

* what is a programming language?

- A program is a series of instructions that ultimately is sent to the CPU to deal with input/output, read/write to memory or do arithmetic.
- A programming language is a codified way of writing & interpreting such instructions
- All languages have four elements
 - input & output capabilities
 - arithmetic & logic capabilities
 - control structures, e.g. loops & conditionals
 - abstractions, e.g. functions & classes

Analogy: A program is like a river.

- the source is input
- the mouth is output
- Arithmetic / logic are like mills. They are what we do w/ the river
- Control structures are like dams & canals. used to control the flow
- Abstractions are like the plans for the mills & dams. They help us organize arithmetic & control structures.

Activity: Install python, Hello world

* Spend 5-10 minutes trying to start Spyder.

II. Python syntax

* A programming language is defined by its syntax.

Syntax are the words & symbols we use to express the language.

* Syntax consists of keywords & operators

- keywords express actions like print (output), or for (control)

- operators manipulate the values of operands
e.g. + (add), or (logical)

- we will see more examples in a minute.

* In addition to language defined keywords & operators, we can define identifiers.

For example we can define a variable, x.

x = 5.
↑
identifier

or a function

f(x):
↑
identifier return x+2

* Variables can hold different types of data :

- integers - floats
- boolean values (true/false)
- strings (characters)



Example

Basic keywords and operators

- cover basic i/o : input, print
- arithmetic : +, -, *, /, %, **
- comparison : ==, >, <, !=, <=, >=
- assignment : =, +=, -=
- logical : and, or, not
- data types : integer, bool, float, string
- comment character, semicolon ;, backslash \
- indentation