Assignment 1 -- CSC 115, Fall 2002

(Updated Sept 12/2002)

Objectives:

- o Review of programming skills from Programming I course.
- o Basic use of Object Oriented programming including
- o Creating objects
- o Inheritance
- o Use of constructors
- Basic use of I/O to the console.
- o Effective use of program testing.
- Effective use of the *javadoc* commenting style.
- o Arrays

Note: We do not provide some skeleton code for this assignment as you need the experience of creating a program from scratch. However, we have given some "implementation rules" to ensure you get adequate practice with a variety of the Java language and object oriented features. Marks will be deducted if these rules or any of the other requirements are not met.

Instructions:

Problem:

Objective: to create a casino program that contains a set of slot machines that a user can play. The casino will have two kinds of slot machines (regular and fancy). The user can play the machines (one at a time in a given order), until either they choose to quit, or until they run out of tokens.

For this assignment, you will create AT LEAST the following three classes. (Feel free to create other supporting classes if you wish.)

SlotMachine class ("SlotMachine.java"): This class implements a regular slot machine. Each machine has a particular win frequency. For example, the player will win, 1 out of 2 tries, 1 out of 3 etc , but no less than a 1 in 10 chance of winning. Each machine also a set amount (a jackpot) it pays out. The jackpot should be set relative to the win frequency. For example, if the win frequency is 1 in 2, the jackpot should be 1 token; 1 in 3 win frequency, jackpot should still be 1 token; 1 in 4, jackpot will be 2 tokens, and so on (this casino makes a lot of money!).

It costs one token to play (to keep things simple, there is only one kind of token accepted in this casino). It tells the user the player that they are about to play their machine (by giving the machine name as well as by reminding the player of their win frequency and jackpot. After the turn, the slot machine tells the player whether they won or not.

FancySlotMachine class ("FancySlotMachine.java"): This type of slot machine is almost the same as the regular slot machine, but it implements an extra "double or nothing" feature. If the user wins, the machine will ask the user if they would like to wager the amount won so far on that turn. If the player wins again, she will receive double the jackpot. If not, she loses her winnings. The player can keep doubling their winnings until either she chooses not to wager again or she loses. If the player loses, then the player must move onto the next machine. The machine uses the same win frequency to determine if the user wins a "double or nothing" turn. (*Implementation Rule*: this class should extend the SlotMachine class.)

Casino class ("Casino.java"): Your casino should have at least three regular SlotMachines, where each has a different win frequency, and at least three FancySlotMachines, again with different win frequencies. When the Casino program is run, it should prompt the player to enter the number of tokens they have to start with. Then the casino class will let the player play each machine (regular and fancy) in turn. The player keeps playing until they

would like to quit, or until they run out of tokens. For each turn on a slot machine, they should be told how many tokens they have so they can decide if they should quit or keep playing. The program terminates if the user wants to quit, or if they run out of tokens.

(Implementation Rule: The casino class must keep track of the slot machines using the array feature in Java.)

Deliverables

The assignment is worth 4% of the final course grade. It will be marked out of 100 marks. Part (A) – due in the labs, the week of Sept 16^{th} -- worth 20 marks

For part (A) you will create the basic SlotMachine and Casino classes. Your Slot Machine class doesn't have to do anything, other than store its name, its win frequency and calculate its jackpot (since it depends on the win frequency). You also need to create the shell for the casino class and initialize an array in Casino to hold the three regular slot machines. The main method will also need to be written as part of the Casino class so that you can create the Casino object, which will store the three slot machines in an array. Within this main method, you will have to write the code that asks the user to input the number of tokens they have.

Part (B) – due on Monday, September 23rd -- worth 80 marks

For part (B), we suggest you first finish implementing the SlotMachine class before extending it for the FancySlotMachine. Fully test SlotMachine before going further using a main method in the SlotMachine class. Finally, extend the SlotMachine class for FancySlotMachine, and again test it separately.

You need to hand in a printout of your code and some sample code. Details on how to hand in your code will be posted shortly.

Rules

The following additional rules are imposed:

- o Each file (class) must have a header that contains your student number .
- The <u>javadoc commenting style</u> is to be used. These are the comments that define the purpose, input, and expected output of each of your public methods and classes. Text, lecture, and lab examples are a good introduction.
- The <u>regular comments</u> must contain instructions for programmers who may have to modify your code at some later date. These comments should help the programmer understand what the code is doing in plain language. You can assume that the programmer is proficient enough to know the basic features of Java.
- It is assumed that your program has been thoroughly tested by you. Include a "main" program within each class that tests that class.

Summary of Implementation rules we imposed:

- The casino class should keep track of the machines using the array feature in Java.
- The FancySlotMachine should be extended from the SlotMachine class

Questions?

Email csc115@csc.uvic.ca

Or post your question to the csc115 webboard so that others can see the answers! http://webboard.uvic.ca

Hints

1) Use the following piece of code to help you calculate whether a user wins or not based on their win frequency. This calculation is approximate only but is sufficient for the purposes of this program.

int randomValue = (int)(Math.random()*100) % winFrequency;

Bonus: We use a very simple and approximate method here for generating a win based on the win frequency and for calculating the jackpot. For bonus marks (up to a maximum of 10 marks) try to improve on this approach. Clearly state that you have attempted a more advanced problem so that the marker doesn't assume you made mistakes in your assignment!

2) Use the following piece of code for the player to input an integer.

```
java.io.BufferedReader stndin;
stndin = new java.io.BufferedReader(new
java.io.InputStreamReader(System.in));
int intval = 0;
try {
    intval = Integer.valueOf(stndin.readLine()).intValue();
} catch (IOException e) {
}
```

3) The following is some sample input. Your output doesn't have to exactly match this, but it may be useful as a guide.

Note, we named our slot machines Huey, Louie and Dewey and the Fancy Slot Machines Super Huey, Super Louie and Super Dewey. The user input is shown in bold.

```
Hi Welcome to Casino Royale, how many tokens do you have!
10
Keep playing (10 tokens left)? y/n
У
Playing Huey with a jackpot of 1 and a 1 in 2 chance of winning....
You won!!!!!!
Keep playing (10 tokens left)? y/n
У
Playing Louie with a jackpot of 1 and a 1 in 3 chance of winning....
You won!!!!!!
Keep playing (10 tokens left)? y/n
У
Playing Dewey with a jackpot of 2 and a 1 in 4 chance of winning....
Sorry you lost, but try again!
Keep playing (9 tokens left)? y/n
У
Playing Super Huey with a jackpot of 1 and a 1 in 2 chance of winning....
Sorry you lost, but try again!
Keep playing (8 tokens left)? y/n
У
Playing Super Louie with a jackpot of 1 and a 1 in 3 chance of winning....
You won!!!!!!
Your current jackpot is: 1
Double or Nothing? y/n
v
Playing Super Louie for double or nothing....
```

You lost Keep playing (7 tokens left)? y/n У Playing Super Dewey with a jackpot of 2 and a 1 in 4 chance of winning.... Sorry you lost, but try again! Keep playing (6 tokens left)? y/n У Playing Huey with a jackpot of 1 and a 1 in 2 chance of winning.... You won!!!!!! Keep playing (6 tokens left)? y/n У Playing Louie with a jackpot of 1 and a 1 in 3 chance of winning.... Sorry you lost, but try again! Keep playing (5 tokens left)? y/n У Playing Dewey with a jackpot of 2 and a 1 in 4 chance of winning.... Sorry you lost, but try again! Keep playing (4 tokens left)? y/n У Playing Super Huey with a jackpot of 1 and a 1 in 2 chance of winning.... Sorry you lost, but try again! Keep playing (3 tokens left)? y/n У Playing Super Louie with a jackpot of 1 and a 1 in 3 chance of winning.... Sorry you lost, but try again! Keep playing (2 tokens left)? y/n У Playing Super Dewey with a jackpot of 2 and a 1 in 4 chance of winning.... Sorry you lost, but try again! Keep playing (1 tokens left)? y/n У Playing Huey with a jackpot of 1 and a 1 in 2 chance of winning.... You won!!!!!! Keep playing (1 tokens left)? y/n У Playing Louie with a jackpot of 1 and a 1 in 3 chance of winning.... Sorry you lost, but try again! Sorry you've run out of tokens! Goodbye