

**Part I.** (47 points) Solve each of the following problems. For the multiple choice problems, select the correct answer by placing an "X" in the box beside it.

(1<sup>pt</sup>) 1. Java source code files are created and saved using what file extension? 1 pt

.jav       .jcod       .jsrc       .java

(1<sup>pt</sup>) 2. Which of the following is a reserved Java keyword? 1 pt

apple       7up       total       boolean

(1<sup>pt</sup>) 3. Which one of the following is *not* a correct Java variable name? 1 pt

2bad       zero       value       year2000

(1<sup>pt</sup>) 4. How many choices are possible when using a single if-else statement? 1 pt

1       2       3       4

(1<sup>pt</sup>) 5. Which one of the following is *not* a correct arithmetic expression? 1 pt

alpha  
 (alpha/momentum) - 12.4  
 alpha(/momentum - 12.4)  
 ((alpha-momentum) - 12.4)

(1<sup>pt</sup>) 6. A colony of rabbits doubles its population every 28 days. The population starts out at 2, and increases until it reaches 100000. Say that a section of code simulates this process. Which of the following while statements is most likely to be used? 1 pt

while (population = 100000)  
 while (population < 100000)  
 while (population > 28)  
 while (population = 28)

(1<sup>pt</sup>) 7. What is the output of the following code fragment? 1 pt

```
for (int i = 0; i < 5; i++)  
{  
    System.out.print(i + " ");  
}
```

1 2 3 4 5  
 0 1 2 3 4  
 0 1 2 3 4 5  
 i i i i i

7 pts

(1<sup>pt</sup>) 8. Which of Java's primitive data types would you use to store the square root of 2?

1 pt

(1<sup>pt</sup>) 9. Which of Java's primitive data types would you use to store your age?

1 pt

(1<sup>pt</sup>) 10. Write a single line of code that will create an integer variable called `num` and store the number 407 in it.

1 pt

(1<sup>pt</sup>) 11. Write a single line of code that will increment the integer variable `num` by 1.

1 pt

(1<sup>pt</sup>) 12. What are the two possible values of a `boolean` variable?

1 pt

(1<sup>pt</sup>) 13. What is the Java operator for boolean **AND-ing**?

1 pt

(1<sup>pt</sup>) 14. What is the Java operator for boolean **OR-ing**?

1 pt

(1<sup>pt</sup>) 15. What is the output of the following:

```
System.out.println( (true&&false) || ((true&&true)||false) );
```

1 pt

(1<sup>pt</sup>) 16. Write a statement that will store the value `true` in a `boolean` variable `b` if the value in the variable `m` is 44 or less.

1 pt

(1<sup>pt</sup>) 17. Write code using a `for`-loop that will print out the numbers 2, 4, 6, 8, 10.

1 pt

10 pts

(2<sup>pts</sup>) **18.** What is the value of `num` after these commands execute?

```
int num = 10;
num = num + num;
num = num - 5;
```

Answer:

2 pts

(2<sup>pts</sup>) **19.** What is the output of the following code:

```
int pancakes = 10;
if (pancakes > 3)
{
    System.out.println("Yum!");
}
else
{
    System.out.println("Still hungry!");
}
```

Answer:

2 pts

(4<sup>pts</sup>) **20.** Convert the following hexadecimal(base-16) numbers to binary(base-2). Show your calculations.

(a) (2 pts)

$F4B_{\text{hex}}$

(b) (2 pts)

$EC8_{\text{hex}}$

4 pts

(4<sup>pts</sup>) **21.** Convert the following binary(base-2) numbers to hexadecimal(base-16).

(a) (2 pts)

$1110111010_{\text{bin}}$

(b) (2 pts)

$101101101011001111_{\text{bin}}$

4 pts

12 pts

- (3<sup>pts</sup>) **22.** Write a Java program that calculates the area of a circle. Your Java program should use the variable `double radius = 5.0`; After you have performed the calculation, print the result.

3 pts

```
public class CircleArea
{
    public static void main(String[] args)
    {
        // YOUR CODE HERE

    }
}
```

- (3<sup>pts</sup>) **23.** Write a Java program that converts a Fahrenheit temperature to a Celsius temperature using the following equation:

3 pts

$$\text{Celsius} = \frac{5}{9} * (\text{Fahrenheit} - 32)$$

Your Java program should use the variable `double fahrenheit = 83.0`; Perform the conversion using the provided equation, and print your result.

```
public class Temperature
{
    public static void main(String[] args)
    {
        // YOUR CODE HERE

    }
}
```

6 pts

- (4<sup>pts</sup>) **24.** Consider the following code listing for the video game **League of Hackers**. Unfortunately, the programmer of this game neglected to do any debugging, and it is full of syntax errors. Identify each Java syntax error by writing a circle around the incorrect part. *Hint:* There are 8 errors in total.

4 pts

```
//----BEGIN CODE FOR LEAGUE OF HACKERS----
public glasses LeagueOfHackers
{
    public irratic void main(Spaghetti[] args)
    {
        String name = "Stryker";
        int strength = 7;
        int luck == 3;
        int health = 5;

        Display.out.println("Welcome to League of Hackers!");
        System.out.println("Prepare for your first battle!");

        if choice (strength > 4 AND health > 4)
        {
            System.out.println("You have defeated your opponent!");
        }
        else if (luck >>> 6)
        {
            System.out.println("You manage to escape unharmed!");
        }
        else
        {
            System.out.println("You and your opponent form an alliance!");
        }
    }
}
```

- (8<sup>pts</sup>) **25.** You are going to write a Java program using conditionals(**if**, **else if**, **else**). The program will determine the result of a rock, paper, scissors game, given **player1** and **player2**'s choices. Your program will print out the result. The following figure illustrates the rules of the game. Use these rules to complete the **truth table** for all the possible choices for **player1** and **player2**, and the result of the game. We will use the following integer values to represent the hands: **rock** = 0, **paper** = 1, and **scissors** = 2.

8 pts



player1	player2	result
rock(0)	rock(0)	tie
paper(1)	paper(1)	tie
rock(0)	scissors(2)	player1

12 pts

```
public class RPS
{
    public static void main(String[] args)
    {
        int player1 = 0;
        int player2 = 2;

        // YOUR CODE HERE
    }
}
```