CS 152
Computer Programming Fundamentals
Control Structures: If and While

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A sequence of instructions with no choices is not very complicated.

More complex behaviour is created with control structures.

- Branches – Choose course based on a test
- Loops – Repeat a sequence of instructions
Branch with if

```java
if (booleanExpr) {
    // statements if booleanExpr is true
} else {
    // statements if booleanExpr is false
}
```
If Example

```java
int x = 5;
if (x < 10) {
    System.out.println("x is small");
} else {
    System.out.println("x is big");
}
```
Can omit else

If you only need to choose between doing something or not doing it, you can omit the else part.

```java
int x = 5;
if (x == 5) {
    System.out.println("Success!");
}
```
Chaining ifs together

A sequence of multiple ifs lets you chose between several possibilities.

```java
if (x < 10) {
    System.out.println("x is small");
} else if (x < 20) {
    System.out.println("x is medium");
} else {
    System.out.println("x is big");
}
```
Nesting ifs

if statements can be used wherever a statement can occur, including inside the body of another if statement.

```java
if (x % 2 == 0) {
    System.out.println("x is even");

    if (x != 2) {
        System.out.println("x is not 2");
    }
}
else {
    System.out.println("x is odd");
}
```
While Loop

```java
while (booleanExpr) {
    // statements to repeat while booleanExpr is true
}
```

Make sure that your loop condition will be false eventually so that you don’t end up with an infinite loop.
Counting with a loop

```java
int number = 1;

while (number < 6) {
    System.out.println(number);
    number++;  // Remember, ++ adds one to variable
}
```
int i = 0;

while (i < 10) {
    if (i % 2 == 0) {
        System.out.println(i + " is even");
    } else {
        System.out.println(i + " is odd");
    }
    ++i;
}