

Final Exam Review

CS 104: Intro to Game Programming
May 17, 2025

Functions

1. Label the Function: In the below code, label the parts of the function (fill in the blanks), using their general terms (i.e., don't add any types like `int`).

```
----- (----- , -----)
    {
    -----
}
```

2. Practice: Write a function `int countPositive(int[] nums)` that returns the count of elements in `nums` that are larger than 0.

Loops

1. **Converting Loops:** Convert the following loop to a `for` loop.

```
int x = 0;
while(x <= 3) {
    println(x);
    x++;
}

// The equivalent for loop:

//
```

Arrays

1. **Brainstorm:** Why might we use (or have we used) arrays?

2. **Scenario:** Suppose you're a biology student looking to write a program to compute basic statistics for your lab.

(a) Write a function that computes the variance of an array of floats, given x_1, x_2, \dots, x_n (the array of values) and \bar{x} (the mean). You need to compute:

$$s^2 = \frac{\sum [(x_i - \bar{x})^2]}{n - 1}$$

- (b) Write another function that calculates the standard deviation, given the same as in (a). You are encourage to use the function you defined in (a). Assume the function `sqrt()` takes the square root. Your function needs to compute:

$$\text{standard deviation} = s = \sqrt{s^2}$$

Objects

1. Classes & Polymorphism: Complete the following parts.

- (a) Create a class `Person` to hold general information about a person. Create an instance of this class.

- (b) Create a subclass of **Person** called **Sudent** that holds information about a student. Create a new **Person** variable and assign a new **Student** to it.

- (c) Create another subclass of **Person** called **Faculty** that holds information about a faculty member. Create a **Person** array of length 3 and assign the **Person** from part (a) to the first slot in the array and the **Student** from part (b) to the second slot. Finally, add a new **Faculty** object to the last slot.

Java

1. **Translate:** Translate the below Processing code into proper Java code.

```
void setup() {  
  println("Hello, World!");  
}
```

// The Java code for this:

//