DATA TYPES

P4

Variable

- A **variable** is a form of identifier; a '**name**' which represents a value.

- It is used to store and retrieve data from a computer systems RAM. Every variable should have a unique and meaningful name.
- In order to reserve enough RAM for the variable, we must select an appropriate data type. For eg. If we want to store a footballers number of passes;

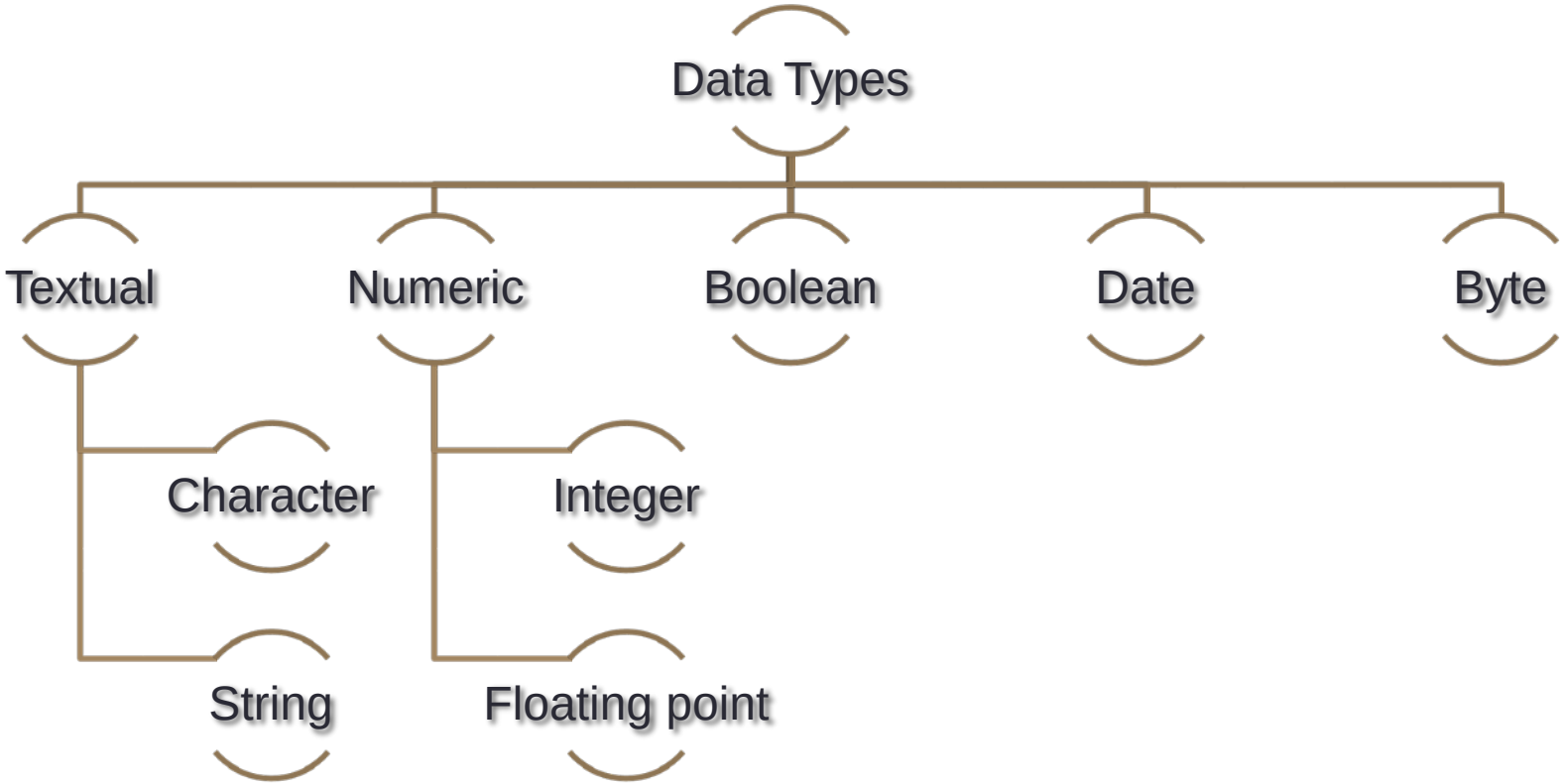
Data Types

- **Data types** are one of the essential building blocks of software design and are used to specify the kind of values which need to be stored in the computer system’s RAM.

Names of data types

- The actual names of data types will vary according to the language. However there are common categories which the diagram in the next slide will highlight.

Common categories of data types



Character

- Sometimes abbreviated to **char,** this can store **one character;** in other words, any symbol in the computer system's character set such as an alphabet, digit, punctuation, currency symbols etc. Examples include: A, %, @, #,".

- A character normally needs 1 byte of RAM storage.

String

- A string is a number of characters joined together. The string can be composed of any number of valid symbols. Some languages may define a limit for the length of the string such as 255 characters or bytes. Examples include “Any sentence”, “01707720000”, “Asif Khan” or “#563”.

- Some languages use ASCIIZ strings where a zero (0) value marks the end of a string, for example;
- ASIF0

Integer

- Often abbreviated to **int**, an integer is a **whole number** with no decimal part. Integers can be **positive**, **negative or neither** (‘unassigned’). Examples include 777, 512, -9

- Programming languages place a limit on the size of integers. However, this depends on the RAM an integer is allocated and whether the integer is signed (positive or negative) or unsigned. Some languages have short or small **int** variables which use less RAM.

Floating Point

- These are ‘real’ numbers which have a decimal point and fractional part. Examples include: +1154.66, -50.6, +0.5

- Floating points have two main parts: the **mantissa** and the **exponent.**
- **For example +1.42E+2 or $1.42x10^2$**
- In this example both values equal to 142.
- 1.42E + 2 means move the decimal point two places to the right.
- $1.42x10^2$ means multiply 1.42 x 100 (10 squared).

Floating point cont…

- The mantissa represents the accuracy of the number while the exponent represents the magnitude.

- In programming languages floating points come in various sizes. Larger floating point numbers offer greater magnitude and accuracy of numerical data.

Boolean

- The name reflects the mathematic logic developed by 19th Century English mathematician George Boole. Boolean values are true or false, yes or no. This reflects the 0 and 1 binary values used by computer systems.

Byte

- **A byte stores 8 bits of computer data.**