CIS 201 Computer Science I
Fall 2009 Lab 09
Experiments with Code

November 9, 2009

- Understanding (and testing) loops
- Thinking about dimensions in output

Checkpoint 1 Getting Started

Rather than showing each running section of a single program to the lab monitor, in this lab you will read code, answer questions about the code, and show your answers to the lab monitor. Then, as part of the *following* checkpoint you will type in and execute the program so that you can check your own answers.

```
System.out.println("*******");
System.out.println(" ***** ");
System.out.println("  ***  ");
System.out.println("   *   ");
```

1. How many stars does the above code print?
2. How easily could it be changed to print 10 lines in the given pattern?
3. How easily could it be changed to print 100 lines in the given pattern?

Show your work on Checkpoint 1 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Checkpoint 2 Some Loops

Go ahead and type in a non-FANG program and include the above code. Run the program and verify your count.

```
for (int i = 0; i != 10; ++i) {
  System.out.print(" " + i);
}
System.out.println();
for (int j = 10; j != 0; --j) {
  System.out.print(" " + j);
}
System.out.println();
```

1. What is the output of the above code?
2. What (if anything) is different between the ranges of the two loops? Why are they (or are they not) different?

Show your work on Checkpoint 2 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Checkpoint 3 Nested Loops I

Go ahead and type in a non-FANG program and include the above code. Run the program and verify your count.

```
for (int r = 0; r != 4; ++r) {
  for (int c = r; c != 0; --c) {
    System.out.print(" ");
  }
  for (int c = 3 - r; c != 0; --c) {
    System.out.print("*");
  }
  System.out.print("*");
  for (int c = 3 - r; c != 0; --c) {
    System.out.print("*");
  }
  System.out.println();
}
```

1. How many stars does the above code print?
2. In what shape is the output? Is there a pattern to the different lines?
3. How difficult would it be to modify the code to print 30 lines in the given pattern? How would you do it?

Show your work on Checkpoint 3 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Checkpoint 4 Parameters

Go ahead and type in a non-FANG program and include the above code. Run the program and verify your count.

```
public void p(int x) {
  for (int i = 0; i != x; ++i) {
    if ((i % 3) == 0)  {
      for (int j = 0; j != x; ++j) {
        System.out.print("*");
      }
      System.out.println();
    }
  }
}
```

1. How many *rows* are drawn by a call of `p(10)`?
2. How many *columns* in the first row for the above call?

3. How many stars are drawn by a call of `p(10)`?

4. How many stars are drawn by a call of `p(3)`? and `p(4)`?

Show your work on Checkpoint 4 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Checkpoint 5 os

Go ahead and type in a non-FANG program and include the above code. Run the program and verify your count.

```
public static final int CUTOFF = 10;
public static final int FULLWIDTH = 30;

public void os(boolean stars) {
  for (int c = 0; c != FULLWIDTH; ++c) {
    if (stars && (c < CUTOFF)) {
      System.out.print(”*”);
    } else {
      System.out.print(”-”);
    }
  }
  System.out.println();
}
```

1. What does `os` print when the parameter is `true`?

2. What does `os` print when the parameter is `false`?

3. How difficult would it be to change where the two symbols change over?

Show your work on Checkpoint 5 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Checkpoint 6 ts

Go ahead and type in a non-FANG program and include the above code. Run the program and verify your conclusions.

```
public void ts(boolean stars) {
  for (int c = 0; c != FULLWIDTH; ++c) {
    if (stars && (c < CUTOFF)) {
      System.out.print(”*”);
    } else {
      System.out.print(”-”);
    }
  }
  System.out.println();
  for (int c = 0; c != FULLWIDTH; ++c) {
    if (stars && (c < CUTOFF)) {
      System.out.print(”*”);
    } else {
      System.out.print(” ”);
```

```
      }
    }
    System.out.println();
  }
```

1. Using the same constants given in the previous question, what does `ts` do with a `true` or a `false` constant.
2. How many stars are drawn when `ts(true)` is executed?

Show your work on Checkpoint 6 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Checkpoint 7 what

Go ahead and type in a non-FANG program and include the above code. Run the program and verify your conclusions.

```
public void what() {
  for (int tsCount = 0; tsCount != 6; ++tsCount) {
    ts(tsCount < 3);
  }
  os(false);
}
```

1. How many rows does this code write on the screen?
2. How many times is `ts` called with `true`?
3. How many times is `ts` called with `false`?
4. How many stars are drawn?
5. What does the output look like?

Show your work on Checkpoint 7 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Checkpoint 8 \ExerciseHeaderOrigin

Go ahead and type in a non-FANG program and include the above code. Run the program and verify your conclusions.

Show your work on Checkpoint 8 to the lab monitor, answering any necessary questions for them. Have them sign before continuing.

Log off of the lab computer you are using before leaving they lab. Anyone entering the lab has unlimited access to your files if you remain logged on. **DO NOT** turn off lab computers! They are a shared resource and there might be someone else logged in to "your" machine.