



# University of Maryland College Park

## Dept of Computer Science

### CMSC131 Fall 2015

### Midterm I Key

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.

**ANSWER: C**

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

**ANSWER: 32**

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

**ANSWER: b and d**

4. (4 pts) Which of the following expressions are equivalent based on the two String variables s and t? Circle all that apply.

```
String s = "Mary";  
String t = "Mary";
```

- a. `s.equals(t)`
- b. `s.compareTo(t) == 0`
- c. None of the above

**ANSWER: a and b**

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

**ANSWER: byte and short**

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?`

**ANSWER:**

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.

`_environment#`   `surface10`   `10CaRdS`   `salt&pepper`

**ANSWER: surface10**

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).

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

**ANSWER:**

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

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

**ANSWER: 10001**

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

**ANSWER: 27**

11. (4 pts) What is pseudocode?

**ANSWER:** English-like description of the set of steps required to solve a problem

12. (4 pts) What is **null**?

**ANSWER:** A Java value meaning no address

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"`

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

**ANSWER:** `"\"C:\\home\\tmp\""`

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

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

**ANSWER: 2**

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

**ANSWER:** `final String BEST_SCHOOL = "UMCP"`

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

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

**ANSWER:** y is 11 and x is 10.

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)

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

**ANSWER:** No because of short circuit

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

```
String k = null;  
int x = k.length();
```

**ANSWER:** K is not an object

## 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.

Number of Calories	Classification
Less than or equal to a 100	Awesome
More than 100 and less 200	OK
Greater than or equal to 200	Danger!

### 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.

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

```
        Scanner scanner = new Scanner(System.in);  
  
        System.out.print("Enter calories: ");  
        String classification;  
        int calories = scanner.nextInt();  
        if (calories <= 100) {  
            classification = "Awesome";  
        } else if (calories > 100 && calories < 200) {  
            classification = "OK";  
        } else {  
            classification = "Danger!";  
        }  
        System.out.println(classification);  
  
        scanner.close();
```

### 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.**

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

        Scanner scanner = new Scanner(System.in);
        boolean valid;

        do {
            System.out.println("Enter login id: ");
            String loginid = scanner.next();

            System.out.println("Enter pin number: ");
            int pinNumber = scanner.nextInt();
            valid = loginid.equals("Bob") && pinNumber == 1234;
            if (!valid) {
                JOptionPane.showMessageDialog(null, "Invalid values");
            }
        } while (!valid);
        JOptionPane.showMessageDialog(null, "Access Granted");
        scanner.close();
    }
}
```

## 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).

```
public static void printDiagram(int size) {  
  
    int row, col;  
  
    for (row = 1; row <= size; row++) {  
        for (col = 1; col <= row; col++) {  
            System.out.print("**");  
        }  
        System.out.println();  
    }  
}
```