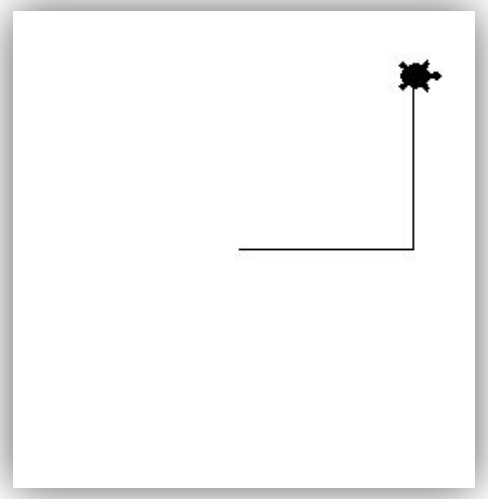
Python Programming Conditionals (Using Turtle)

Simon Fraser University - CMPT 376w
Target Audience: Middle-school students with no prior technical experience.
The relevant code is in the github link in the description.

```
# Create a turtle named "ourTurtle"
# All the text to the right of a hashtag "#" is
# a “comment” that is ignored by the computer.
import turtle
screen = turtle.Screen()
ourTurtle = turtle.Turtle()
ourTurtle.shape("turtle")
```

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```

The output of the code ➜



```
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```
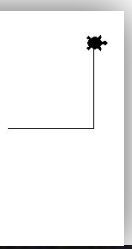
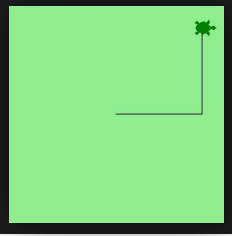



```
# If the turtle's x-coordinate is greater than 50,
# change the turtle's and the screen's color to green.
if ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```



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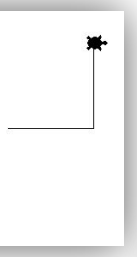
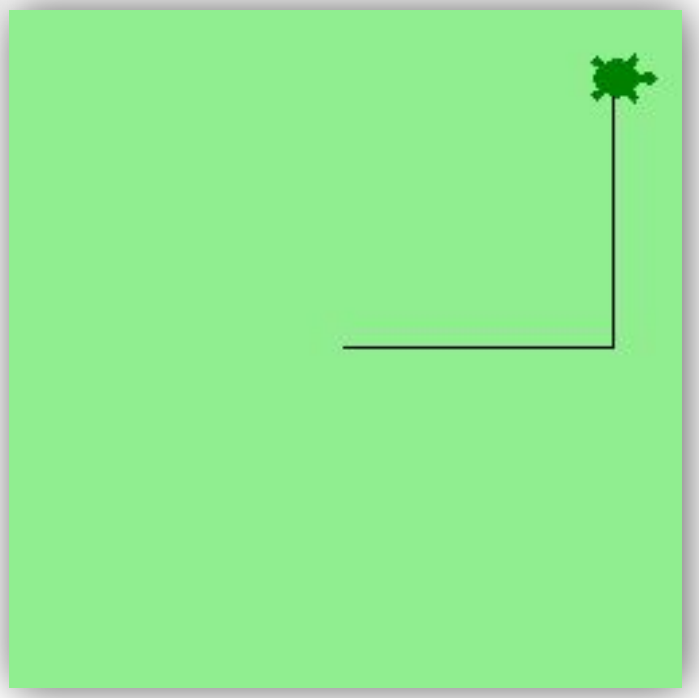


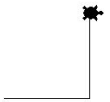
True

```
if ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

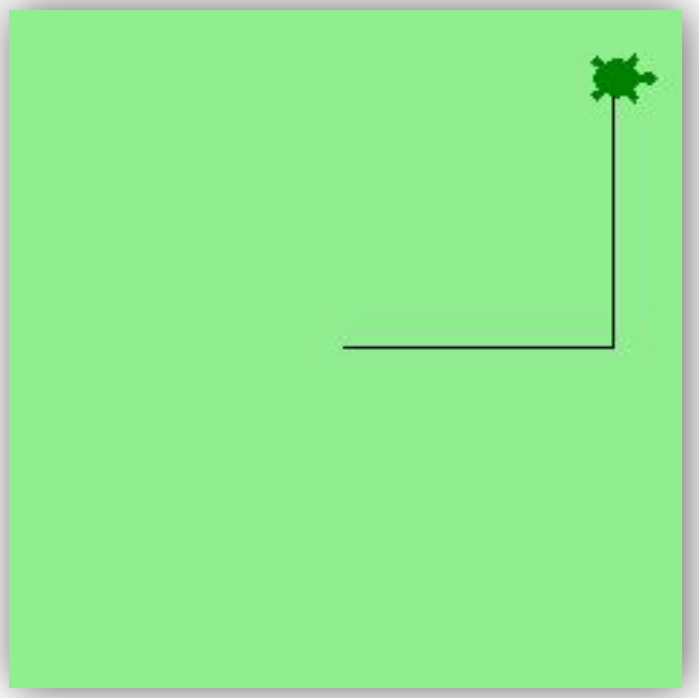


Condition

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```



```
if ourTurtle.xcor() > 50:
  ourTurtle.color("green")
  screen.bgcolor("lightgreen")
```



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ourTurtle.sety(100) # up 100 pixels
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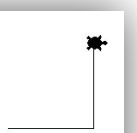

ourTurtle.xcor() = 100

```
if ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

```
# This code moves our turtle 100 pixels
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ourTurtle.setx(100) # right 100 pixels
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```
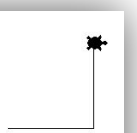
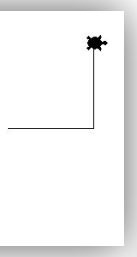



100 > 50 is true

```
if ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

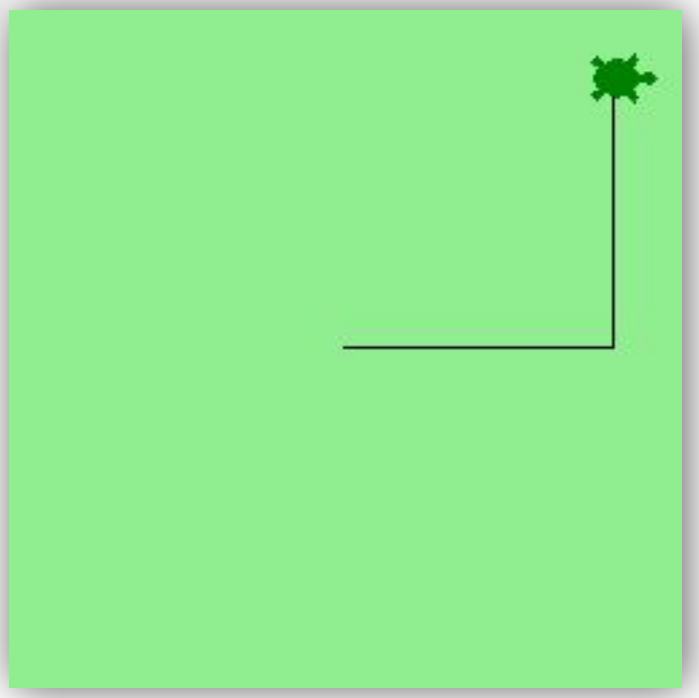
Other examples:
100 > 50 is true
100 > 150 is false
100 > 100 is false

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```



True

```
if ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```



Condition

Test Time

Know the meaning of the following:
“condition”
ourTurtle.xcor()

```
if ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

What happens when a condition in an if-statement is true?

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```

Comparison Symbols:
>, <

100 > 50 is true

Other examples:
100 > 150 is false
100 > 100 is false

```
if ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

100 < 50 is false

Other examples:
100 < 150 is true
100 < 100 is false

```
if ourTurtle.xcor() < 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```

Comparison Symbols:
>, <, >=, <=

100 >= 50 is true

Other examples:
100 >= 150 is false
100 >= 100 is true
Just like ≥ in math.

```
if ourTurtle.xcor() >= 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

100 <= 50 is false

Other examples:
100 <= 150 is true
100 <= 100 is true
Just like ≤ in math.

```
if ourTurtle.xcor() <= 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```

Comparison Symbols:
>, <, >=, <=, ==, !=

100 == 50 is false

```
if ourTurtle.xcor() == 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

Other examples:
100 == 150 is false
100 == 100 is true
Just like = in math.

100 != 50 is true

```
if ourTurtle.xcor() != 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```

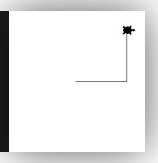
Other examples:
100 != 150 is true
100 != 100 is false
Just like ≠ in math.

Comparison Symbols:

>, <, >=, <=, ==, !=

not

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```

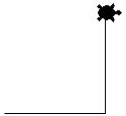


Condition Symbols:
>, <, >=, <=, ==, !=, not

not 100 > 50 is false

because **100 > 50** is true, and **not true** is false

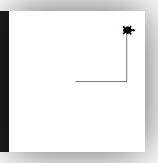
```
if not ourTurtle.xcor() > 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```



not true is false
not false is true

and

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```

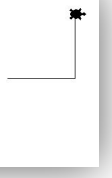


Condition Symbols:
>, <, >=, <=, ==, !=, not, and

100 > 50 and 100 < 50 is false

because **true and false** is false as seen here

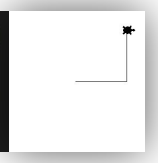
```
if ourTurtle.xcor() > 50 and ourTurtle.ycor() < 50:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
```



true and true is true
true and false is false
false and true is false
false and false is false

or

```
# This code moves our turtle 100 pixels
# to the right, and 100 pixels up.
ourTurtle.setx(100) # right 100 pixels
ourTurtle.sety(100) # up 100 pixels
```



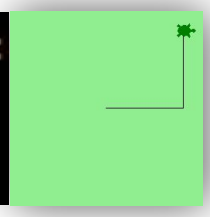
Condition Symbols:
>, <, >=, <=, ==, !=, not, and, or

100 > 50 or 100 < 50 is true

because **true or false** is true as seen here

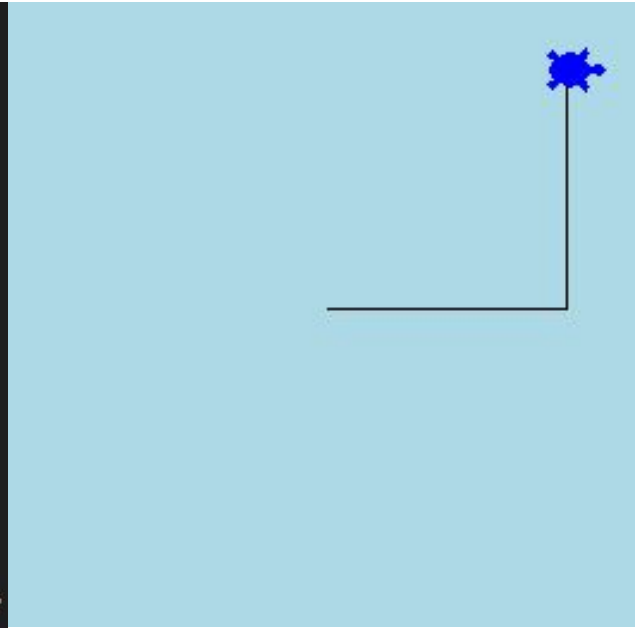
true or true is true
true or false is true
false or true is true
false or false is false

```
if ourTurtle.xcor() > 50 or ourTurtle.ycor() < 50:
  ourTurtle.color("green")
  screen.bgcolor("lightgreen")
```



else/elif

```
if False:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
elif False:
    ourTurtle.color("purple")
    screen.bgcolor("lavender")
elif True:
    ourTurtle.color("blue")
    screen.bgcolor("lightblue")
elif True:
    ourTurtle.color("red")
    screen.bgcolor("pink")
elif False:
    ourTurtle.color("yellow")
    screen.bgcolor("lightyellow")
else:
    ourTurtle.color("orange")
    screen.bgcolor("peachpuff")

codeAfterIfAndElseStatements = 'here'
```



```
if False:
    ourTurtle.color("green")
    screen.bgcolor("lightgreen")
elif False:
    ourTurtle.color("purple")
    screen.bgcolor("lavender")
elif False:
    ourTurtle.color("blue")
    screen.bgcolor("lightblue")
else:
    ourTurtle.color("red")
    screen.bgcolor("pink")
```