# ++ --

# ++

++ is a shorthand for adding 1 to a number.

These are the same:

```
x = x + 1;
x++;
```

This is really handy when using long variable names:

```
numberOfPlayers = numberOfPlayers + 1;
numberOfPlayers++;
```

# --

-- is a shorthand for subtracting 1 from a number.

These are the same:

```
x = x - 1;
x--;
```

Also handy when using long variable names:

```
zombieCount = zombieCount - 1;
zombieCount--;
```

# ++

The ++ and -- operators can appear in two forms:

```
Postfix:   x++    "update x after this statement"
Prefix:    ++x    "update x before this statement"
```

```
int x = 5;
System.out.println(++x);  // Would output 6
System.out.println(x);    // Would output 6
```

```
int x = 5;
System.out.println(x++);  // Would output 5
System.out.println(x);    // Would output 6
```

# Loops

# Loops

Loops are a control flow construct used to repeatedly execute statements in your program.

In general, program execution enters a loop when a condition is true and stays inside the loop as long as the condition is true.

(there are other ways to break out of loops)

# while

Look at this code snippet below:

```
int i = 1;

while (i <= 5) {
    System.out.println(i);
    i = i + 1;
}
```

What will be the result?

# while

Look at this code snippet below:

```
int i = 10;

while (i <= 5) {
    System.out.println(i);
    i = i + 1;
}
```

What will be the result?

# while

Look at this code snippet below:

```
int i = 1;

while (i <= 5) {
    System.out.println(i);
}
```

What will be the result?

# while

Look at this code snippet below:

```
int i = 10;

while (i >= 0) {
    System.out.println(i);
    i = i + 1;
}
```

What will be the result?

# while loops for input validation

A while loop can be a useful tool for validating input.

```
String name = "";

while (name.length() == 0) {
    System.out.println("Enter your name: ");
    name = scan.next();
}
```

# while loops for menu

A while loop can be a useful tool for building a menu.

```
boolean quit = false;

while (quit == false) {
    System.out.println("Main Menu: ");
    System.out.println("A)dd, D)rop, Q)uit");
    char option = scan.next().charAt(0);
    // Code to handle add/drop here
    if (option == ‘q’) quit = true;
}
```

# for

The for loop is designed for iterating a number of times, or iterating through lists. It has 3 parts to it, initialization, condition, and update.

```
for (initialization; condition; update) {
    // Do something here
}
```

# for

Look at this code snippet below:

```
int i;

for (i = 0; i < 10; i++) {
    System.out.println(i);
}
```

What will be the result?

# for

Look at this code snippet below:

```
int i;

for (i = 10; i > 0; i--) {
    System.out.println(i);
}
```

What will be the result?

# for

If you only need the i variable while inside the loop, you can declare it in the initialization.

```
for (int i = 0; i < 10; i++) {
    System.out.println(i);
}
```

What will be the result?

What happens if we try to print i outside of the loop?

# Demo

Don’t Forget!

Check the syllabus / schedule for reading assignments and due dates!

# Loops and Strings

You can use a combination of a loop, length, and the charAt function to iterate through each character in a string.

# Loops and Strings

```
for (int i = 0; i < 6; i++) {
    System.out.println(i);
}
```

Output:

```
0
1
2
3
4
5
```

# Loops and Strings

```
String course = "CS 121";

for (int i = 0; i < course.length(); i++)
{
    char c = course.charAt(i);
    System.out.println(c);
}
```

| 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| C | S |  | 1 | 2 | 1 |

# Loops and Strings

```
String phrase = "163 William St. Room 236";
int totalDigits = 0;

for (int i = 0; i < phrase.length(); i++)
{
    char c = phrase.charAt(i);
    if (Character.isDigit(c)) {
        totalDigits++;
    }
}

System.out.println("Total Digits: " + totalDigits);
```

# Nested Loops

Loops in loops!

# Nested Loops

```
for (int i = 0; i < 5; i++)
{
    for (int j = 0; j < 5; j++)
    {
        System.out.print("*");
    }

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

# Nested Loops

```
for (int i = 1; i <= 12; i++)
{
    for (int j = 1; j <= 12; j++)
    {
        System.out.printf("%4d", (i * j));
    }

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

# Nested Loops

#mindblown

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

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

# Nested Loops

```
while (done == false) {
    int totalSpaces = 0;
    System.out.println("Enter 3 words: ");
    String phrase = scan.nextLine();

    for (int i = 0; i < phrase.length(); i++)
    {
        if (phrase.charAt(i) == ' ') {
            totalSpaces++;
        }
    }

    if (totalSpaces == 2) done = true;
}
```

# Let’s Code

Don’t Forget!

Check the syllabus / schedule for reading assignments and due dates!