

C++ Programming

Data types and variables

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Is Data the new Oil of the Digital Economy?



- Your personal info
 - Age
 - Name
 - Current Job
 - Address
 - Mobile Number
- Your sharing
 - Images, videos, posts
- Your connections / interactions
- A lot of data!
 - What is the **data type**?!

Data type: We vs Programming

Value	We call it	C++ Data Type
52 <i>(I am 52 years old)</i>	Number	Integer
12.7 <i>(The baby is 12.7 kg)</i>	Number	Double (or float)
Z <i>(My name starts with Z)</i>	Letter	Character
Computer	Word	String / Sequence of characters
Male of Female?	Status of 2 things	Boolean (2)

Data Type: Boolean

- Some things are of two types only. E.g. a person is Male or Female?
 - C++ call them **boolean**. Their values are true or false
 - E.g. Male is True, Female is False (or the opposite)
 - E.g. coin is head or tail. We can think head is true and tail is false
 - E.g. Light can be on or off. [Computers](#) “understand” on and off.
 - On = True = 1
 - Off = False = 0
 - True also corresponds to 1, and False to 0.

So

- Summary: integer, double, character, string, boolean
 - There are more other types and details
 - No need for early headache :)

The need for names!

- Let say we want to build program for hospital
 - We need to refer to patients
 - One of them is called “Mostafa”. He is 55 years old. He has 2 children!
 - We also has a Doctor: who has name, salary, address, etc
- How can we represent this information?
 - We need to put them in memory when the program starts
 - We need to have names to refer to them?
 - E.g. I want to know mostafa’s age?



Computer Memory Like Streets



- Each home has street address (location)
 - Name and number
 - 127 John Street
 - 127 = location
 - John = Name
- There are people in the home
 - People have types
 - Male, Femal, Child

Computer Memory (RAM)

- Think of it as boxes
- Each box has
 - Address location
 - Type (e.g. integer or double)
 - Name: E.g. age, name or salary
- We call it **variable**
 - A box in the memory

Location	Name/Value	Data Type
1	EMPTY	NA
2	Age = 55	Integer
3	Weight = 92.5	Double
4	Group = 'D'	Character
5	Gender = Male	Boolean
6	Name = "Mostafa"	String

Memory

So

- Age = 52
- Variable
 - **Name** (aka identifier) = Age
 - **Value** = 52
 - **Datatype** = Integer
 - **Memory address** = Somewhere in RAM

Homework: Guess!

- Guess the syntax rules:
 - `int age = 52;`
 - `double weight = 12.7;`
 - `char ch = 'Z';`
 - `string name = "mostafa";`
 - `bool status = true;`

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”