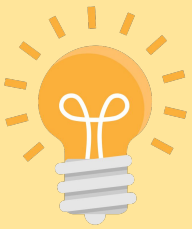

Unit 1:
Intro to Python

Out put

to Divider

Python is a programming language that lets you work more quickly and integrate you systems more effectively. You can learn to use python and see almost immediate gains in productivity and lower maintenances.

Types of Data & How they're used

Boolean: true or false

Number: Values, no “”, can use mathematical operators

- Int: whole number
- Float: Decimal number

String: cannot be evaluated, must be enclosed in “”

*Hashtags are comments

Naming Conventions in Python

- Variable names should indicate their purpose
- Can contain letters, numbers, and underscores
  - Use underscores to separate words
  - camelCase
  - snake_case
- Python is case sensitive (e.g. Num_kids vs num_kids)
- No spaces, symbols, or keywords
  - Ex: print, False, True, else, for, while
- Cant start with a number (e.g. 1Game vs Game1)
- Not be too long

Displaying Information: All programming languages provide some mechanism for displaying information

- Displaying Information Along With Variables: To provide more useful output, text is typically combined with information stored in variables.

Input & variables

to Divider

Vocabulary

- **Data type:** All values in a programming language have a "type" - such as a Number, Boolean, or String - that dictates how the computer will interpret it. For example, 7+5 is interpreted differently from "7" + "5".
- **Expression** - any valid unit of code that resolves to be a value
- **Variable** - a placeholder for a piece of information that can change
- **Compiler** - a program that converts commands so that a computer can understand and execute them
- **Integrated Development Environment (IDE)** - software or an application that combines multiple tools in one window
- **Input** - the command the sends information from the user into the computer
- **Variable** - A name for a space in the computer's memory for something we're storing
- **Syntax** - the rules that define the written structure of a programming language
- **Binary** - a number system based on 2
- **Decimal** - a number system based on 10
- **Computer Science** - the study of the principles and use of computers
- **print()** - a command that displays text and numbers on the screen
- **String** - an object in Python that stores letters, numbers and words (not used for calculations)
- **Escape Sequences** - special sequences marked with the \ symbol. can allow you to make a new line, tab, print a quotation mark, or print a backslash.
- **Comment** - A note written in computer code for the programmer to read, that the computer ignores. Marked in Python with a # symbol.
- **Analog** - data and information in the real world that can be measured continuously, instead of discretely
- **Digital** - Data and information in the real world that can be measured discretely or numerically, instead of continuously
- **Integer** - any whole number (either positive or negative), and zero
- **Concatenation** - adds two strings together
- **Typeerror** - when the type of variable doesn't match with concatenation

Compiler	Translates code to machine language.
Computer	An electronic device consisting of hardware and software.
CPU	Central Processing Unit – carries out program instructions.
Hardware	The physical machine; anything you can touch.
Input	The user sends information to the computer.

Main Memory	Short-term memory; temporary-power off, all information is lost.
Output	The computer sends information to the user.
Program	Instructions that a computer follows, written in code.
Secondary Memory	Long-term memory; storage.
Software	Programs that run on hardware.

Project STEM 1.4

Computer

- Comprised of **hardware** and **software**
  - Hardware is the physical, tangible part of the computer
  - Software runs on hardware
  - Software and programs are written in code
  - Software is any program or code, and extends beyond the programs/**applications** you use everyday.
  - The **Operating System** (e.g. Windows 10, Mac OSX, iOS, Android) runs the computer and manages the computer's hardware. (The software that supports a computer's basic functions, such as controlling computer memory, scheduling tasks, and running applications.)

Computers generally have an **input device**, **output device**, **CPU**, **main memory**, and **secondary memory**.

- Input Device
- Output Device
- CPU
  - Central Processing Unit
  - Brain of the computer
  - Runs programs by going through the program's **instructions**, stored in binary
- Memory
  - Two types: **main memory** and **secondary memory**
  - Main memory
    - Also known as **RAM**
    - Short term - is erased when the power turns off
    - Very fast, but expensive
  - Secondary memory
    - Long term - stays even after the power turns off
    - Examples: HDD, SSD, flash drives
    - Slower, but relatively cheap

To combine two print commands on a single line of output, we use a comma followed by end="". In the example below, the two print commands are written as separate lines of code, but by adding , end="" within the parentheses, the computer knows to bring the second line up.

```
print("Hello", end="")
print(" there")
```

Output: Hello there

Escape Sequence	Meaning
\n	Create a new line
\t	Tab for extra spacing
\"	Quotation mark
\\	Backslash

UNit 1 Review

⬅️ BACK to divider

- use the `int()` function to convert a string-representation of a digit-based number (e.g. "57" or "8", but not "fifty-seven" or "eight") to a number that Python can do calculations on
- The `str()` function does the opposite - takes an integer and converts it to a string, so that we can combine it with other strings.
- **Typecasting** - changing the data type of one variable, into another data type
  - Typecasting is needed in Python because all inputs from the user are automatically stored as a string unless otherwise specified.
- Digital information is information that has only two states - for example, a light switch either being on or off.
- Analog information, however, can have states in between along a spectrum.
- There are risks to changing analog data into digital data: sometimes, we can lose information in the process of converting something analog into something digital.
- Base 2= 0 and 1
- Base 10 = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9