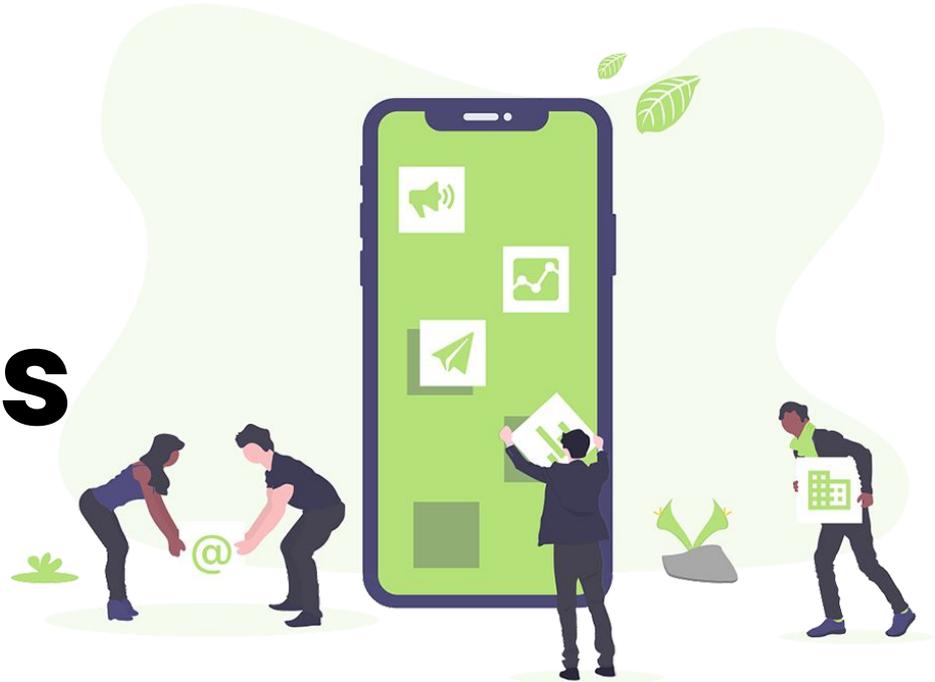


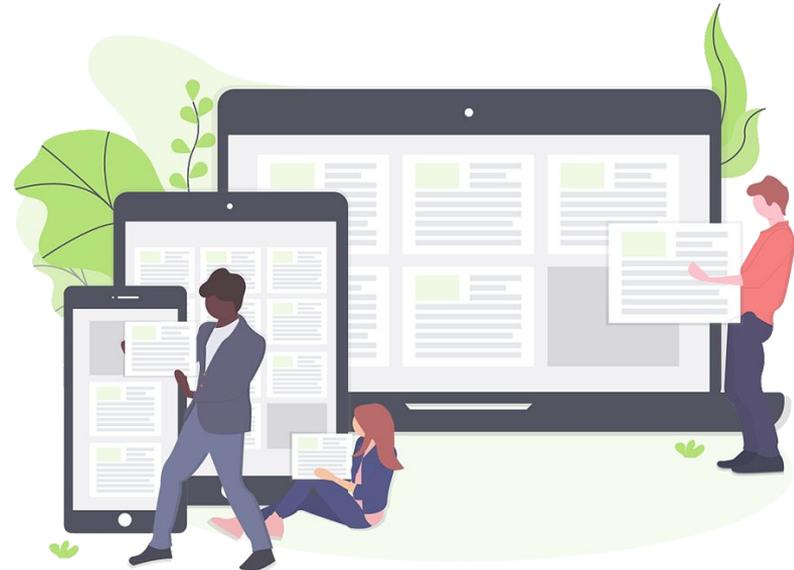
UCLA TeachLA

Booleans & Conditionals



Agenda

- Recap
- What are booleans?
- What are boolean operators?
- Practice!
- What are conditionals?
- 3 Kahoots!



Raffle Update!

- Drawing raffles in two weeks!
 - Ask questions!
 - Play Kahoots! → More raffles!
 - Will draw 5 names!
- Prizes:
 - Gift Cards!!!
 - Amazon, Jamba Juice, and more!



RECAP

What did we learn last time?

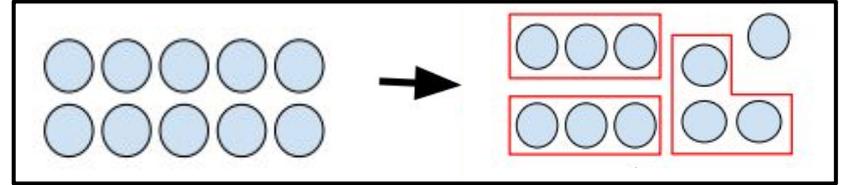
- Modulus or Remainders (%)
- Exponents (**)
- Variables!



Examples : Modulus

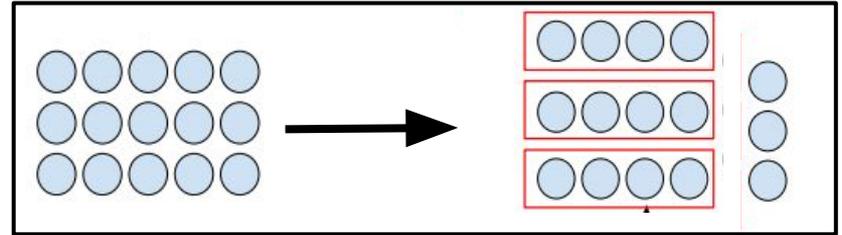
- **10 % 3**

- Divide: $10/3 = \underline{3} \text{ R } 1$
- Keep **remainder**: $10 \% 3 = 1$



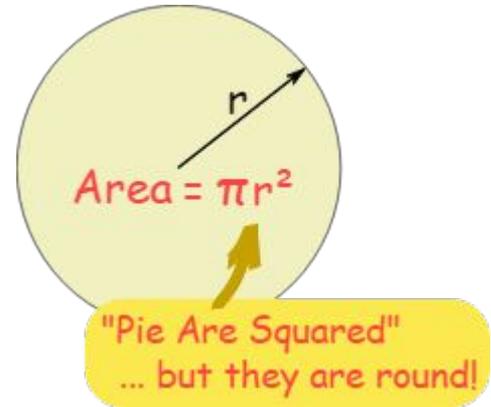
- **15 % 4**

- Divide: $15/4 = \underline{3} \text{ R } 3$
- Keep **remainder**: $15 \% 4 = 3$



Examples : Exponent

- **Math Example** - what is 3^3 ?
 - $3^3 = 3 \times 3 \times 3 = 27$
 - 3 is multiplied by itself three times
- **Python Example** : `print(3**3)`
 - returns 27



Concept : Tools with Variables

- Assigning values
 - `x = 5`
 - `s = "abc"`
- Change values: **reassign**, `+=`, `-=`
- Print values: `print(x)`, `print(5)`, `print("abc")`



RECAP KAHOOT TIME!!!



Today we will learn how Python can do 2 of these things:

- **Input** (keyboard, camera)
- **Storage** (saving and reading information)
- **Processing** (do math to things)
- **Output** (video, audio output)



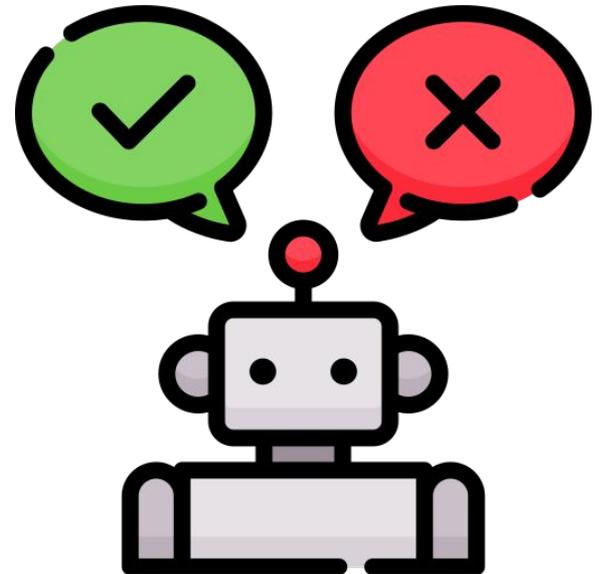
Booleans



Boolean Operators & Conditionals

Why should I care? – Booleans

- **Used all the time in computers**
- Often times we use computers to represent the real world
 - Things are True/False in the real-world
 - Computers solve these problems quickly!



Concept: Booleans



- Think of a True/False Question!
 - Is today sunny?
 - Is $5 + 5 = 7$?
 - Are there seven days in a week?
 - What is my name? ← NOT a True/False question
- Booleans are a variable that store either True or False

Examples: Booleans

- 5 is greater than 3 **True**
- The sky is blue **True**
- Today is Wednesday **False**
- Apples taste like oranges **False**

- Put in the chat a **True** statement!



YES!



NO!



Concept : Boolean Operators

- Boolean operators compare, combine, or reverse values to get a result that's either **True** or **False**
- Similar to mathematical operators (+, -, *, /)
 - But, instead of operating on numbers (2, 3, 10) operate on Booleans (True, False)



Concept : Boolean Operators – Not

- **not** : **not** value
 - just the exact opposite
 - not **True** -> **False**
 - not **False** -> **True**
- Example: value = I am 12, **not** value
- I am **not** 12



Concept : Boolean Operators – Or

- **or** : value1 **or** value2
 - 2 boolean values involved in operation
 - if either value is True -> whole operation is True
- Example: value1 = I am 12 (**True**), value2 = I am 13 (**False**).
- I am 12 **or** I am 13 - you can be 12 **or** 13!



Concept : Boolean Operators - And

- **and** : value1 **and** value2
 - 2 boolean values involved in operation
 - if both values are **True** -> operation evaluates to **True**
- Example: value1 = I am 12 (**True**) and value2 = I am 13 (**False**).
- I am 12 **and** I am 13 - you can't be 12 **and** 13!



Concept : Boolean Operators - And + Or Compared

AND

True and True -> True
False and True -> False
True and False -> False
False and False -> False

OR

True or True - > True
True or False - > True
False or True -> True
False or False -> False

Concept : Boolean Operators ==

- ==
 - checks two values for equality
 - value1 == value2
 - evaluates to **True** only if both values are equal AND of the same type
 - 3 == 3 -> **True**, but "3" == 3 -> **False**



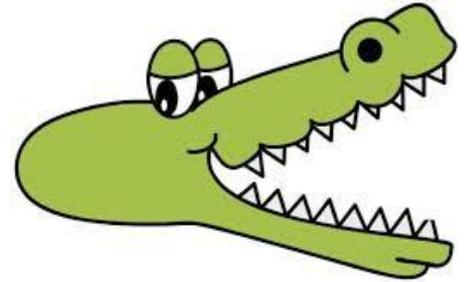
Concept : Boolean Operators $>$, \geq

- $>$
 - checks if value1 (left hand value) is greater than value2
 - $\text{value1} > \text{value2}$
 - if $\text{value1} > \text{value2}$ -> **True**, otherwise **False**
- \geq
 - checks if value1 (left hand value) is greater than or equal to value2



Concept : Boolean Operators $<$, $<=$

- $<$
 - checks if value1 (left hand value) is less than value2
 - $\text{value1} < \text{value2}$
 - if $\text{value1} < \text{value2} \rightarrow$ True, otherwise False
- $<=$
 - checks if value1 (left hand value) is less than or equal to value2



Examples : Boolean Operators

- not, and, or examples
 - two variables : `x = False`, `y = True`
 - `print(x or y)`
 - `print(x and not y)`
 - `print(not x and y)`

Examples : Boolean Operators

- `==, <, <=, >, >=`
 - `print(2 + 5 == 2 * 3)`
 - `print(12 / 6 >= 10 % 3)`
 - `print(not 10.2 >= 102)`
 - `print(15 - 5 == 10 and 1 < 2)`

Code examples



KAHOOT TIME!!!



If / Else

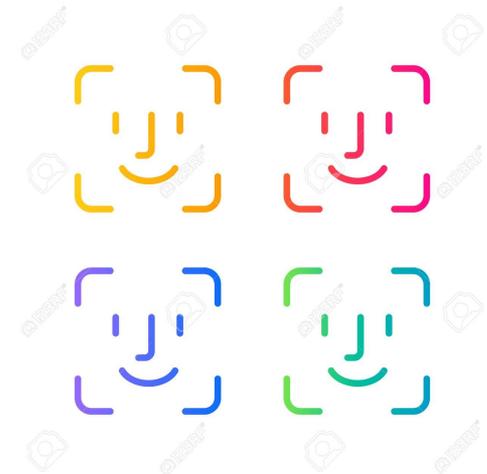
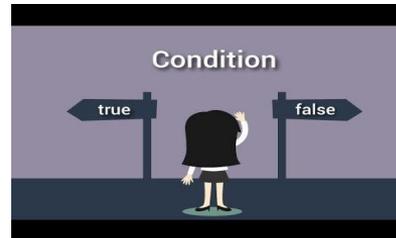
Conditionals

Different pathways for the code to follow



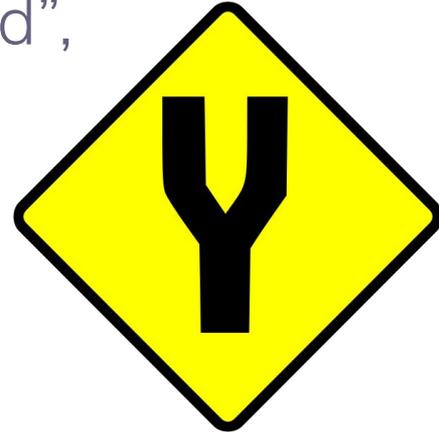
Why should I care? – Conditionals

- Gives code a **purpose**
- **Adapt** program based on input
- Get information and find out what to do with it
 - based on the **requirements** / rules
- Ex:
 - type password → login
 - Iphone Face ID



Concept : Conditionals

- Conditionals are essentially “forks in the road”, where the code can take different paths
- They give programmers the option to run specific blocks of code based on information like variable values



Conditional Examples

- If it is going to rain today, pack an umbrella;
otherwise, pack a hat.
- If the food is too hot, blow on the food;
otherwise, eat the food.



If Statements

- if statement's
 - Start with the word if
 - Follow with conditions in parentheses (Remember to Add a “:”)
 - Booleans and boolean operators go between the ()
 - Conditions run only when if statement is TRUE
- Examples:



Notice the tab indentation after the conditional

```
if (x > 5):
```

```
    print ("x is greater than 5")
```

```
if (fav_food == sushi):
```

```
    print("My favorite food is sushi :)")
```

**What about the conditions when
the if statement evaluates to
false?**

Elif Statements

- elif (**else if**) statements are run when the previous if or elif conditions were false
- You can have as many elif statements as you want
- Example:

```
if (3<1):
```

```
    print ("three is less than one")
```

```
elif (5==3):
```

```
    print ("five is equal to three")
```

```
elif (3==3):
```

```
    print ("three is equal to three")
```

#This is what is printed

Else Statements

- Else Statements run when the previous if AND elif statements are not true (false).
- Example:

```
If (5+3 == 10):
```

```
    print ("5+3 = 10")
```

```
elif (1+2 == 4):
```

```
    print ("1+2=4")
```

```
else:
```

```
    print ("None of the above are True") #This is what is printed
```

Else Statement: when if statement is false, do these actions instead



In a grouping of if, elif, and else blocks, *only* the *first one* to have a true condition *runs*

Nested Conditionals

- Conditionals within conditionals allow for more freedom and more pathways for the code to follow
- Example:

```
if (5>10):
```

```
    print ("five is greater than ten")
```

```
else:
```

```
    if (10 % 5 == 0):
```

```
        print ("ten is divisible by five")    #This is what is printed
```

```
    else:
```

```
        print ("ten is not divisible by five")
```

Examples : Conditionals

- Instagram Verified 

```
if (followers > 10000):  
    print("You are now verified")
```
- Vending Machines

```
if (input == A1):  
    return skittles  
  
elif (input == A2):  
    return sour patch kids
```



Don't get it?

Let's look at some code!



As a programmer, you are responsible for figuring out **when to use each **conditional****

Next Week!



Happy Coding!

