

# CPS 101: COMPUTER PROGRAMMING I

Mid-term Exam

Alfusainey Jallow, Lamin Saidy & Ebrima Jaw

April 1st, 2016

## Instructions

Please answer all questions. The questions are divided into general and problem set questions! There is an optional bonus point question worth 10 points.

– *Good Luck!*

## General Questions (40 points)

1. What is the difference between number variables and object variables. (5 pts)
2. Explain why it is safe to declare the following variable public. (5 pts)

```
public static final LIMIT=2;
```

3. Explain the difference between accessor and mutator methods. (5 pts)
4. (5 pts). What is a static variable in Java? How will the static age variable be called?

```
1 public class Person {  
2     public static age;  
3 }
```

5. Is it true that all Java programs must have a main method? Motivate your answer. (5 pts)
6. (5 pts) What are the rules for declaring a constructor and state it's main function in a Java program.
7. (10 pts) Consider the code snippet below. How can you get the string "Algebra" from the *course* variable?

```
String course = "Modern Algebra 1";  
String algebra = ...; // complete this part.
```

## Problem Set (50 points)

1. The Java Math library offers Java programmers useful methods to perform various mathematical functions. Using the Math library, write a Java method to compute and return the value of the following formula. (20 pts)

$$x = \frac{n(n-1)}{2}(b^2 - 4ac)$$

Hint: Use the method structure provided below. Feel free to declare additional local variables if you want.

```
1 public double compute() {  
2  
3     double x = use the Math library here;  
4     ...  
5  
6     return x;  
7 }
```

- 
- (15 pts) Write a predicate method *isPositive(int value)* that returns true if its explicit parameter is positive and false otherwise.
  - (15 pts). Consider the following *Java* program

```
1 public class Person {
2     private String name;
3     private int age;
4     public void setName(String name) {
5         this.name = name;
6     }
7     public void setAge(int age) {
8         this.age = age;
9     }
10 }
```

```
1 public class PersonTester {
2     public static void main(String args[]) {
3         // HINT: call the setName(String) and setAge(int) methods
4         // of the person class here...
5     }
6 }
```

How can you call the setName(String) and setAge(int) methods inside of the main method of the PersonTester class?

### Bonus Point (10 points)

- Write a method that returns the last character in its argument.  
Hint: Use the method structure provide below as starting point.

```
1 public char getLastChar(String str) {
2     char lastChar = '';
3
4     // 1. get the last character of the string,
5     // 2. assign it to your lastChar variable declared above.
6
7     return lastChar;
8 }
9 s
```