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Basic Information Technologies

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https://github.com/ihpar/bit_chem

Data

- In computer science, **data** is any sequence of one or more symbols. Data requires interpretation to become information.

- Digital data is data that is represented using the binary number system of 1s and 0s, instead of analog representation.

- Practically, anything in the computer representation of a solution (for a World problem), which is not an instruction to the CPU, i.e., not an action, can be called data.

Data Types

1. Numerical:
   - **Integers**: An integer is the number zero (0), a positive natural number (1, 2, 3, …), or the negation of a positive natural number (−1, −2, −3, …).
   - Floating points

2. Symbolic:
   - Boolean
   - Character

Introduction to Programming Concepts with Case Studies in Python, Üçoluk G., Kalkan S.
https://en.wikipedia.org/wiki/Integer

Data Types

1. Numerical:
   - Integers
   - **Floating points:** A floating point number, is a positive or negative whole number with a decimal point. For example, 5.5, 0.25, and -103.342 are all floating point numbers, while 91, and 0 are not.

2. Symbolic:
   - Boolean
   - Character

Introduction to Programming Concepts with Case Studies in Python, Üçoluk G., Kalkan S.
https://www.freecodecamp.org/news/floating-point-definition/

Data Types

1. Numerical:
   - Integers
   - Floating points

2. Symbolic:
   - **Boolean**: The Boolean (Bool) is a data type that has one of two possible values : true / false.
   - Character

Introduction to Programming Concepts with Case Studies in Python, Üçoluk G., Kalkan S.
https://en.wikipedia.org/wiki/Boolean_data_type

Data Types

1. Numerical:
   - Integers
   - Floating points

2. Symbolic:
   - Boolean
   - **Character**: 'a', 'b', 'Z', 'W', '*', '_', ... A sequence of characters is called a **string**. E.g. "Hello world"

Python Arithmetic Operators

Operator	Name	Precedence	Example
+	Addition	3	12 + 5
-	Subtraction	3	5 - 9
*	Multiplication	2	7 * 2
/	Division	2	15 / 2
%	Modulus	2	12 % 5
**	Exponentiation	1	2 ** 4
//	Floor division	2	13 // 5

Parentheses have the highest precedence and can be used to force an expression to evaluate in the order you want.

4 * (2 - 1) is 4.

Python Print Function

- The print() function prints the specified message to the screen, or other standard output device.

- The message can be a string, or any other object, the object will be converted into a string before written to the screen.

- print("Hello how are you?")

- print(3 * 5)

https://www.w3schools.com/python/ref_func_print.asp

Boolean Algebra

- Values can be either True (T) of False (F).

- In Python there are 3 basic boolean algebra operators: and, or, not.

- Also, any comparison will evaluate to a boolean value.

Boolean Algebra

x	y	x and y	x or y
F	F	F	F
F	T	F	T
T	F	F	T
T	T	T	T

x	not x
F	T
T	F

Comparison Operators

Operator	Name	Example
==	Equal	2 == 5
!=	Not equal	2 != 5
>	Greater than	2 > 5
<	Less than	2 < 5
>=	Gr. th. or equal	2 >= 5
<=	Ls. th. or equal	2 <= 5

- Arithmetic operators have higher precedence than the comparison operators.
- Comparison operators have higher precedence than the boolean operators.
- Not has higher precedence than and, or operators.

Exercises

- Programming exercises on aritmetic and logic operators.

$$\frac{4+2}{2} \checkmark$$

$$(2^3 + 2^2) \times 5$$

$$(8+4) \times 5 = 12 \times 5 = 60$$

$$\frac{4+2}{4-2}$$

A leap year is a year which is perfectly divisible by 4.

Is 2023 a leap year?
2024
2025

Exercises

- Programming exercises on aritmetic and logic operators.

  — If you get a grade ⩾ 90 you get AA.

  Can 85, 90, 95 get an AA?

  — If your grade is between 85 (inclusive) and 90 you get BA

  — If your age is between [18−25) you are young.

  [25−40) middle aged.

  is someone born in 2000 young?