

Print Name (last name first): _____

Do not open this exam until instructed to do so. The exam consists of 8 pages, numbered 1 through 8. Before starting to work, make sure that you have all 8 pages. There are five problems, each counting 20 points. The last page contains some miscellaneous facts that you may or may not find useful. Write all answers on the exam.

During this exam it is prohibited to:

1. exchange information with any other person in any way, including by talking or exchanging papers or books;
2. use any electronic aid, including calculators;
3. use any books or notes;
4. leave the exam room before you complete and turn in your exam.

I have read and understand all of the instructions above. On my honor, I pledge that I have not violated the provisions of the NJIT Academic Honor Code.

Signature and Date

Problem	1	2	3	4	5	Total
Points						

2

1. Circle **true** or **false** for each of the following statements.

a) It is valid in Java to assign a double value to an integer variable.

false

b) If a method is declared **private**, then other methods in the same class may not call the method. **false**

c) `float` is a valid Java identifier. **false**

d) The length of a String object can be changed. **false**

e) A constructor can return an integer value. **false**

2. a) Consider the following code fragment.

```
int x = 3, y = 6, z = 5;
if(x > y && y > z)
    System.out.println(x);
else if(x > y || x <= y)
    System.out.println(y);
else
    System.out.println(z);
```

Circle the response that describes the output.

1. Nothing; there is a syntax error.
2. 3
3. 5
4. 6 ←
5. None of the above.

b) Consider the following code fragment.

```
String a = " red";
String b = " blue";
boolean x = a==b;
b = a;
System.out.println(x + b);
```

Circle the response that describes the output.

1. Nothing; there is a syntax error.
2. true red
3. false red ←
4. false blue
5. true blue
6. None of the above.

4

3. The *median* of a set of numbers is a number in the set such that at least half the numbers in the set are no smaller and at least half are no larger. Complete the following class definition so that the program prompts the user to enter three integers from the keyboard and prints the median (middle value). For example, if the user enters 8, 3, 5, then the output should be 5. If the user enters 2, 7, 2, then the output should be 2.

```
import java.util.Scanner;

public class Median {

    public static void main(String[] args) {

        Scanner scan = new Scanner(System.in);

        System.out.println("Enter three numbers:");
        int a = scan.nextInt();
        int b = scan.nextInt();
        int c = scan.nextInt();

        if ((a <= b && b <= c) || (c <= b && b <= a))
            System.out.println("A median is: " + b);
        else if ((a <= c && c <= b) || (b <= c && c <= a))
            System.out.println("A median is: " + c);
        else
            System.out.println("A median is: " + a);
    }
}
```

4. Complete the definition of the following method `userName()` that takes a name and returns a “user name” consisting of the first four characters of the name followed by a random digit from 1 to 9. If the name has fewer than four characters, use the whole name followed by the digit. For example, if the name is “Washington” then the method might return “Wash3”. If the name is ”Ho”, the method might return “Ho8”.

```
String userName(String st) {  
  
    String name;  
    int digit = (int) (Math.random()*9)+1;  
  
    if(st.length() > 4)  
        name = st.substring(0,4) + digit;  
    else  
        name = st + digit;  
  
    return name;  
}
```

5. The **Coin** class that is in chapter 5 of the textbook appears on the next page. Complete the following **main** method so that it creates a pair of coins, flips each coin three times, and prints out a message stating which coin landed heads most often, or if there was a tie.

```
public static void main(String[] args) {

    Coin coin1 = new Coin();
    Coin coin2 = new Coin();

    int heads1 = coin1.isHeads() ? 1 : 0;
    int heads2 = coin2.isHeads() ? 1 : 0;

    coin1.flip();
    if(coin1.isHeads())
        ++heads1;
    coin1.flip();
    if(coin1.isHeads())
        ++heads1;

    coin2.flip();
    if(coin2.isHeads())
        ++heads2;
    coin2.flip();
    if(coin2.isHeads())
        ++heads2;

    if(heads1 > heads2)
        System.out.println("Coin 1 landed heads more often.");
    else if(heads1 < heads2)
        System.out.println("Coin 2 landed heads more often.");
    else System.out.println("Tie.");

}
```

```
public class Coin
{
    private final int HEADS = 0;
    private final int TAILS = 1;
    private int face;

    // Sets up the coin by flipping it initially.
    public Coin ()
    {
        flip();
    }

    // Flips the coin by randomly choosing a face value.
    public void flip ()
    {
        face = (int) (Math.random() * 2);
    }

    // Returns true if the current face of the coin is heads.
    public boolean isHeads ()
    {
        return (face == HEADS);
    }

    // Returns the current face of the coin as a string.
    public String toString()
    {
        String faceName;
        if (face == HEADS)
            faceName = "Heads";
        else
            faceName = "Tails";
        return faceName;
    }
}
```

Potentially Useful Facts

String Methods

```
int length()  
int compareTo(String anotherString)  
char charAt(int index)  
String substring(int beginIndex, int endIndex)
```

Scanner Methods

```
int nextInt()  
double nextDouble()  
String nextLine()
```

Random Methods

```
int nextInt(int num)
```