0. Name (2 pts):

CS 2334: Programming Structures and Abstractions

Midterm Exam II

Monday, November 9, 2009

General instructions:

- This examination booklet has 7 pages.
- Do not forget to write your name at the top of the page and to sign your name below.
- The exam is open book and notes, but closed electronic device.
- The exam is worth a total of 100 points (and 10% of your final grade).
- Explain your answers clearly and concisely. Do not write long essays (even if there is a lot of open space on the page). A question worth 5 points is only worth an answer that is at most one sentence.
- You have 50 minutes to complete the exam. Be a smart test taker: if you get stuck on one problem go on to the next. Don't waste your time giving details that the question does not request. Points will be taken off for answers containing excessive or extraneous information.
- Show your work. Partial credit is possible, but only if you show intermediate steps.

Problem	Topic	Max	Grade
0	Name	2	
1	Binary I/O	15	
2	Graphical User Interfaces	25	
3	Event-Driven Programming and MVC	35	
4	Collections Framework	25	
Total			

On my honor, I affirm that I have neither given nor received inappropriate aid in the completion of this exam.

Signature: _____

Date: _____

1. **Binary I/O** (15 pts)

(a) (5 pts) True or False: a String is represented as a binary number when it is written to an ASCII text file.

(b) (10 pts) Briefly describe the advantage of using ObjectOutputStream and ObjectInputStream over using DataOutputStream and DataInputStream.

2. **Graphical User Interfaces** (25 pts)

(a) (10 pts) Briefly explain why paintComponent() should be declared as "protected" and not "public".

(b) (10 pts) Briefly describe the function and benefits of using a layout manager.

(c) (5 pts) True or False: a layout manager implements the getPreferredSize() method.

3. **Event-Driven Programming and the Model View Controller Approach** (35 pts)

   (a) (10 pts) List two advantages of event-based programming over standard procedural programming.

   (b) (10 pts) List the three types of classes that play roles in event-driven programming. Briefly describe their function in the process.

(c) (10 pts) True or False, and briefly explain: in the MVC approach, an event Listener is part of the Model.

(d) (5 pts) How many JList objects can register a Listener with a single DefaultListModel?

4. **Java Collections Framework** (25 pts)

Consider the following code:

```
public class Person implements Comparable<Person>
{
    public int ID;
    public String name;

    public Person(int ID, String name) {
        this.ID = ID;
        this.name = name;
    };

    public String toString() {
        return(name + ", " + ID);
    };

    public int compareTo(Person p) {
        return(this.name.compareTo(p.name));
    };
};
```

```
import java.util.*;

public class driver {

    public static void displayList(List list) {
        System.out.println("##");
        for(Object o: list) {
             System.out.println(o);
        };
    };

    public static void main(String[] args) {
        LinkedList<Person> list = new LinkedList<Person>();
        Person p1 = new Person(45, "Bob");
        Person p2 = new Person(25, "Zella");
        Person p3 = new Person(32, "Arnie");

        list.add(p1);
        list.add(p2);
        list.add(p3);

        Collections.sort(list);

        displayList(list);

        Collections.sort(list, new Comparator<Person>() {
                              public int compare(Person p1, Person p2){
                                  if(p1.ID > p2.ID) return(1);
                                  if(p1.ID < p2.ID) return(-1);
                                  return(0);
                              };
             });

        displayList(list);
    };
}
```

(a) (15 pts) What output does the program produce?

(b) (10 pts) True or False, and briefly explain: a LinkedHashSet would be an adequate substitute in the above code for the LinkedList.