University of Maryland College Park
Dept of Computer Science
CMSC131 Fall 2015
Midterm I

Last Name (PRINT): ____________________

First Name (PRINT): ____________________

University Directory ID (e.g., umcpturtle)________________________

I pledge on my honor that I have not given or received any unauthorized assistance on this examination.

Your signature: ______________________________________________________

Instructions

• This exam is a closed-book and closed-notes exam.
• Total point value is 200 points.
• The exam is a 50 minutes exam.
• Please use a pencil to complete the exam.
• WRITE NEATLY.
• There are four problems in the exam.
• You don’t need to use meaningful variable names; however, we expect good indentation.

Grader Use Only

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Problem #1 (Short Answers)

1. (4 pts) Java compilers produce:
   a. Assembly code.
   b. A third-generation code.
   c. Bytecode.
   d. Pure machine code (can run on the computer CPU).
   e. None of the above.

2. (4 pts) How many different combinations of 0’s and 1’s can be represented with 5 bits?

3. (4 pts) Which of the following are reserved names in Java? Circle all that apply.
   a. position
   b. else
   c. location
   d. if
   e. None of the above

4. (4 pts) Which of the following expressions are equivalent based on the two String variables s and t? Circle all that apply.
   ```java
   String s = "Mary";
   String t = "Mary";
   a. s.equals(t)
   b. s.compareTo(t) == 0
   c. None of the above
   ```

5. (4 pts) Name two primitive types used to store integers in addition to int and long.

6. (4 pts) What value would Java compute for the following Java code fragments?
   a) int x = 1; int y = x / 2; // What is the value of y?
   b) int w = 15 % 3; // What is the value of w?

7. (4 pts) Which of the following could be used to name variables in Java? We’re not asking if they are good style, just whether or not they are permissible. Circle all that apply.
   ```java
   _environment#    surface10    10CaRdS    salt&pepper
   ```
8. (8 pts) Re-write (in the box) the following code fragment using a for-loop. The body of the for loop can only have the System.out.println statement (no other statement).

```java
int y = 3, val = 10;
while (y >= 1) {
    System.out.println("val: "+ val);
    val *= 2;
    y--;
}
```

9. (4 pts) Write the binary representation of 17.

10. (4 pts) Write the decimal equivalent of the binary number 11011.

11. (4 pts) What is pseudocode?

12. (4 pts) What is null?

13. (4 pts) Complete the following assignment so we are able to print the following message. Notice that double quotes surround the message.

```
"C:\home\tmp"
```

```java
String path = System.out.println(path);
```

14. (4 pts) How many distinct String object instances are created in the following code segment?

```java
String movie = "The Martian";
String november = new String("Hunger Games");
String best = november;
```

Answer:_______

15. (4 pts) Define a String constant named BEST_SCHOOL that has as value “UMCP”.

```java
```
16. (4 pts) Write the output generated by the following statements.

```java
int y = 10;
int x = y++;
System.out.println(y);
System.out.println(x);
```

17. (4 pts) Will the value of x change in the following code? Briefly explain (yes or no answer with no explanation will receive no credit)

```java
int x = 20, y = 10;
if ( (y >= 10) || (++x > 20)) { }
```

18. (4 pts) The following code fragment generates an error when run. Why?

```java
String k = null;
int x = k.length();
```
Problem #2 (Conditionals)

Fill in the method below in order to complete a program called Dessert. The program reads a number of calories and prints the dessert classification based on the table below.

<table>
<thead>
<tr>
<th>Number of Calories</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than or equal to a 100</td>
<td>Awesome</td>
</tr>
<tr>
<td>More than 100 and less 200</td>
<td>OK</td>
</tr>
<tr>
<td>Greater than or equal to 200</td>
<td>Danger!</td>
</tr>
</tbody>
</table>

Restrictions/Assumptions

- Use the message “Enter calories: ” to read the number of calories.
- You must use System.out.println to print the classification.
- You should use the Scanner class to read values.

```java
public class Dessert {
    public static void main(String[] args) {
```
Problem #3 (Loops)

Fill in the method below in order to complete a program called AccountAccess. The program will keep asking for a login id (string value) and a pin number (integer) as long as the values provided are different than “Bob” and 1234, respectively. Each time invalid values are provided the program will print the message “Invalid values.” Once “Bob” and 1234 are provided the program will display the message “Access Granted” and end. For this problem:

- Use the Scanner class to read values.
- Use System.out.println to display the messages “Enter login id: “ and “Enter pin number: .“
- Use the JOptionPane.showMessageDialog method to display “Invalid values” and “Access Granted.”
- You must use a do while statement.

```java
public class AccountAccess {
    public static void main(String[] args) {
```
Problem #4 (Coding)

Fill in the method below. The method will display a diagram where each row has two more * than the previous row. The number of rows corresponds to the size parameter. Notice the first row will have two *. The following are examples of diagrams the method will generate:

For a size parameter of 2:
**
****

For a size parameter of 3:
**
****
******

For a size parameter of 4:
**
****
******
********

Your solution must handle different size values (not just 2, 3, and 4).

```java
public static void printDiagram(int size) {
    // Your code here
}
```