Loops in Java

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Opening Discussion

- Let's look at solutions to the interclass problem.
- What is the purpose of having loops in a programming language?
- What loops did we have in Alice? When did you want to use each of those loops?

Loops in Java

- Java includes both a for loop and a while loop, just like Alice. The line between when you would use them isn't as clean cut though because we have complete control over the conditional in the for loop.
- In Java a for loop is basically just like a while loop except that we get to do initialization and iteration in the loop structure.
- The primary purpose of a for loop is still for counting loops and while loops are rarely used just for counting.

while Loop

- The while loop in Java is basically the same as what you have in Alice.
  - while(conditional) {
    - statements
  - }
- The statements will be executed repeatedly as long as the conditional is true.
- When you see a while loop in a program Java first checks the conditional, then if it is true, it executes the statements. After the statements the conditional is checked again.
- This is called a pre-check loop because the check is done before the body. It is possible the body never happens.

for Loop

- The syntax of the for loop in Java is just like what was displayed in Alice. The difference is that you have to type the parts in and have more control over them.
  - for(initializer; conditional; iterator) {
    - statements
  - }
- In Java we can declare variables in the initializer so a simple counting loop looks like this.
  - for(int i=0; i<10; i++) {
    - Statements using i
  - }
- The i++ is just a shortcut for i=i+1. You can use the long form if you feel more comfortable with it.

Tracing a for Loop

- The for loop is also a pre-check loop. The initializer is executed only once before the first check of the condition.
- If the condition is true, the body of the loop executes, then the iterator executes before the condition is checked again.
  - Initializer
  - Condition
  - Body
  - Iterator
  - Condition
  - Body
  - Iterator
  - ...

The do-while Loop

- Java includes a third loop that isn't used very often. Unlike the others, it is post-check. There are some situations when this can be very handy.
  - do {
    - statements
  - } while(condition);
- Here the statements always happen and the condition is checked after the statements. It is helpful in those situations where the statements can set things up for the condition and the code should always happen once.
- Text programs with menus qualify often have this behavior.

Code

- With the time that is left we should do something interesting in code with loops.

Minute Essay

- What is your most significant problem in dealing with Java so far? What could I do to help fix this?
- Interclass Problem – Do problem 10.11.