

Name: _____

CS 141: Introduction to (Java) Programming: Exam 1*Jenny Orr • Willamette University • Fall 2013*

1.	(max 18)	4.	(max 16)
2.	(max 12)	5.	(max 12)
3.	(max 24)	6.	(max 18)
Total:		(max 100)	

1. (3 pts each, 18 pts total) What is the value of the variable **answer** after each of the following statements given the declarations below.

These are tricky - pay special attention to variable types!

```
double answer = 10;
double x = 4;
double y = 3;
int n = 2;
int m = 7;
```

- a. `answer += 2.5;` _____
- b. `answer = n % m;` _____
- c. `answer = m % n;` _____
- d. `answer = 4*n/m;` _____
- e. `answer = 1 + y/x;` _____
- f. `answer = n/x;` _____

2. (1 pt each, 12 pts total) For each definition, identify the index (e.g. A, B, ...) of the vocabulary word it describes. Please write clearly so your answer is unambiguous.

Definitions:

- i. _____ A named location in memory for holding data.
- ii. _____ A sequence of characters.
- iii. _____ A number that appears in code without explanation.
- iv. _____ The place a programmer can look at to read about a class's methods.
- v. _____ A variable type which contains a only single value, e.g. int, double or char as opposed to String or Scanner
- vi. _____ Combining strings to form a new string.
- vii. _____ The way Java compares and orders strings.
- viii. _____ Explicitly converting a value from one type to a different type.
- ix. _____ A single letter, digit or symbol (e.g. ascii code).
- x. _____ An input value that is used to signal the end of input.
- xi. _____ An error in a syntactically correct program that causes it to act differently from specification.
- xii. _____ Setting the value of a variable for the first time, before it is used.

Vocabulary Word

- | | |
|------------------------|--|
| A. Assignment | L. Initialization |
| B. Expression | M. Primitive type |
| C. Boolean value | N. Class type |
| D. Relational operator | O. Application programming interface (API) documentation (Javadoc) |
| E. Compile time error | P. Boolean operator |
| F. Run-time error | Q. A String |
| G. Sentinel | R. Type |
| H. Cast | S. Variable |
| I. Character | T. Lexicographic |
| J. Concatenation | |
| K. Magic Number | |

3. (4 pts each, 24 pts) Given the declarations:

```
int x;  
int y;  
char c;  
String answer;  
String word1;  
String word2;
```

Write a Boolean expression for the following:

a. The answer begins with the letter Z

b. The mathematical expression $20 < x < 100$

c. The character c is the letter E or e

d. word1 does not equal word2

e. It is not true that x and y are both less than 10

f. y is either less than 100 or more than 200.

4. (4 pts each, 16 pts total) What is the output of the following loops?

Briefly explain your answers (otherwise, no partial credit can be given if your answer is not quite right!)

Loop 1:

```
int cnt = 0;  
for (int j = 10; j < 15; j++) {  
    cnt++;  
}  
System.out.println("cnt = " + cnt);
```

Loop 1 Output:

Loop 2:

```
int cnt = 0;
for (int j = 5; j < 15; j++) {
    for (int i = 0; i < 10; i++) {
        cnt++;
    }
}
System.out.println("cnt = " + cnt);
```

Loop 2 Output:

Loop 3:

```
int cnt = 0;
for (int j = 0; j < 4; j++) {
    for (int i = 0; i < j; i++) {
        cnt++;
    }
}
System.out.println("cnt = " + cnt);
```

Loop 3 Output:

Loop 4:

```
int cnt = 0;
for (int j = 0; j < 4; j++) {
    for (int i = 0; i < 5; i++) {
        for (int k = 0; k < 10; k++) {
            cnt++;
        }
    }
}
System.out.println("cnt = " + cnt);
```

Loop 4 Output:

5. (12 pts) Write a while-loop which sums the integers from a to b (inclusive) and prints the result once at the very end.

```
import java.util.Scanner;
public class LoopPractice {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        System.out.print("Enter 2 integers: ");
        int a = in.nextInt();
        int b = in.nextInt();

    }
}
```

6. (18 pts total) Multiple Choice - Circle the correct answer. (Please be clear! Ambiguous or hard to read answers will be counted as incorrect.)

A. (1 pt) Which one of the following errors represents a part of a program that is incorrect according to the rules of the programming language?

- | | |
|--------------------|-------------------------|
| a) Syntax errors | c) Logic errors |
| b) Run-time errors | d) Out-of-memory errors |

B. (1 pt) Which one of the following types of statements is an instruction to replace the existing value of a variable with another value?

- | | |
|----------------|-------------------|
| a) Update | c) Assignment |
| b) Declaration | d) Initialization |

C. (1 pt) What is wrong with the following code snippet?

```
public class Area
{
    public static void main(String[] args)
    {
        int width = 10;
        height = 20.00;
        System.out.println("area = " + (width * height));
    }
}
```

- a) The code snippet uses an uninitialized variable.
- b) The code snippet uses an undeclared variable.
- c) The code snippet attempts to assign a decimal value to an integer variable.
- d) The code snippet attempts to add a number to a string variable.

D. (2 pts) What is the output of the following code snippet?

```
public static void main(String[] args){
{
    String str1 = "I LOVE Willamette";
    String str2 = str1.substring(4, 9);
    System.out.println(str2);
}
}
```

- a) I LOV
- b) OVE W
- c) VE Wil
- d) VE Wi

E. (1 pt) What will be the output when the following code is executed

```
double x = 2.5;
double y = 0.0;
if ( y != 0 && x/y != 1.0) {
    System.out.println("x/y is not equal to 1");
}
else { System.out.println("x/y is equal to 1");}
```

- a) x/y is not equal to 1
- b) x/y is equal to 1
- c) There will be no output.
- d) The program will crash.

F. (1 pt) What kind of operator is the <= operator?

- a) Boolean
- b) Arithmetic
- c) Inequality
- d) Relational

G. (1 pt) Which of the following options refers to the technique of simulating program execution on a sheet of paper?

- a) Compiling
- b) Prototyping
- c) Tracing
- d) Debugging

H. (1 pt) Which of the following loops executes the statements inside the loop before checking the condition?

- a) for
- b) while
- c) do-while
- d) do-for

I. (2 pts) Assuming that a user enters 25 as the value for x, what is the output of the following code snippet?

```
Scanner in = new Scanner(System.in);
System.out.print("Enter a number: ");
int x = in.nextInt();
if (x < 100) {
    x = x + 5;
}
if (x < 500) {
    x = x - 2;
}
if (x > 10) {
    x++;
}
else {
    x--;
}
System.out.println(x);
```

- a) 27
- b) 28
- c) 29
- d) 30

J. (1 pt) Which of the following loop(s) could possibly not enter the loop body at all?

- I. for loop
- II. while loop
- III. do-while loop

- a) I only
- b) I and II only
- c) II and III only
- d) I and III only

K. (1 pt) A loop inside another loop is called:

- a) A sentinel loop c) A parallel loop
b) A nested loop d) A do/while loop

L. (2 pts) What is the output of the following loop?

```
for (int i = 20; i >= 2; i = i - 6) {
    System.out.print(i + ", ");
}
```

- a) 20, 14, 8, c) 20, 14, 8, 2,
b) 14, 8, d) 14, 8, 2,

M. (2 pts) What is the first and last value of i to be printed by the following code snippet?

```
int n = 20;
for (int i = 0; i <= n; i++)
{
    for (int j = 0; j <= i; j++)
    {
        System.out.println(" " + i);
    }
}
```

- a) 0 and 20 c) 1 and 19 e) None of the above
b) 1 and 20 d) 0 and 19

N. (1 pt) What will be the output of the following code snippet?

```
boolean token = false;
while (token)
{
    System.out.println("Hello");
}
```

- a) "Hello" will be displayed infinite times. c) No output after successful compilation.
b) No output because of compilation error. d) "Hello" will be displayed only once.

O. (2 pts) What is the output of the following code:

```
int x = 7;
int y = 9;
int z = 5;

x = y;
y = z;
z = x;
System.out.println(x + " " + y + " " + z);
```

- a) 9 5 9 c) 7 9 5
b) 9 5 7 d) 7 7 7