

# Sample Exam I

## CS 151 – Dr. Shaffer

### September 15, 2003

**Instructions:** This test is closed book/notes. The work on this test must be entirely your own as indicated in the course syllabus. Solve all problems unless otherwise indicated.

1. We wish to introduce a new class `Card` into Java. In each of the following parts of this question you will complete some part of the `Card` class. (You may, if you like, write the complete source code to the class on the back of this page rather than writing it in pieces.)
  - (a) Write a complete class declaration for the `Card` class.
  - (b) We expect that cards will need to store their suit (“hearts”, “clubs” etc) and their face value (2, 3, 4...Jack...Ace). Using Strings for the suit and an int for the face value, write the full Java source for the declaration of the instance variables for the `Card` class. (Note: we will use 11 for Jacks, 12 for Queens, 13 for Kings and 14 for Aces)
  - (c) Give the complete Java source for a constructor for the `Card` class which takes to arguments: the suit and the face value and initializes its instance variables appropriately.
  - (d) Write the accessors for the instance variables defined above.
  - (e) Write a method `print()` which displays to `System.out` the suit and face value of the card. The output **must** be formatted in the following examples:

```
2 of clubs
Ace of spades
King of diamonds
```
  - (f) Write a method `isHigherThan(Card c)` which returns true if the receiver is a “higher card” than `c`. For simplicity just use the face values to determine who is higher (don’t worry about any funny business with the Ace).

2. Given this set of definitions,

```
boolean q = true;
boolean z = false;
boolean p; // value not specified but assume it is filled in elsewhere
```

give the values of each of the following expressions:

- (a) `q || z && true`
  - (b) `q || p`
  - (c) `z && !z`
  - (d) `p || !p`
3. Give the output of the following Java program fragments:

```
(a) ArrayList l = new ArrayList();
    l.add("dog");
    l.add("cat");
    l.add("bunny");
    Iterator i=l.iterator();
    while(i.hasNext()) {
        System.out.println(i.next());
    }
```

```
(b) int x = 3;
    int y = 17;
    int z = y % x;
    int q = x % y;
    int a = 3 * x - 2 * y / 5;
    System.out.println("z is "+z);
    System.out.println("q is "+q);
    System.out.println("a is "+a);
```

```
(c) int x = 11;
    int y = 9;
    int z = 2;
    boolean q = x < 2 || y > 5;
    boolean p = z == x || y == 1;
    if(q) System.out.println("q");
    if(p) System.out.println("p");
```

4. We wish to implement the code to control an automatic teller machine. Physically the machine is composed of separate electronic and mechanical pieces: the input keypad, the receipt printer, the card reader, the bank transaction manager, and the cash dispenser. Each of these are good candidates for classes in our control system. Draw CRC cards to support the operation of withdrawing money from this system. (On the actual exam I would probably provide a little more help and give you more room to draw the CRC cards....)
5. There will one additional question on the actual exam but I've run out of ideas for this sample exam.