CSE 121 – Lesson 4

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Summer 2023

Music: 🌸k-pop girlies playlist🌸

sli.do #cse121
Announcements, Reminders

• Programming Assignment 0 is due tonight
• Creative Project 1 out later today
• R0 open last week, due Thursday (7/06) 11:59 PM
• R1 open Thursday (7/06), due Thursday (7/13) 11:59 PM
• Feedback for C0 was released yesterday
  • Start tracking your grades in our Minimum Grade Guarantee Calculator
• Quiz 0 [Take-home] Monday (7/10) due 11:59 PM
Last time: for loops!

For loops are our first control structure
A syntactic structure that controls the execution of other statements.

```python
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

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

PB

PB

PB

PB
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);
}

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

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

C. ```java
for (int i = 1; i <= 5; i++) {
    for (int j = 1; j <= i; j++) {
        System.out.print(i);
    }
    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();
}
```
A Random object generates *pseudo-*random numbers.

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

```java
import java.util.*;
```

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>nextInt()</code></td>
<td>Returns a random integer</td>
</tr>
<tr>
<td><code>nextInt(max)</code></td>
<td>Returns a random integer in the range ([0, \text{max}]), or in other words, 0 to (\text{max}-1) inclusive</td>
</tr>
<tr>
<td><code>nextDouble()</code></td>
<td>Returns a random real number in the range ([0.0, 1.0])</td>
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</tbody>
</table>
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