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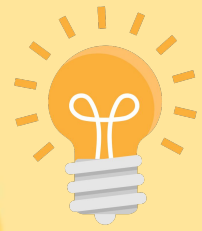
Class: Programming&Prototyping

Guidebook





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Unit 1

# Unit 1: Intro to Python

1.1 What is Computer Science?

1.2 Using Python

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1.4 Hardware and Software

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Unit 1 Vocabulary

Assignment 1: Silly Sentences / Test 1

Unit 1 Review



Python is a programming language that lets you work more quickly and integrate your system more effectively.

You can learn to use Python and see almost immediate gains in productivity and lower maintenance costs.

Variables are spaces in the memory that we say data variables need to be declared

There are 3 main types of data: Boolean which is T/F

Numbers: can use mathematical operations [Integer: whole number Float: Decimal Number]

String: Cannot be evaluated must be enclosed

Naming Conventions in Python

Variables should indicate their purpose

Use underscores to separate words

CamelCase

P     python is case sensitive

Can't start with a number

Keywords like : print, False, True, else, for, while

Variables cannot have key words

In/Out Operations:

String concatenation: To provide more useful output, text is typically combined with information stored in variables through a + sign

Name a variable then use input keyword

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 as "7" + "5"

Expression: Any valid unit of code that resolves to a value

Variable: A placeholder for a piece of information that can change



# Input & variables

1.1) Comp sci is the study of the principles and use of computers

Coding: Using a formal language in order to create software or make programs

The principles include: Data, The internet, Algorithms, Logical Thinking, Ethics & Global impact

Formal Language: designed for a specific reason, follows a strict set of rules &

Python is a type of formal language

Natural language: developed over time by people communicating with each other

Like english

Formal Language) Very Clear, Consistent-works every time & Literal

Natural language) Ambiguity, Not always literal-metaphors

Syntax rules have 2 types - tokens and structure

Parsing is the structure of the sentence

Semantics is understanding the meaning

The meaning of a computer program is unambiguous and literal and can be understood entirely by analysis of the tokens and structure

1.2

A compiler is a program that takes commands and converts them so that a computer can understand them and execute them. We will do our coding here

The formal name of our compiler is IDE- Integrated Development Environment. It is software or an application that combines multiple tools in one window

1.3

“Print” is how we take information and display it on the screen-also known as output

We use the keyword “print” with a set of parentheses. Anything inside the parentheses will be output to the screen.

1.4

Hardware: The physical machine or Anything you can touch such as a monitor, a keyboard, a mouse

Software: The programs that run on our hardware. These are what computer scientists make: our job is to code and create new software for the hardware to run. Ex: Microsoft Word, Web browsers like Chrome or Safari, Cell phone or tablet apps



Software(Programs): The actual instructions that a computer follows; Written in code

A program is a collection of code that is giving the hardware a task

Computer Hardware: There are many types of computing devices but they all have five things in common.:

- At least one input device
- At least one output device
- A CPU
- Main Memory
- Secondary Memory

CPU=Central Processing Unit, Runs programs by going through the program's instructions, stored in binary

Memory- 2 types [main/RAM and secondary]

- 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

## 1.5

The computer takes the words in quotes on the first line and stores it in the variable name. The + sign concatenates two strings next to each other  
“\n” works the same as a return or a enter key and lets you move to the next line when you use them in between words that are in quotations. It is known as an escape sequence. The \ is a escape character that marks the end of a sentence and n means that the computer should move on to a new line. We use escape characters sequences to insert characters in our output which have other meanings and functions in python.

- \n bumps us down a line
- \" prints quotation marks to the screen
- \t inserts a tab in order to line text up on the screen neatly
- \' prints the apostrophe mark
- \\ prints the backslash itself

**ASCII stands for the American Standard Code for Information Interchange, which assigns alphanumeric values to keyboard characters.**

If we don't want to include the line break, by using `, end=""` the line break is replaced with whatever is in quotation marks, which in this case is nothing. So it literally tells the computer how to "end" the line.

## 1.7

Variable is a name for a spot in computer's memory

Different types of data take up different amounts of space in computer's memory

- Integers
    - whole numbers
    - takes up less space in memory
  - Floats
    - decimal numbers
- take up more space because they include numbers before and after the decimal point
- strings
    - any combination of letters, numbers and symbols in quotations

Typecasting: The process of converting the value of one data type to another data type. Use the command `int()`

The `str()` will take what is inside the parentheses and make that data type a string. We must do this any time we are trying to concatenate words (which are a type of string) with something that is not a string (like the `int` in our example).

Binary- a number system based on two

Decimal- A number system based on ten, the number system we basically use

Data Types		
Type	Description	Examples
string	text, words	"Hello world123" 'yellow!!!@#' (note the " " or ' ' around strings)
int	whole numbers and their opposites	3 -8 90 0 -10000
Float	+/- numbers with decimals	1.34 *6.0 -9.7976
boolean	Only two values	True False (note upper and lower case)

TypeError when you try to concatenate integers `int()` and a string `str()` objects

NameError: name 'c' is not defined

SyntaxError: EOL (end of line) while scanning string literal

Type Coercion:

Ex: `print("hi" + 5)`

Fix:

string	<code>str()</code>	<code>str(5) = "5"</code> <code>str("hey") = "hey"</code>
integer	<code>int()</code>	<code>int("4") = 4</code> <code>int("hey") = Error</code>