? Check zero or more.
   (a) Its constructors.
   (b) Its destructors.
   (c) Its state.
   (d) Its behaviors.

9. What are the type and value of the following expression?

```
new ArrayList().size()
```

10. What do we call a constructor that takes no parameters?

11. Write an object named `StrikeList` with the following public interface:
    (a) A constructor that initializes the list to contain the numbers 0 through 100.
    (b) Method `strike` that accepts an `Integer` and removes it from the list.
    (c) Method `size` that reports how many of the numbers have not been struck.
    (d) Method `get` that accepts an `int` index and returns the unstruck number at the specified index.

    Include any necessary private implementation.

12. Write an object named `Person` with the following public interface:
    (a) A constructor that accepts as parameters the person's name as a `String` and latitude-longitude as two `double`s.
    (b) Getters for the three pieces of state.

    Include any necessary private implementation.

13. Rewrite the following code, replacing the three parallel arrays with one array of `Person`:

```
public static void map(String[] names, double[] lats, double[] lons) {
  for (int i = 0; i < names.length; ++i) {
    System.out.printf("%s -> %.4f, %.4f%n", names[i], lats[i], lons[i]);
  }
}
```

14. Write an object named `Date` with the following public interface:
    (a) A constructor that accepts as parameters a year, month, and day, all of type `int`.
    (b) Method `toString` that returns the date as a `String` of the form `YYYY/MM/DD`, with day and month padded with leading zeroes as necessary.

    Include any necessary private implementation.

15. Write a `main` method that retrieves from the user a year, month, and day using a `Scanner`. (No prompts are necessary.) It constructs a date and prints it to `System.out`.