READ THIS NOW!

Failure to read and follow the instructions below may result in severe penalties. Failure to adhere to these directions will not constitute an excuse or defense.

- Print your name in the space provided below.
- Print your name and ID number on the Opscan form; be sure to code your ID number on the Opscan form. Code Form A on the Opscan.
- Choose the single best answer for each question — some answers may be partially correct. If you mark more than one answer, it will be counted wrong.
- Unless a question involves determining whether given Java code is syntactically correct, assume that it is. The given code has been compiled and tested, except where there are deliberate errors. Unless a question specifically deals with Java import directives, you should assume the necessary library files have been imported.
- Note that questions about printed values disregard formatting completely.
- In questions/answers which require a distinction between integer and real values, integers will be represented without a decimal point, whereas real values will have a decimal point, [1054 (integer), 1054.0 (real)].
- When you have completed the test, sign the pledge at the bottom of this page and turn in the test and your Opscan.
- This is a closed-book, closed-notes examination. No calculators or other electronic devices may be used during this examination. You may not discuss (in any form: written, verbal or electronic) the content of this examination with any student who has not taken it. You must return this test form when you complete the examination. Failure to adhere to any of these restrictions is an Honor Code violation.
- There are 25 multiple-choice questions.
- Mark your answers on the test form, for future reference, and on the Opscan. The answers you mark on the Opscan form will be considered your official answers.

Do not start the test until instructed to do so!

Name ____________________________ (print: Last name, First)

VT PID: ____________________________ (print: campus email address)

Pledge: On my honor, I have neither given nor received unauthorized aid on this examination.

______________________________
signature
Given the following Java class declaration:

```java
public class Test2 {
    public Test2() {
        x = y = 0;
    }
    public Test2(int a, int b) {
        x = a;
        y = b;
    }
    public boolean equals(Test2 t2) {
        return (x == t2.x) && (y == t2.y);
    }
    private int x, y;
}
```

1. What, (if anything), is wrong with the declaration in `Test2` client code below?

   ```java
   Test2 t2 = new Test2(1, 2);
   ```

   1) The default constructor must be invoked first.
   2) The second (parameterized) constructor requires `int` variable parameters.
   3) The constructor must be invoked through the object, (e.g., `Test2 t2.Test2(1, 2);`)
   4) None of the above

Assuming the `Test2` class from the previous question, given the following declarations in `Test2` client code:

   ```java
   Test2 t22 = new Test2(2, 2);
   Test2 t23 = new Test2(2, 3);
   ```

2. What is the total number of instance variables in the `Test2` objects t22 and t23?

   1) 1  2) 2  3) 3  4) 4  5) 5  6) 6  7) none of these

3. Assuming the `Test2` class above and the declarations from the previous question, what, (if anything), is wrong with the code segment in `Test2` client code below?

   ```java
   boolean t3same = (t22.x == t23.x) && (t22.y == t23.y);
   ```

   Why will the above code to set the `boolean t3same` variable not compile?

   1) The `t22` instance variables must not be prefixed (or qualified) by the `t22` reference variable.
   2) The `t22` instance variables can only be accessed in the `Test2` class member functions.
   3) The “this” Java reserved reference variable must be used to access the instance variables.
   4) None of the above
Assuming the Test2 class from the previous questions, given the following segment in Test2 client code:

```java
test2   t41 = new test2( 4, 0 );
test2   t42 = new test2( 4, 0 );

boolean b4 = t42.equals(t41);
```

4. What is the value assigned to the boolean b4 variable?

1) true  2) false  3) none of these  4) 4

Assuming the Test2 class from the previous questions, given the following segment in Test2 client code:

```java
test2   t51 = new test2( 5, 0 );
test2   t52 = new test2( 5, 0 );

boolean b5 = (t51 == t52);
```

5. What is the value assigned to the boolean b5 variable?

1) true  2) false  3) none of these  4) 50  5) 5

For the following 3 questions, select the value of the given Java arithmetic expression. Note that the presence of a decimal indicates a double value, rather than an int.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>6) 9 / 4 + 3.0</td>
<td>5.25</td>
<td>5.0</td>
<td>5</td>
<td>4</td>
<td>none of these</td>
</tr>
<tr>
<td>7) 8 / 5 - 4 / 5</td>
<td>1</td>
<td>0.8</td>
<td>3</td>
<td>4</td>
<td>none of these</td>
</tr>
<tr>
<td>8) 16 % 4 / 3 - 2</td>
<td>-1</td>
<td>2</td>
<td>-0.666</td>
<td>not allowed</td>
<td>none of these</td>
</tr>
</tbody>
</table>

For the next 2 questions, select the value assigned to the relevant variable, given the declarations:

```java
int    IntId;
double DecId;
```

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>9) DecId = 19 / 5;</td>
<td>3</td>
<td>3.0</td>
<td>3.8</td>
<td>4</td>
<td>none of these</td>
</tr>
<tr>
<td>10) IntId = (int) (5 + 2.7);</td>
<td>7</td>
<td>7.7</td>
<td>8</td>
<td>8.0</td>
<td>none of these</td>
</tr>
</tbody>
</table>
11) Given the following incomplete Java code segment:

```
String str = "3.1415";
double dval = ________________;
```

Choose the Java code below to replace the underlined blank above to convert the string into an equivalent double representation?

1) Double.doubleValue.valueOf(str)
2) Double.valueOf(str).doubleValue()
3) double.DoubleValue.valueOf(str)
4) double.valueOf(doubleValue(str))
5) None of the above

12) What is the value of the variable \( Z \) after the following code is executed?

```
int W = 7, X = 3, Y = 9, Z = 0;
if (Z - X <= Y / 7) {
    Z--;
    if (W*2-X != Y+X-1)
        Z++;
    else
        Z--;
} else {
    Z = 3;
}
```

1) -1  
2) -2  
3) 0   
4) 1   
5) 3   
6) the code contains a syntax error  
7) none of the above

13) What output will the following program produce? (Be careful this may be tricky.)

```
int Score = 87, Rank = 2;
if (Rank > 2)
    if (Score < 90)
        System.out.println("Not bad!");
    else
        System.out.println("Pretty Good!");
```

1) Not bad!  
2) Pretty Good!  
3) "Not bad!"  
4) "Pretty Good!"  
5) both 1 and 2  
6) both 3 and 4  
7) No output is produced.  
8) none of these
14) What is the value printed for the variable Beta if the following code is executed?

```java
int Beta = 0, X = 5;
if ( X % 3 == 1 )
    Beta = Beta + X;
X--;
if ( X % 2 == 0 )
    Beta = Beta + X;
X--;
if ( X / 3 == 0 )
    Beta = Beta + X;
System.out.println("Beta = " + Beta);
```

1) 0  
2) 1  
3) 2  
4) 3  
5) 4  
6) 5  
7) 6  
8) None of these

15) Assume that the BufferedReader reference variable myInput has been successfully associated with a FileInputStream. In the code below that attempts to read the next line of input from myInput, what will be the value assigned to the String reference variable if the readLine method fails.

```java
String NextLine = myInput.readLine();
```

1) -1  
2) 0  
3) null  
4) nil  
5) false  
6) none of the above

16) What is the value printed for the variable alpha if the following code is executed?? (Be careful here.)

```java
int num=4;
int alpha = 10;
switch (num)
{
    case 3  : alpha++;  
    case 4  : alpha = alpha + 2;  
    case 8  : alpha = alpha + 3;  
    default : alpha = alpha + 4;
}
System.out.println("alpha = " + alpha );
```

1) 10  
2) 14  
3) 12  
4) 19  
5) 15
Given the following Java code segment:

```java
int Count = 0;
int number = 2;
boolean done = false;
while (!done)
{
    Count++;
    number = number * 2;
    done = (number > 64);
}
System.out.println( "Count = " + Count );
```

17) What is printed out when the above code is executed?

1) 1  2) 2  3) 3  4) 4  5) 5  6) 6  7) 0  8) 10  9) none of the above

Given the following Java code segment:

```java
int i=1, sum=0, j;
while (i <= 5)
{
    sum = 0;
    j = 1;
    while (j<=i)
    {
        sum = sum + j;
        j++;
    }
    i++;
}
System.out.println( "sum = " + sum );
```

18) What is printed out for sum when the above code is executed?

1) 0  2) 1  3) 5  4) 14  5) 15  6) none of the above
19) What is the output of the following code fragment?

```java
int beta = 5;
while (beta > 1)
{
    switch (beta)
    {
        case 1 : System.out.print( 'R' );
                break;
        case 2 :
        case 4 : System.out.print( 'O' );
                break;
        case 5 : System.out.print( 'L' );
    }
    beta--;
}
System.out.println( 'X' );
```

1) X 2) ROOLX 3) LOOX 4) LOORX 5) ROOX

20) What does the above code segment display?

```java
int num = 345;
while (num > 0)
{
    System.out.print( ' ' );
    System.out.print( num % 10 );
    num = num / 10;
}
System.out.println();
```

1) 5 .5 0 2) 3 4 5 3) .5 0 0 4) 5 4 3 5) 34.5 3.45 .345 6) none of the above
For the next 5 questions, consider the incomplete static member function definition given below, assume it is located in the main program class:

```java
public static int CountAs(String aString)  //Assumes aString is not null
{
    int Counter = _________;    //Line A
    int TotalA  = 0;
    while(Counter < ________)     //Line B
    {
        if ( _________ .equals("A") )   //Line C
            TotalA=TotalA+________;   //Line D
        Counter++;
    }
    return ( _________ );     //Line E
}
```

21) How should the blank, (i.e. underscores), for the initial value of Counter in line A be filled?

1) -1  
2) 0  
3) 1  
4) 2  
5) it should be left blank  
6) none of these

22) How should the blank in line B be filled, (for the less than comparison to Counter)?

1) aString.length()  
2) length(aString)  
3) aString.hasMoreElements()  
4) Counter.length()  
5) none of these

23) How should the blank in line C be filled?

1) aString.substring(Counter)  
2) aString.substring(Counter).toUpperCase()  
3) aString.substring(Counter, Counter + 1)  
4) aString.substring(Counter, Counter + 1).toUpperCase()  
5) none of these

24) How should the blank in line D be filled?

1) 1  
2) 2  
3) Counter  
4) ++  
5) none of these

25) How should the blank in line E be filled?

1) TotalA  
2) Counter  
3) aString.length()  
4) none of these