

# Week 1

Python Basics: How to Translate Procedures

into Codes

**Applied Data Science** 

**Columbia University - Columbia Engineering** 

### Course Agenda



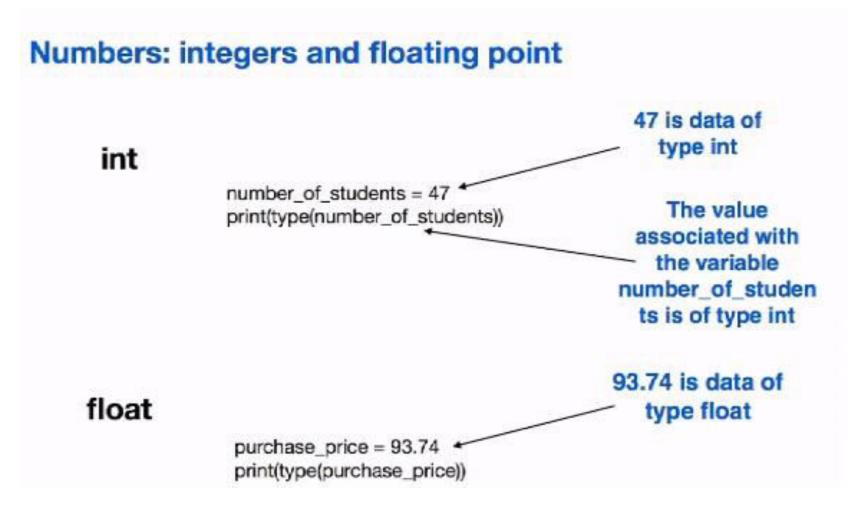
- Week 1: Python Basics: How to Translate
   Procedures into Codes
- ❖ Week 2: Intermediate Python Data structures for Your Analysis
- Week 3: Relational Databases Where Big Data is Typically Stored
- ❖ Week 4: SQL Ubiquitous Database Format/Language
- Week 5: Statistical Distributions The Shape of Data
- Week 6: Sampling When You Can't or Won't
   Have ALL the Data

- Week 7:Hypothesis Testing Answering Questions about Your Data
- Week 8: Data Analysis and Visualization Using Python's NumPy for Analysis
- Week 9: Data analysis and visualization Using Python's Pandas for Data Wrangling
- Week 10: Text Mining Automatic Understanding of Text
- Week 11: Machine learning Basic Regression and Classification
- Week 12: Machine learning Decision Trees and Clustering

# **Basic Data Types in Python**



Numbers is one of the data types in Python. This data type is of two types: integers and floating point.



# **String Operations in Python**



Strings are an **ordered collection** of characters.

# string operations

x="Always take a banana to a party!"

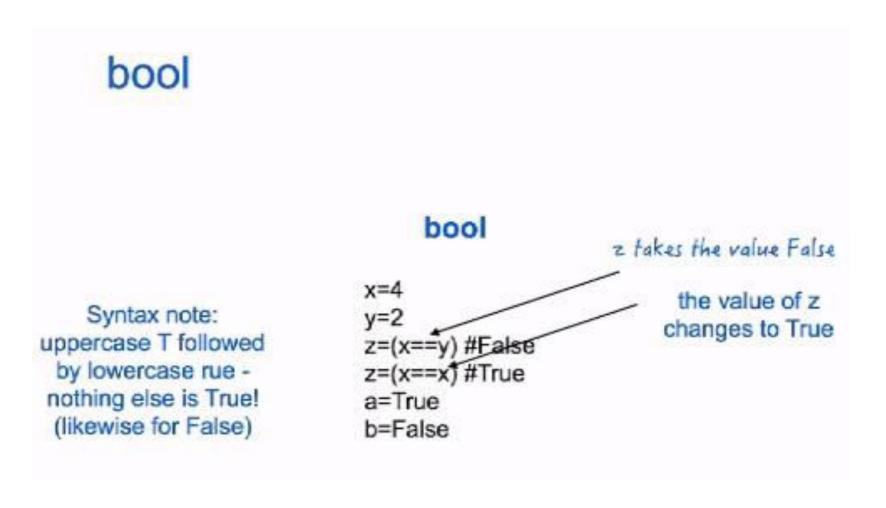
We can extract substrings from a string

```
y=x[7:11] #The value of y is 'take' (locations 7, 8, 9, 10)
y=x[7:] #The value of y is 'take a banana to a party!'
y=x[0::2] #The value of y is 'Awy aeabnn oapry' (every 2nd character y=x[::-1] #The value of y is ???? (what does the negative sign mean?)
```

### **Boolean Data Types**



The boolean (bool) data type typically evaluates to either 'True' or 'False'. Note the casing of the values.



# Variables and Assignments



Variables store values. Values do not change, but the value associated with a variable might change.

Declare variables before you use them. Use the syntax below to declare variables with values.

<variable name> = <value>

```
Examples

price now = float(input("What is the price now?"))

pct_return = (price_now - initial_price)/initial_price "100 print("The return on the stock is: ",pct_return)
```

# The "If" Statements and Logical Expressions



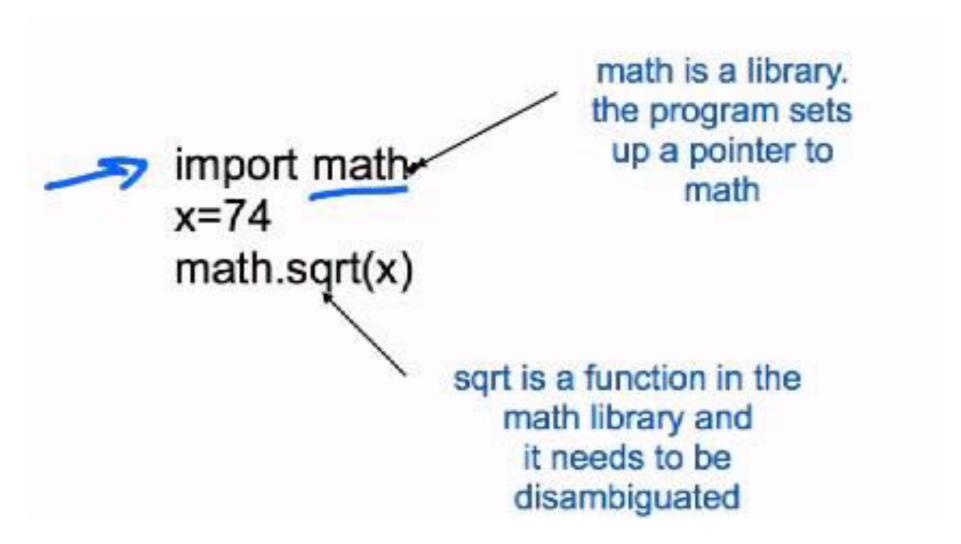
The 'if' statement is used to control program flow and in Python, if something is true, then you do something, and if it's not true, you do something else

```
purchase_price = float(input("Enter the purchase price of the stock: "))
price_now = float(input("Enter the current price of the stock: "))
                                                                    This is a block, note
if price_now < purchase_price * 0.9:
                                                                        the indenting!
  print("STOP LOSS: Sell the stock! ")
  print("You've lost", purchase_price-price_now, "Dollars per share")
                                                                   A colon indicates that
elif price now > purchase price * 1.2: +
                                                                     a block will follow
  print("PROFIT TAKING: Sell the stock!")
  print("You've gained", price now-purchase price, "Dollars per share")
else:
  print("HOLD: Don't do anything!")
  print("Your unrealized profit is",price_now-purchase_price,"Dollars per share")
print("Hope you enjoyed this program!")
               The end of indenting
                indicates that the
                 block has ended
```

### **Using Functions in Python**



A function is a black box and the way to call a function is to use the name of the function and then give it a list of arguments.





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