



# CS 1112: Introduction To Programming

Python Basics; Variables;  
Operations; Type Casting

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# Friendly Reminders

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- Your **safety** and **comfort** is important!
  - If you choose to wear a mask you are welcome to do so
  - *We will interpret wearing a mask as being considerate and caring of others in the classroom (not that you are sick), and realize that some may choose to mask to remain distanced*
- Remember to always be **kind, respectful, supportive, compassionate** and **mindful of others!** 😊
- Be an **active** participant in your learning!  
You're welcome and **encouraged** to ask questions during class!
- If you feel **unwell**, or think you are, **please stay home**
  - *Contact us! We will work with you!*
  - Get some rest 😊
  - View the recorded lectures – *please allow 24-48 hours to post*



# Reminder...

## Syllabus Quiz (“Quiz 0”)

Don't forget to  
take the  
Syllabuzz Quizzz!

- This quiz is *Mandatory!*
- This quiz is located on **Canvas** (see tab on left-hand side).
- Take this quiz *individually*. Absolutely no collaboration permitted.
- Must get **100%** to stay in the course! *May take it as many times as needed.*
  - Review the detailed Syllabus
  - This quiz is *open-book*
  - See score out of **12 points** on Canvas Grades to confirm you've completed the quiz
- **Where?:** “*Assignments*” tab > “*Syllabus Quiz (Required)*”; **or** “*Quizzes*” tab
- **Deadline:** **January 29** @ **11:00pm**. (Just after the add deadline). *Take it early!*
  - *Most students should aim to finish the Syllabus Quiz by January 24, 2025*



# OFFICE HOURS

- Office hours officially start: **January 22** (today!)
- My office hours – location: **Rice 405**
  - **Mondays: 10:30–12:00pm**
  - **Wednesdays: 10:00–11:00am** ←*\*updated\**
- TA office hours – location: **Thornton Stacks**  
*(The TA Information guide will describe where it's located!)*



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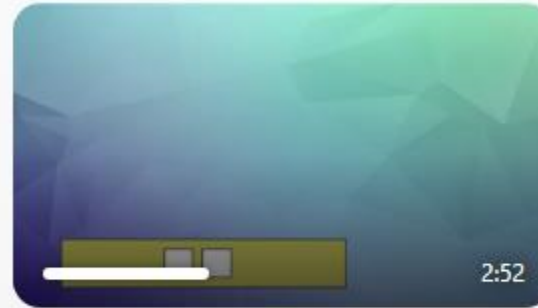
Don't forget to  
check out the  
Office Hour Calendar!



Windows Demo -- Files in  
PyCharm\_default



MAC Demo -- Files in  
PyCharm\_default



How To Open and Run A File in  
PyCharm



How to find your Python file in your  
file system

# PyCharm Video Resources

*There are some **video tutorials** available for you to watch to help you with the basics of dealing with files on PyCharm. We hope you find these useful!!*

*To access them, to go “**Panopto Video**” **Canvas** tab.*

*Click on “**Files in PyCharm Demos**” folder.*

# Reminder...

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## CS 1112 Pledge!

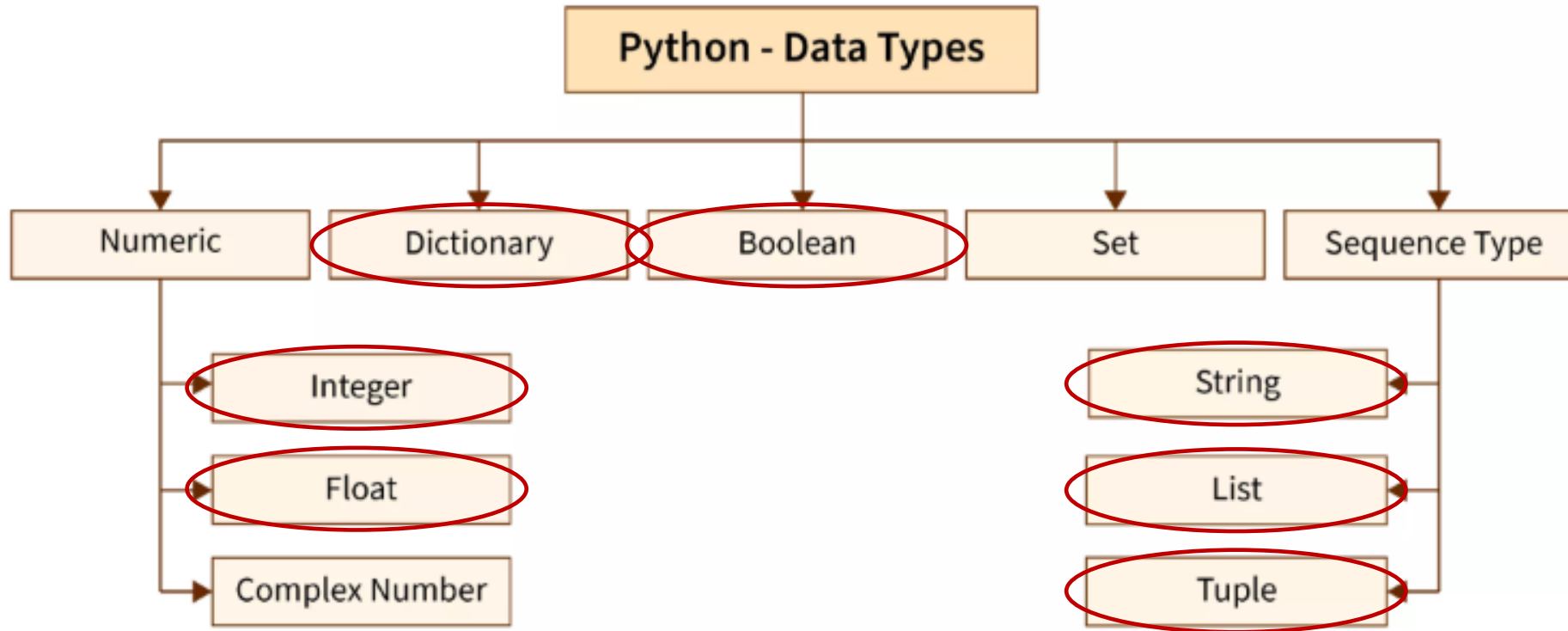
Taking this pledge is mandatory for our class to have a community of trust

★ Google form: <https://forms.gle/dsCdr4CeMbFFl84u5> (*try this first*)

★ Microsoft form: <https://forms.office.com/r/N08QnezyMM>

[Please submit your pledge at only **ONE** of the above links!]

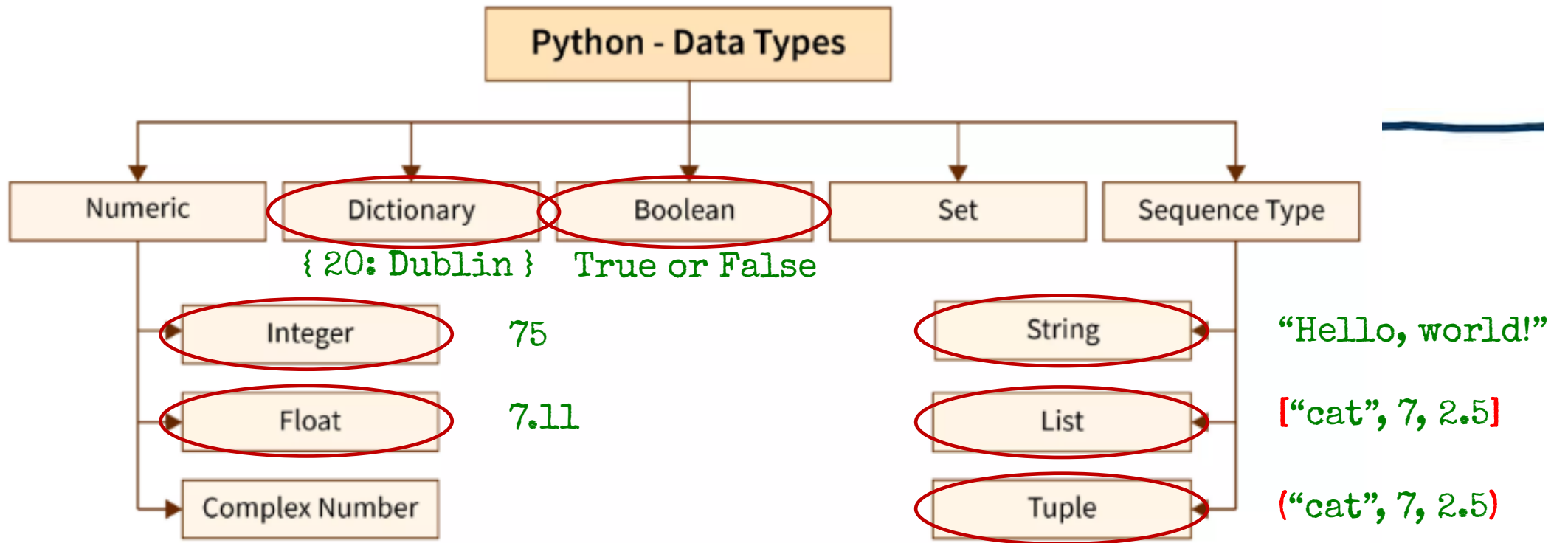




© Scaler, topic on data types

# Data Types





© Scaler, topic on data types

# Data Types

# Variables and Variable Types



- Variable names
  - Lower case (*all characters*)
  - Snake case (e.g., `prime_number`, or `int_quotient`)
- Variable Types

Variable Type	Description (example)
Integer (int)	Whole number ( <code>77</code> )
Float (float)	( <i>Floating-Point number</i> ) Positive or negative numbers with a decimal point ( <code>8.16</code> , <code>-2.34</code> )
String (str)	A sequence of characters. Can be delimited using either single or double quotes ( <code>"hello"</code> )
Boolean (bool)	Objects of Boolean type may have one of two values ( <code>True</code> or <code>False</code> )
List	An <i>ordered</i> collection of objects (like an array in other languages) ( <code>lst = ['cat', 'rabbit', 'dog']</code> )
Tuple	An <i>ordered</i> , <i>immutable</i> , collection of objects ( <code>tpl = ('beetroot', 'cauliflower', 'fennel', 'garlic')</code> )
Dictionary	A collection of key-values pairs, with no duplicate keys

# Variables and Variable Types



- Variable names
  - Lower case
  - Snake case (e.g., `prime_number`, or `int_quotient`)
- Variable Types

Example of a dictionary:

```
this_dictionary = {  
    "brand": "Ford",  
    "model": "Mustang",  
    "year": 1964  
}
```

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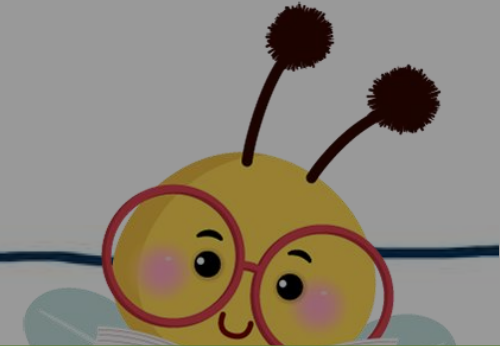
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See example of variables and data types  
in today's Python script!

Example of a dictionary:

```
this_dictionary = {  
    "brand": "Ford",  
    "model": "Mustang",  
    "year": 1964  
}
```



# Arithmetic Operations:

## # Calculations

```
total = a + b
difference = a - b
product = a * b
dec_quotient = a / b
int_quotient = a // b
power = a ** b
remainder = a % b
```

```
# simple addition
# simple subtraction
# multiplication
```

```
# normal division : result is a float
# integer division : result is an integer (cuts off the decimal portion)
# power :  $a^b == a**b$ 
# modulus operator : result is the remainder value after  $a/b$ 
```

Example:

```
a = 3
b = 2
```

## # Print results

```
print( "a + b: ", total)
print( "a - b: ", difference)
print( "a * b: ", product)
print( "a / b: ", dec_quotient)
print( "a // b:", int_quotient)
print( "a ** b:", power)
print( "a % b: ", remainder)
```

# Boolean Operations:

## # Boolean Operations

```
x = True
y = False
and_result = x and y
or_result = x or y
not_result = not x
```

## # Print results

```
print(and_result)
print(or_result)
print(not_result)
```



---

**Let's see how we might solve a larger  
problem in today's Python script!**  
*[Rounding a floating-point number]*





# Quick & Fun Survey Questions

Get to know your peers! ☺

**When you listen to music, do you listen to  
the rhythm or the lyrics?**



P	Q	$P \wedge Q$
T	T	T
T	F	F
F	T	F
F	F	F

P	Q	$P \vee Q$
T	T	T
T	F	T
F	T	T
F	F	F

# Truth Tables

```
# Boolean Operations
x = True
y = False
and_result = x and y
or_result = x or y
not_result = not x
# Print results
print(and_result)
print(or_result)
print(not_result)
```

Most common use case for type casting relates to **user input**, especially data that is numerical that comes in as a string and needs to be converted

# Type Casting

- **Type-casting** is a method with which we can switch (*convert*) a variable's **type** to another

- `i = 1`  
`f = 2.9`  
`s = "33"`  
`st = "4.5"`  
`b = "True"`

- **Conversions:**

- float to int:

`int(f)`

Result:  
2

- int to float:

`float(i)`

1.0

- str to int:

`int(s)`

33

[invalid: int("hello")] !!

- str to float:

`float(st)`

4.5

- str to bool:

`bool(b)`

True

[always *True*: bool("hello") = True] !!



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# PYTHON DEMONSTRATION

Variables and variable Types

Arithmetic and Boolean Operations

Type Casting with Variables

 In-Class “lab” Activity: Vocabulary Worksheet

# Vocabulary Worksheet

- In **pairs** work on the vocabulary worksheet
- **Match** each **term** on the LEFT with its **definition** or **code snippet** (that represents the term) on the RIGHT
- *No choice is used more than once!*

Remember to **check-in** with a TA before leaving class today!

In-Class “lab” Activity!

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# Notes/Reminders...

# Reminder: CS Laptop Loaner Program

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- This course requires students to have a **laptop**
- I realize that not everybody might have one (nor necessarily need one for their desired major / path...)
- If you do not have a laptop for any reason... *not to worry!*
- The CS department's Systems staff has a notebook / laptop loaner program and will be able to loan you a notebook / laptop computer for the duration of the semester if you don't have one or if you cannot afford one.
  - Also available if your laptop is broken and under repair, we can arrange for you to receive a loaner laptop for a week or two until your own laptop is fixed

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Interested? Link: [https://www.cs.virginia.edu/wiki/doku.php?id=cs\\_laptop\\_loaner](https://www.cs.virginia.edu/wiki/doku.php?id=cs_laptop_loaner)

*I am happy to be your sponsor. Please let me know.*

# Tools: Piazza

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- We will use **Piazza** in the following way:
  - Website: <https://piazza.com/> [Linked through **Canvas**]
  - Piazza is a great tool for asking questions about **course content**, **policies**, or getting help on **homework** assignments
  - While you are waiting for an answer, see if there's an answer you can provide to someone else's question. We're all in this together! **CS is a team sport!** 😊
  - TAs will monitor and answer questions throughout the semester
  - Not a means to help you debug your code! (See more below)

It is very important to remember the following:

- **Do not post complete or partial code solutions (for Homework)** on Piazza when seeking answers to your question unless it is in a **PRIVATE** post
- **Do not post complete or partial quiz solutions (code or short-answer)** when seeking answers to your question unless it is in a **PRIVATE** post



# Tools: Gradescope

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- We will use **Gradescope** in the following way:
  - Website: <https://www.gradescope.com/>
  - Linked through **Canvas**
  - **Homework assignments** will be **submitted**
    - Most programming assignments are autograded
    - Some aspects of programming assignments may be manually graded