THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

COMP 110
Introduction to Programming

Fall 2015

Time: TR 9:30 – 10:45

Room: AR 121 (Hanes Art Center)

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Previous Class

- What did we discuss?

Today

- Announcements
  - Assignment 1 : Due Tuesday, Sep 22 @ 11:55 PM

    http://cs.unc.edu/~aikat/courses/comp110/assignments/Assignment1
- Loops

CS/IT Career Fair

- Friday (9/18) from 11am - 2pm
- Great Hall of the Carolina Union
- 56 registered companies

Some advice ☺

1) business casual -- you want the recruiters to know that you take this seriously
2) research the companies that you want to stop and visit with: they don't much care for "What does your company do?" You should have an intelligent question to ask
3) bring your resume (preferably checked out by someone in career services)

LOOPS

- Loops are designed to repeat instructions
  - Think about the requirement: Print number 1 to 10
    - It's easy
      - System.out.println("1");
      - System.out.println("2");
      - ……
  - Think about the requirement: Print number 1 to 100
    - We can still do this
  - Let the user input a value n, then print 1 to n
    - We are in trouble……

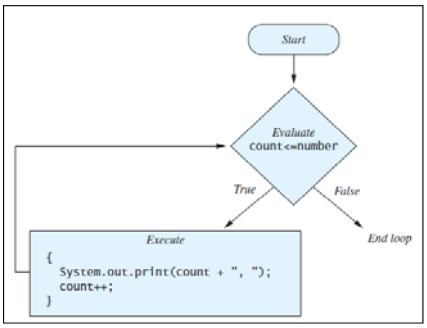
Loop Statement

- What is the pseudo code to fulfill the requirement?
  - Count to 1, if 1<=n, write it down, otherwise stop
  - Count to 2, if 2<=n, write it down, otherwise stop
  - Count to 3, if 3<=n, write it down, otherwise stop
  - ……
  - Count to i, if i<=n, write it down, otherwise stop
  - Count to i+1, if i+1<=n, write it down, otherwise stop
  - ……
  - While a counter<=n, write it down, increase the counter. Otherwise stop

While Loop

- Flow of while statement
  - Start from expression evaluation
  - As long as it's true, repeat instructions in brackets

```
while (count <= number) {
  System.out.println(count);
  count++;
}
```



While Loop

- You have to do some initialization before the statement
- The loop body typically contains an action that ultimately causes the controlling boolean expression to become false.

```
number = keyboard.nextInt();
count = 1;
while (count <= number) {
  System.out.println(count);
  count++;
}
```

While Loop

- Usually there is a counter variable in the statement
  - You can use it in different ways
- Requirement: print the odd numbers from 1 to 10000

```
int count = 1;
while (count < 10000) {
  System.out.println(count);
  count += 2;
}
```

```
int count = 1;
while (count * 2 - 1 < 10000) {
  System.out.println(count * 2 - 1);
  count++;
}
```


Infinite Loops

- Always make sure that your loop will end
  - Never forget to change the counter

```
while (count <= number) {
  System.out.println(count);
}
```

```
while (count <= number); {
  System.out.println(count);
}
```



```
while (count <= number)
{  ; }
  System.out.println(count);
```

Infinite Loops

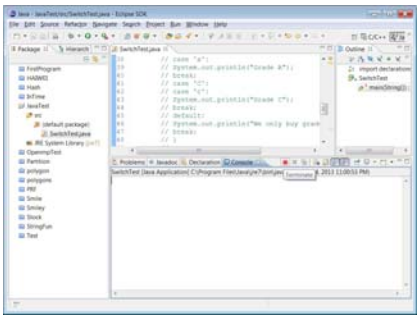
- Always make sure that your loop will end
  - Never forget to change the counter
  - Use comparison rather than "==" or "!="in the control expression
  - Know whether your counter is increasing or decreasing

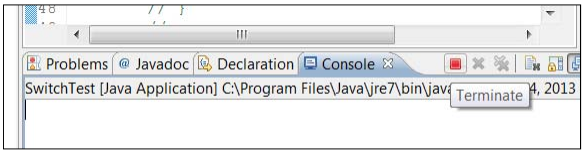
```
while (count != number) {
  System.out.println(count);
  count+=2;
}
```

```
while (count < number) {
  System.out.println(count);
  count--;
}
```

Infinite Loops

- If you wrote an infinite loop and executed it
- Use the **terminate** button of eclipse
  - If it is red, the program is running





Infinite Loops

- Infinite loop is not a syntax error. It's a logical error
- eclipse will not help you in this case
- Write pseudo code, think, and rethink before coding

For Loop

- Is there a better way to organize the code?
- For statement (or usually called *for loop*)
  - Used to execute the body of a loop a **fixed number** of times

```
number = keyboard.nextInt();
count = 1;
while (count <= number) {
  // all the actions
  count++;
}
```

```
number = keyboard.nextInt();
int count;
for (count = 1;
   count<=number; count++) {
  // all the actions
}
```

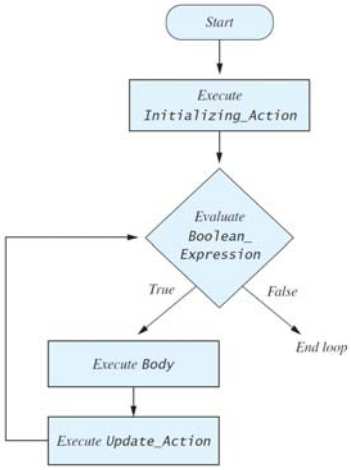
For Loop

- Syntax:
  - **for** (*Initializing_Action; Boolean_Expression; Update_Action){*
    Body;
    }

```
for (count = 1; count <= number; count++) {
  // all the actions
}
```


For Loop

- Flow chart
  - **for** (*Initializing_Action; Boolean_Expression; Update_Action){*
    Body;
    }



For Loop

- Unrolled code

```
for (count = 1;
count<= 2; count++)
{
  // all the actions
}
```

```
count = 1; // initialize for only once
if (count <= 2) {// count == 1, so yes
        // all the actions
        count++;
}
if (count <= 2) {// count == 2, yes again
        // all the actions again
        count++;
}
if (count <= 2) {// count == 3, so no
        // no action;
        // no count++;
}
// stop
```


For Loop: Don't Overcount

- Repeat 3 times

```
for (int count = 1; count <= 3; count++) {
  // all the actions
}
```

- Repeat 3 times

```
for (int count = 0; count < 3; count++) {
  // all the actions
}
```

- Repeat **4 times**!

```
for (int count = 0; count <= 3; count++) {
  // all the actions
}
```

For Loop: Infinite Loop

- Still, if you get things wrong, it may never end

```
int num = 3;
// initializing action; boolean expression; update action
for (count = 5; count >= num; count++)
{
      System.out.print(count + “, ”);
}
```

Ending a Loop

- If you know number of loop iterations?
  - Count-controlled loops
  - ***for(count = 0; count < iterations; count++)***
- User controlled ending
  - Ask-before-iterating (e.g. “yes/no”)
  - Sentinel value

Next class

- More loops
- And Quiz3 – if-else and while loops