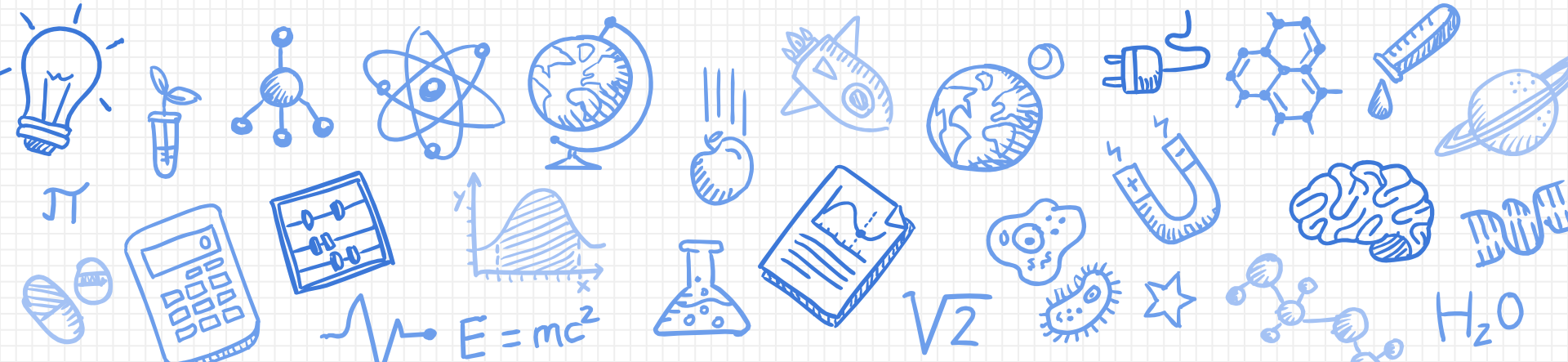
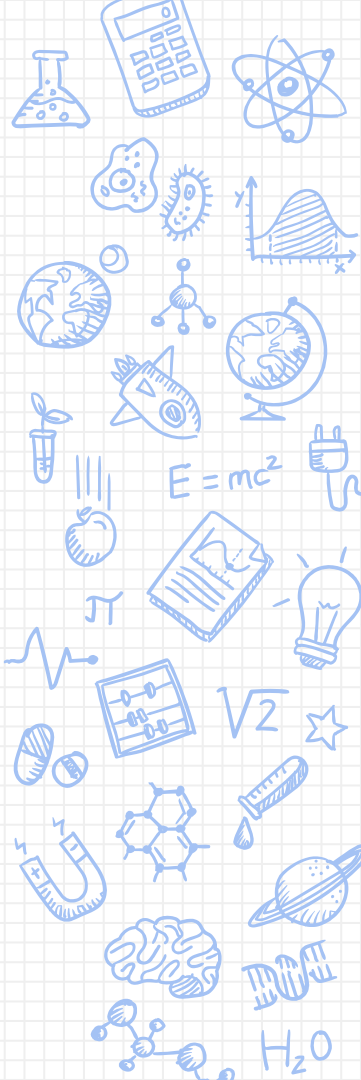
Signed and Unsigned Integers



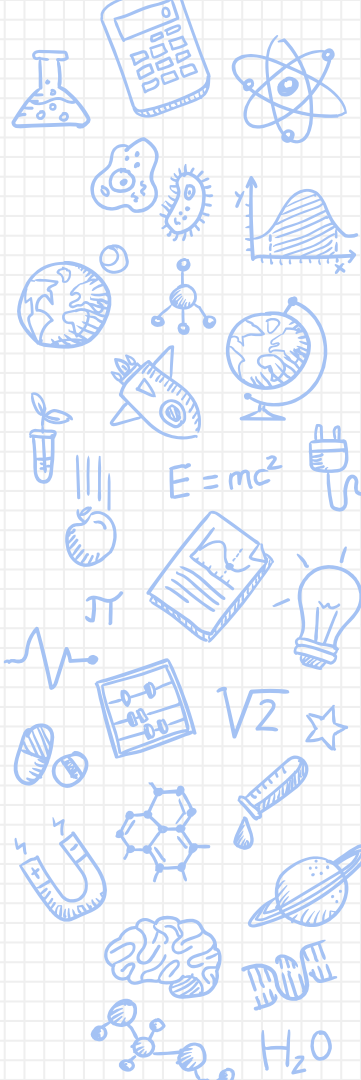
Computer Memory

- ✘ Memory is a piece of hardware.
- ✘ Memory is a storage location where the computer stores temporary data.
- ✘ Programs request memory from the computer (allocation) and then return it back when it is no longer needed (deallocation).
- ✘ Memory is finite.



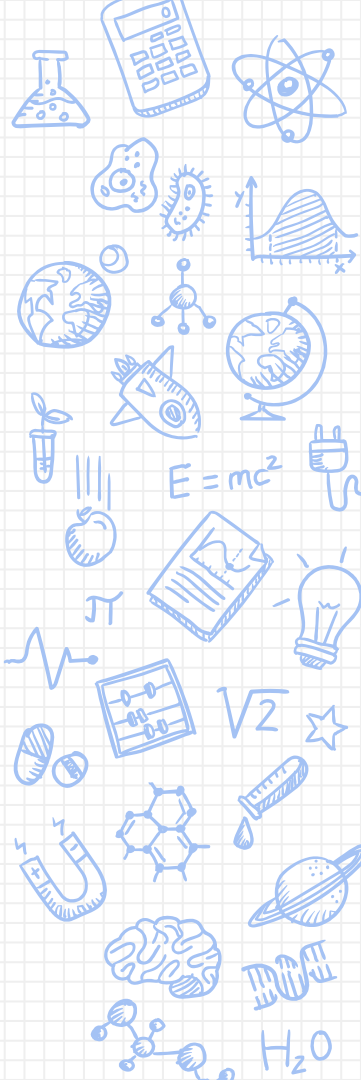
How Memory Is Measured

- The **bit** is the smallest unit of measurement.
- Think of the **bit** is a box that stores either a 0 or a 1.
- 8 bits = 1 byte
- 1,024 bytes = 1 kilobyte
- 1,024 kilobytes = 1 megabyte
- 1,024 megabytes = 1 gigabyte
- 1,024 gigabytes = 1 terabyte



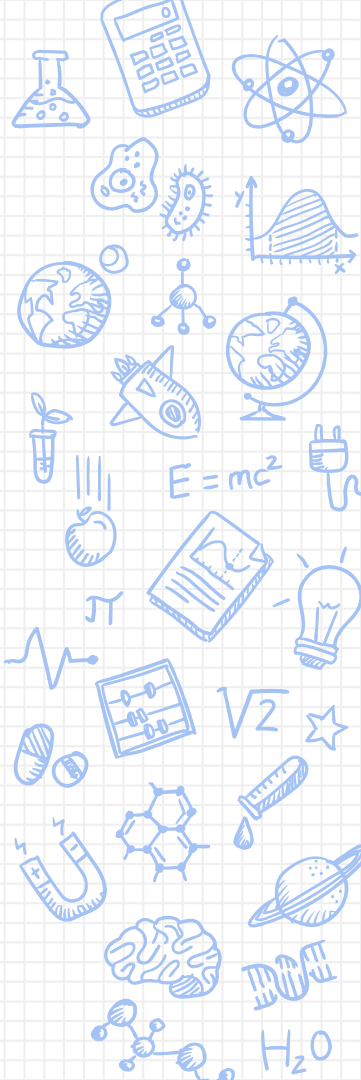
Python vs Rust

- ✘ Python has a single **int** type to model whole numbers.
- ✘ Rust has multiple integer types.
- ✘ Rust code can use smaller integer types to reduce total memory consumption.



Signed vs. Unsigned Integers

- ✘ Signed integers support negative and positive values.
- ✘ Unsigned integers support only zero and positive values.
- ✘ Unsigned integers can extend twice as far in the positive direction compared to a signed integer with the same amount of memory.



Integers in Polars

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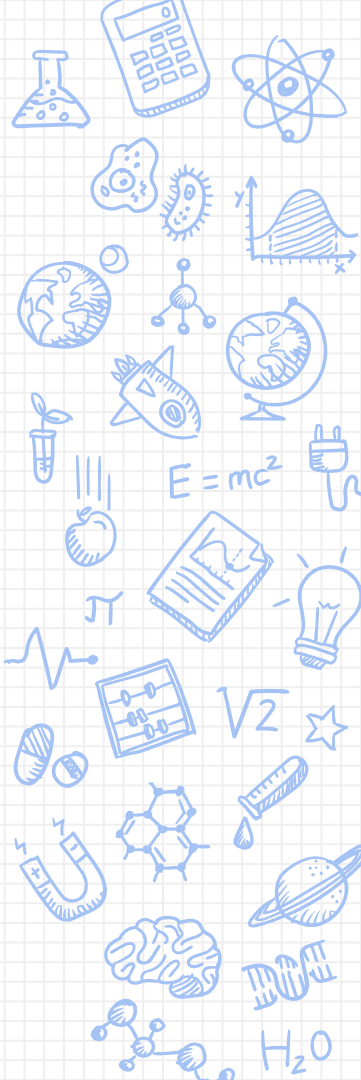

Data type	Lower limit	Upper limit
Int8	-128	127
Int16	-32768	32767
Int32	-2147483648	2147483647
Int64	-9223372036854775808	9223372036854775807

Data type	Upper limit
UInt8	255
UInt16	65535
UInt32	4294967295
UInt64	18446744073709551615