Part 1 Coin Flip

Write a program to see if the coin is heads or tails. Use a random number generator that would give a 0 or 1. 0 is equivalent to heads and 1 is equivalent to tails.

Steps

1. **import Scanner and Random**
   ```java
   import java.util.Scanner;
   import java.util.Random;
   ```

1. **Set up both keyboard and randGen**
   ```java
   Scanner keyboard = new Scanner(System.in);
   Random randGen = new Random();
   ```

2. **Prompt the user to enter an integer heads(enter 0) or tails(enter 1) from the keyboard**

3. **Read in the user prompt into an integer guess**
   ```java
   int guess = keyboard.nextInt();
   ```

4. **use the random to get a 0 or 1 and store in integer coin**
   ```java
   int coin = randGen.nextInt(2)
   ```

5. **Write an if statement to test to see if coin is 0 and guess is 0, print “Yes it's heads!”**
   ```java
   if (coin == 0 && guess == 0) {
       System.out.println("Yes it's heads!");
   }
   ```

   **else if coin is 0 and guess is 1 print out (“ Sorry it's heads”)**
   ```java
   else if (coin == 0 && guess == 1) {
       System.out.println("Sorry it's heads");
   }
   ```

   **else if coin is 1 and guess is 1 print out (“ Yes it's tails”)**
   ```java
   else if (coin == 1 && guess == 1) {
       System.out.println("Yes it's tails");
   }
   ```

   **else print out (“Sorry it's tails”)**
   ```java
   else {
       System.out.println("Sorry it's tails");
   }
   ```
Example user exchange:

Enter a guess - either heads(0) or tails(1)

1
Yes its tails

Another run would be

Enter a guess - either heads(0) or tails(1)

0
Sorry its tails

Part 2 Buy Car

You are looking to buy a car. You have a known budgeted amount of money per month to spend on a car. You have a chance to get a no interest loan from the dealer for 36 months (Use a constant variable for \textsc{TERMOFLOAN} - use final with value 36). You enter from the keyboard the amount of money per month you have to spend and the costs of Car A (Dream Car) and cost of Car B (Second Choice).

You write a java program to determine if you can afford Car A, Car B or no car.

To see if you can afford, take the cost of the car divided by the \textsc{TERMOFLOAN} and compare this to the amount you have to spend per month

You will need to carefully think about the if statements and how they are evaluated. Print out the appropriate message for each scenario. Include in the message how much extra they have to spend based on the choice that works best.

Test with three different scenarios - See sample dialogue - user inputs in bold.

Run 1

Enter the amount of money you have to spend on car per month \textbf{525}
Enter the cost of Dream car 15000

Enter the cost of PlanB car 8000
It seems you have $525.00 to spend on either a $15000.00 car or a $8000.00 car
Congrats, You can get your Dream Car
You have $108.33 extra monthly to spend

Run 2
Enter the amount of money you have to spend on car per month 280

Enter the cost of Dream car 15000

Enter the cost of PlanB car 10000
It seems you have $280.00 to spend on either a $15000.00 car or a $10000.00 car
You can get Car B
You have $ 2.22 extra monthly to spend

Run 3
Enter the amount of money you have to spend on car per month 230

Enter the cost of Dream car 15000

Enter the cost of PlanB car 10000
It seems you have $230.00 to spend on either a $15000.00 car or a $10000.00 car
Get walking
You are $-47.78 short
Part 3. String Operators

Latitude and longitude is the way to refer to any point on earth. For example, the latitude of the Capitol is 38°53’23” N. The longitude is 77°00’27”W. Write a java program to take the Strings

String lat=“385323N”; ←--------make 4 String variables
String longitude=”770027W”;<------------------------4 Strings

and manipulates them so the output would read:

The Capitol is located at
38 degrees 53 minutes and 23 seconds N and
77 degrees 00 minutes and 27 seconds W

You want to split the longitude and lat string each up into 4 pieces. The easiest way is to make 8 String variables and put in each the appropriate section of print statement.

Example String latDeg = lat.substring(0,2);

Continue the above and then put it all together in a print statement.

Things to consider

1) Use print, printf and println to drive the output to be what you want. Limit the money in output to 2 decimal places. I want the output to be formatted like the cases illustrated above.

2) Test thoroughly to make sure you get all conditions

Part 4 StringOrdering

For this lab you will write a Java program to prompt the user to enter three strings. Your program will determine the correct lexographic or alphabetic ordering of those strings.
Example of the if-else

```java
If (str1.compareToIgnoreCase(str2)<0 && str1.compareToIgnoreCase(str3)<0 &&str2.compareToIgnoreCase(str3)<0)
    System.out.println(str1 + " , " + str2 + " , " + str3);
else if
```

```
Sample Output

This is a sample transcript of what your program should do. Items in bold are user input and should not be put on the screen by your program.

Run 1:
Enter the first string: football
Enter the second string: basketball
Enter third String: squash

Output:
basketball, football, squash

Run 2:
Enter the first string: squash
Enter the second string: Tennis
Enter third String: baseball

Output:
baseball, squash, Tennis

Run 3:
Enter the first string: squash
Enter the second string: squash
Enter third String: baseball
Output:
Error : Strings are identical

NOTE: For this exercise you will need to use the compareToIgnoreCase() String method. Here is a sample of the String method comparing str1 and str2

str1.compareToIgnoreCase(str2) returns an int < 0 if str1 comes first
str1.compareToIgnoreCase(str2) returns an int >0 if str2 comes first
str1.compareToIgnoreCase(str2) returns and int  0 if str1 equals str2

Part 5: Boolean Expressions

5.a Enter the following program and run it:

/*
 Name:        your name
 Date:        today's date
 Title:       Expressions.java
 Description: A program to allow practice with boolean expressions
 Input:       2 boolean values (initially -- you'll modify this later
 Output:      The result of applying various logical operators to the
              two values
 */

import java.util.Scanner;

class Expressions
{
    public static void main ( String[] args )
    {
        Scanner keyboard = new Scanner( System.in );
        boolean  first;
        boolean  second;
        boolean  result;
        }
System.out.println( "Enter true/false for first value" );
first = keyboard.nextBoolean();
System.out.println( "Enter second value" );
second = keyboard.nextBoolean();
result = first && second;
System.out.println( "The value of " + first + " && " + second 
+ " is " + result );
} //end main function
} //end Expressions class

As soon as you have entered the program, save it by selecting the File --> Save AS from the menu. A dialog box will open, in which you can type a name to save the program as. Save it as Expressions.java on both your J:\ drive as well as making a backup copy on the A:\ drive.

5.b Try the program for a variety of true and false values for first and second. Then, modify the program so that result is determined by each of:

first != second
first || second
first == second

5.c Now, change the type of first and second from boolean to int, (remember to also change nextBoolean to nextInt and change the prompt) and try out the following expressions:

first > second
first >= second

and run it again with a variety of values. Ensure that you understand how each of the boolean operators work.

5.d -----> Make a chart of the results of your experiment. Show the results of your chart to one of the TAs or to me

Part 6: Simple if-else Statements

Let's do another program. Enter in the following program:

/*
Name: your name
Date: today's date
Title: Expressions2.java
Description: A program that determines the larger and smaller of 2 values
Input: 2 integer values
Output: Which is the larger and which is the smaller value
*/
import java.util.Scanner;

class Expressions2
{
    static public void main ( String[] args )
    {
        Scanner keyboard = new Scanner( System.in );
        int first_value, second_value;
        int max, min;

        System.out.println( "Enter first value (an integer please):" );
        first_value = keyboard.nextInt();
        System.out.println( "Enter second value (another integer):" );
        second_value = keyboard.nextInt(); /* end of user input */

        if ( first_value > second_value )
        {
            max = first_value;
            min = second_value;
        }
        else
        {
            max = second_value;
            min = first_value;
        }
        System.out.println( "The maximum is " + max + " and minimum is " + min);
    }  //end main function
}  //end Expressions2 class

6.b Run this for different values of first_value and second_value, some where first_value is larger and some where second_value is larger

6.c -----> Please answer this question. What happens when first_value and second_value are equal (i.e. which one gets assigned to max and which one to min)?

Part 7: More if-else Statements

7.a Now, write a similar program, where you will ask the user to input his/her age, and have the program print out "You are a senior citizen" if the user is 65 or older, or print out "You are not a senior citizen" otherwise. Save this program as Expressions3.java

Also, check to see if the user enters a negative age. If a negative age is entered, some error message should be issued, as people cannot be negative ages.
Please show me or the TA your working program Expressions3.java, and also which tests you used to make sure your program ran correctly.

**Part 8: Nested if-else Statements**

Let's do one more practice program. Enter the following program into the computer, and save it as Expressions4.java

```java
import java.util.Scanner;

class Expressions4
{
    static public void main ( String[] args )
    {
        Scanner keyboard = new Scanner( System.in );
        boolean first, second, third;

        System.out.println( "Enter in 3 true/false values" );
        first = keyboard.nextBoolean();
        second = keyboard.nextBoolean();
        third = keyboard.nextBoolean();

        if (first && second)
        {
            if (third)
            {
                System.out.println( "1" );
            }
            else
            {
                System.out.println( "2" );
            }
        }
    }
}
```
else
   if (second && third)
   {
       System.out.println( "3" );
   }
else
{
   if (first || !third)
   {
       System.out.println( "4" );
   }
   else
   {
       System.out.println( "5" );
   }
}
} //end main function
} //end Expressions4 class
8.b -----> - On a piece of paper, record the values of first, second, and third that will lead to each of the numbers 1 though 5 being printed out.
    - Show two different ways for the number 4 to be printed out.
    - Are there others?