

CS 1340:Fall 2020:Lecture 04

Intro to Python for CS and Data Science

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Highlights from Remainder of Ch 1

- Programming requires precision in the way you “say” things to Python
- Code Formatting can be:
 - required by the Python language
 - suggested by convention of the Python language
- For some activities, ZyBooks will be strict about output formatting as well
 - yes, including whitespace
- Whitespace comes in two forms:
 - vertical (mentioned this last class)
 - horizontal

Example

```
# Vertical WhiteSpace
hourly_wage = 22
hours_week_01 = 12
hours_week_02 = 15
hours_week_03 = 11

pre_tax = (hours_week_01 + hours_week_02 + hours_week_03) * hourly_wage
print('Before taxes, you earned', pre_tax)
```

Before taxes, you earned 836

Precision precision precision!

- You've got to pay attention to detail
 - *yes... even if you aren't a **detail** person*
- If things look very similar to you,
 - then they are still VERY different to the computer
 - Examples:
 - `= vs ==`
 - counting from 1 to 10 and counting from 0 to 10 are very different to a computer

Python 3 Official Documentation

New Stuff

- Numeric
 - integer
 - floating point number (number with a fractional component)
- String
- List
- Dictionary
- Set
- Tuple

- Every 'thing' in a Python program has a **Data Type**
- You can think of it as **metadata** describing what operations I can perform on it

```
someVar1 = '123'
```

```
someVar2 = 123
```

- '123' is a string
 - You can't perform mathematical ops on a string... doesn't make any sense.
- 123 is an integer

input() and Type Conversion

- You can use use the `int(...)` function to convert from string to integer.
 - Technical term: **casting**

```
age = input('How old are you? ')
print(type(age))
```

- *Note the alternative way of calling the `input()` function*
- `type(...)` will tell you the data type of the thing in parens.
- If you run this, even if you enter an integer for age, the type will be `'str'`

```
var01 = 123
var02 = 'Mark'
var03 = 3.1415
print(type(var01))
print(type(var02))
print(type(var03))
```

Output:

```
<class 'int'>
<class 'str'>
<class 'float'>
```

3 Fundamental Constructs in all Programming

1. Sequential Execution (What you've been doing so far)
2. Conditional Execution
3. Repetitive Execution

Conditional Execution

- only execute a block of code **if some condition is true.**
- Conditional Execution is sometimes called **branching**

```
if some_condition:
```

```
    statement1
```

```
    statement2
```

```
    ...
```

```
elif some_other_condition:
```

```
    statement3
```

```
    statement4
```

```
    ...
```

```
else:
```

```
    statement5
```

```
    statement6
```

Conditional Example (a.k.a. if statement)

```
final_grade = 93

if final_grade >= 97:
    print('You earned an A+')
elif final_grade >= 93:
    print('You earned an A!')
elif final_grade >= 90:
    print('You earned an A-!')
else:
    print('Better luck next time!')
```

You earned an A!

- **condition** - a test that is either true or false
- **relational operators** -
 - `>`, `<`, `>=`, `<=`, `==` `<-` work with numerical data