IEEE
Computer Chapter
Southern Alberta Section

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SCHULICH IGNITE 2019

Session Overview

- Introduction to **booleans** and **if/else** statements
- **Relational** and **Logical** Operators

```
if (wantToCode && likePizza) {
    goToSchulichIgnite();
}
```

What are Comparison operators?

- Special operators that **compares** against each other to check if a statement is true or false

- Super handy with **if!**
  It's like we covering if statements or something...

The Comparison Operators

Comparison operators

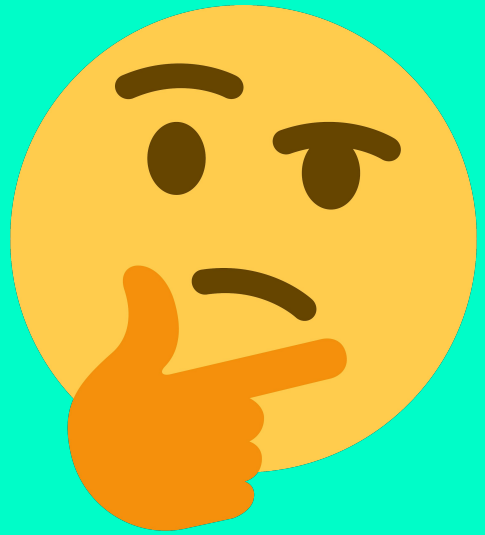
Operator	Meaning
<	less than
<=	less than or equal to
>	greater than
>=	greater than or equal to
==	equal to
!=	not equal to

Don't Forget: `==` (equal) is NOT the same as `=` (assignment)

BOOLEANS

- It’s another variable!
- can ONLY be true or false
- Useful for if statements!

```
boolean myBoolean = true;
```



If Statements

If Statements

- Want to run some code only if some condition is true? Use **if** statements!

```
// Do some code...

if (condition == true) {
    // Do special code!
}

// Do some more code...
```

Example

- if your house is cold, then your thermostat does something (turns on your furnace)

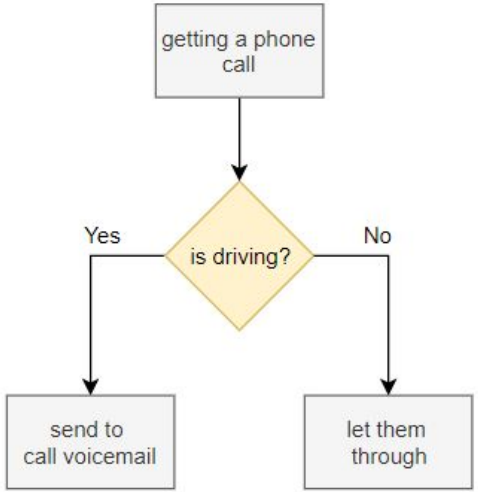
```
if (house_temp == cold) {
    turn_thermostat_up();
}
```

Example: Try it out!

```
float temperature = 36.00;
boolean hot = temperature > 25;

println(“The temperature is: ” + temperature);

if (hot) {
    println(“It’s hot outside!”);
}
println(“I could go for some pizza”);
```

IF...ELSE STATEMENT

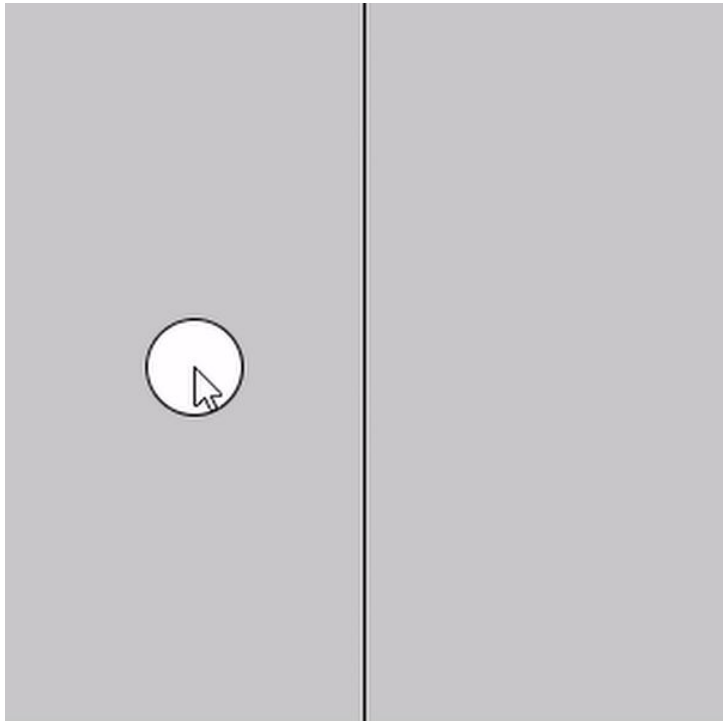
```
if (condition == true) {
    // do something
} else {
    // do something else
}
```



E.g. if you're driving, send calls to voicemail.
else, let them through

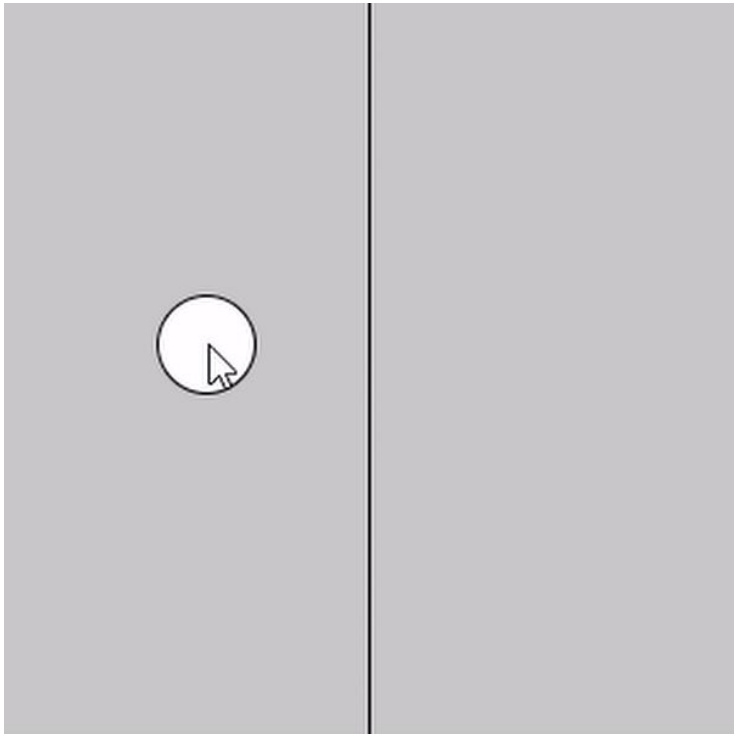
Case 1!

```
fill(255,255,255);

if (mouseX > 250) {
    fill(255, 0, 0);
}

ellipse(mouseX, mouseY, 30, 30);
```



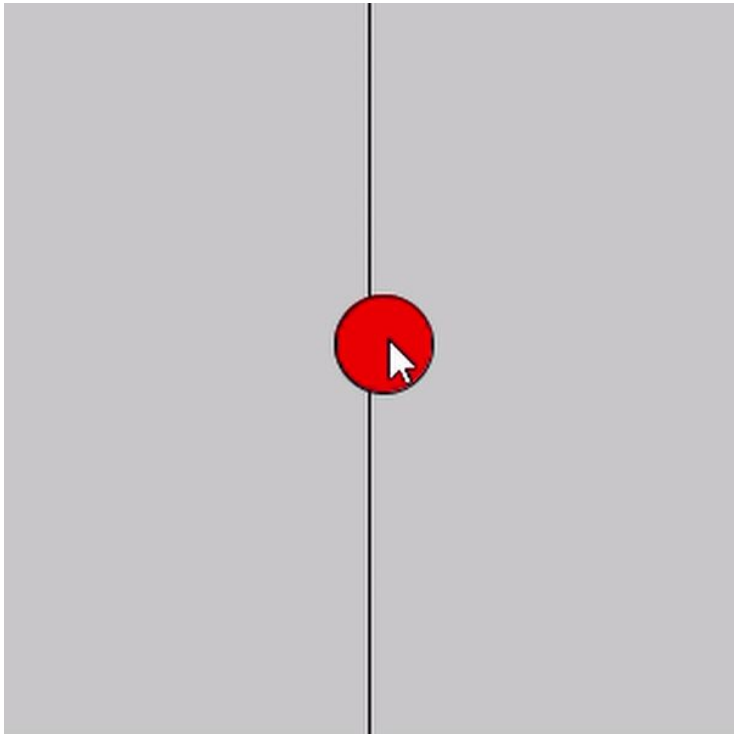
Case 2!

```
if (mouseX > 250) {
    fill(255, 0, 0);
}

ellipse(mouseX, mouseY, 30, 30);
```



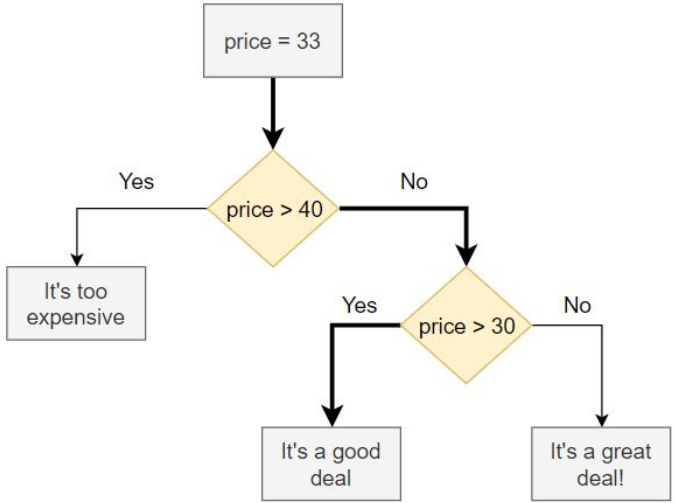
CASE 3!

```
if (mouseX > 250) {
    fill(255, 0, 0);
} else {
    fill(0, 0, 255);
}

ellipse(mouseX, mouseY, 30, 30);
```



IF … ELSE IF … ELSE STATEMENT

```
float price = 33.00;
if (price > 40) {
    println("It's too expensive. ");
} else if (price > 30) {
    println("It's a good deal! ");
} else {
    println("It's a great deal! ");
}
```



You can also use multiple else if blocks in the same if statement

Examples of logical operators

Logical operators

Operator	Meaning
&&	and
||	or
!	not

Logical expressions

- The statement “Programming is fun **AND** useful” is true, because programming is fun as well as it is useful ;)
- The statement “At 22°C, water is a liquid **AND** a solid” is false, as water is not a solid at this temperature
- But the statement “At 22°C, water is a liquid **OR** a solid” is true, as water is ONE of those things (a liquid)

Combining NOT (!) and AND &&

You can combine any logical operators to do what you need
(Oh the coding you will know, oh the operations you will see!)

Do you like green eggs and ham?

```
boolean likeGreenEggs = false;
boolean likeHam = false;

if ( !likeGreenEggs && !likeHam ) {

    println(“I do not like green eggs and ham,”);
    println(“I do not like them, Sam-I-am!”);
}
```

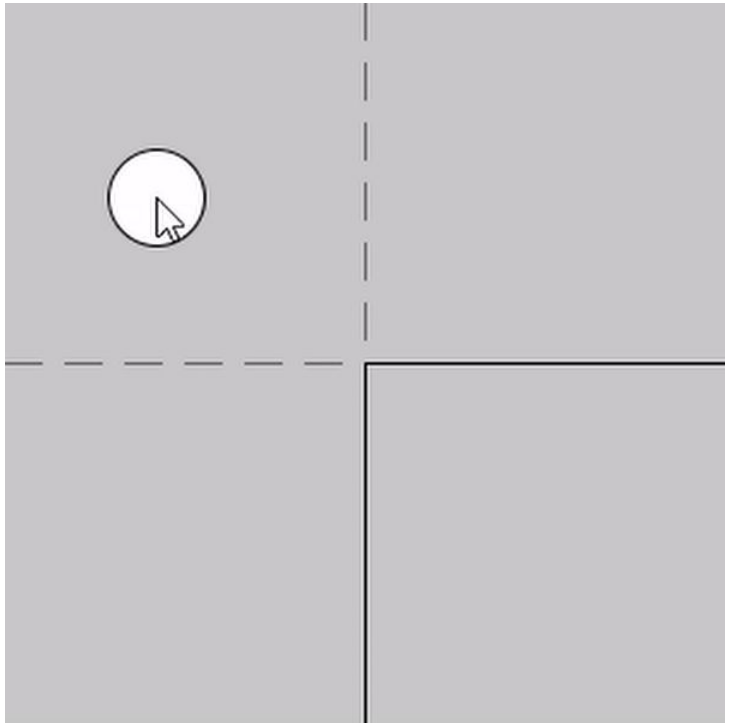
Example

- What will the following program print out?

```
boolean a = false;
println("boolean a is: "+ a);
a = (245 == 245);
println("boolean a is: "+ a);
boolean b = ((3+6)>= 42);
println("boolean b is: "+ b);
boolean c = (a||b); //a OR b
//if either are true it will evaluate to true
println("boolean c is: "+ c);
c = (a && b); //a AND b
//if BOTH are true it will evaluate true
println("boolean c is: "+ c);
c = (245 == 245)|| ((3+6)>= 42) && ((1+1)==2);
println("boolean c is: "+ c);
```

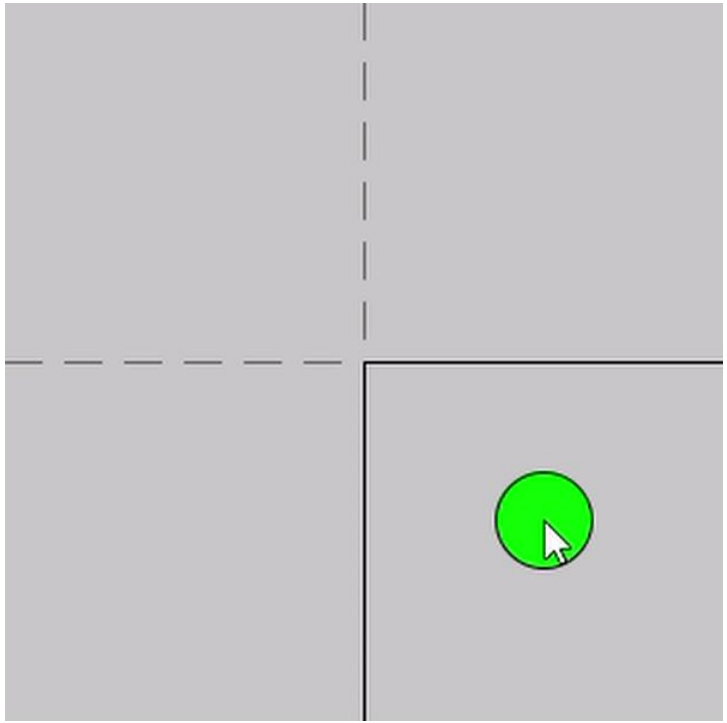
Example: Try it out!

```
if (mouseX > 250 && mouseY > 250) {
    fill(0, 255, 0);
}

ellipse(mouseX, mouseY, 30, 30);
```



Example: Try it out!

```
if (mouseX > 250 && mouseY > 250) {
    fill(0, 255, 0);
} else {
    fill(0, 0, 255);
}

ellipse(mouseX, mouseY, 30, 30);
```



Another Special Variable: mousePressed

The variable **mousePressed** has the value true or false

- True: You are clicking down on the mouse
- False: You aren't clicking down

Useful when combined with **if** statements!

```
if (mousePressed) {
    println("The mouse is pressed now!");
}
```

Exercise 1: Teleporting Ball

Draw a circle at the top left-hand corner of the window.

The circle should move horizontally to the right hand side of the screen until it goes out of the window and disappears.

Make the circle reappear at the original location after it moves off the screen.

Exercise 2: Bouncing Back

Make the circle from Exercise 1 **bounce** and change directions when it hits an edge of the window.

Hint: Ask your mentors questions!

Exercise 3: ScreenSaver

Make the circle from Exercise 2 start in a random direction and bounce like a screensaver.

Hint: Ask your mentors questions!