CSE 121 – Lesson 5

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Music: 121 23sp Lecture Vibes 🌸

TAs:

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Announcements, Reminders

- Creative Project 1 is out, due Tues April 18

- Resubmission Cycle 0 released yesterday, due Thurs April 20

- Feedback for C0 was released yesterday
  - Start tracking your grades in our
    Minimum Grade Guarantee Calculator

- Quiz 0: Thursday, April 20 during section

Last time: for loops!

For loops are our first *control structure*

A syntactic structure that *controls* the execution of other statements.

```
for ( initialization ; test ; update ) {
    body (statements to be repeated)
}
```
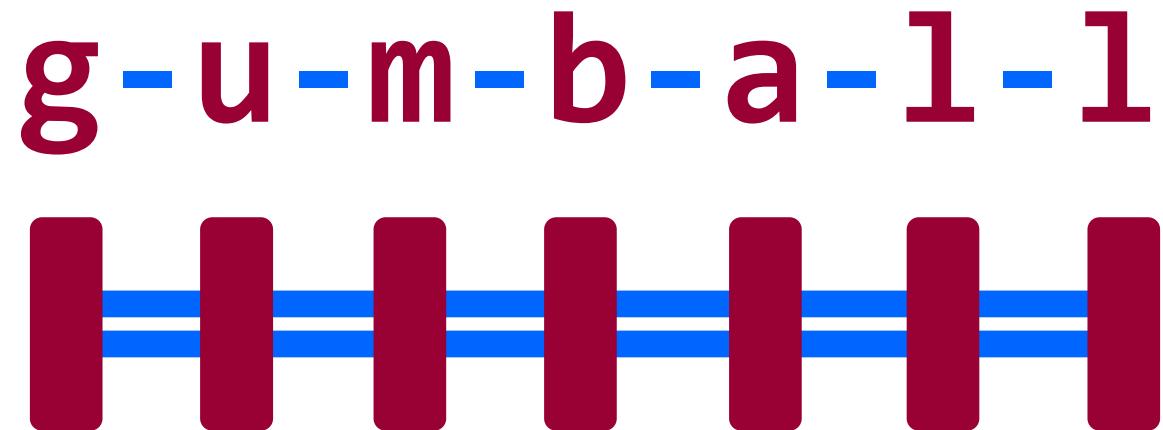
Fencepost Pattern

Some task where one piece is repeated *n* times, and another piece is repeated *n-1* times and they alternate

$$\texttt{g-u-m-b-a-l-l}$$

Fencepost Pattern

Some task where one piece is repeated *n* times, and another piece is repeated *n-1* times and they alternate

g-u-m-b-a-l-l

(PCM) Nested for loops

```java
for (int outerLoop = 1; outerLoop <= 5; outerLoop++) {
    System.out.println("outer loop iteration #" + outerLoop);
    for (int innerLoop = 1; innerLoop <= 3; innerLoop++) {
        System.out.println("    inner loop iteration #" + innerLoop);
    }
    // at this point, innerLoop is OUT OF SCOPE!
    System.out.println(innerLoop);
}
```

Poll in with your answer!

What output is produced by the following code?

```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print(i);
    }
    System.out.println();
}
```

A.
```
1
12
123
1234
12345
```

B.
```
i
ii
iii
iiii
iiiii
```

```
1
22
333
4444
55555
```

Poll in with your answer!

What code produces the following output?

A.
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print(i);
    }
    System.out.println(
}
```

C.
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; i <= j; j++) {
        System.out.print(j);
    }
    System.out.println();
}
```

B.
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print(j);
    }
    System.out.println();
}
```

D.
```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; i++) {
        System.out.print(j);
    }
    System.out.println();
}
```

```
1
12
123
1234
12345
```

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(PCM) Random

A Random object generates *pseudo*-random numbers.

- The Random class is found in the `java.util` package

  `import java.util.*;`

Method	Description
`nextInt()`	Returns a random integer
`nextInt(max)`	Returns a random integer in the range [0, *max*), or in other words, 0 to *max*-1 inclusive
`nextDouble()`	Returns a random real number in the range [0.0, 1.0)

Pseudo-Randomness

Computers generate numbers in a predictable way using mathematical formulas.

Input may include current time, mouse position, etc.

True randomness is hard to achieve – we rely on natural processes

- e.g., atmospheric noise, lava lamps