VG101 — Introduction to Computer and Programming

Worksheet (chapter 2)

Manuel — UM-JI (Summer 2019)

Worksheet concept

- Simple exercises based on the slides
- Optional personal work
- No submission, no grading
- Only refer to websites in English

Ex. 1 — *Slide questions*

Ensure you can answer all the questions appearing in chapter 2.

Ex. 2 — *Napier's bones*

Implement the algorithm describing Napier's bones (cf. Worksheet 1 exercise 1).

Ex. 3 — *Use of Matlab*

1. Read online about Graphical User Interfaces (GUI).
2. Read online about Command Line Interface (CLI).
3. Check how to start Matlab in "no desktop mode", i.e. no GUI, and run the density script in this mode.

Ex. 4 — *A first simple program*

Rewrite the simple program from slide 2.**??** using the `'s'` flag for the `input` function. Then convert the inputs from the `'s'` mode into into numbers.

Ex. 5 — *Matrices*

1. Generate a 10×10 matrix A composed of random elements.
2. Extract the seventh element on the third row of A using (i) its index, and (ii) its coordinates.
3. Delete the third column and the fourth row of A.
4. Extract the sixth row and teh second column from A.
5. Extract the 4×4 matrix at the center of A.
6. Construct the following matrix,

$$\begin{bmatrix} A & A' & B \\ A' & A & C \end{bmatrix},$$

where B is the sum along of the rows of A and A', and C is the subtraction of the sum of the rows of A with the sum of the rows of A'.

Ex. 6 — *Truth table*

Write a Matlab script which return the truth table for the operations `and`, `or`, and `xor`.

Ex. 7 — *ASCII code*

1. Search online what are ASCII codes.
2. Write a script which prompts the user for a key and returns it corresponding ASCII code.

Ex. 8 — *Conditional statements and loop*

1. Rewrite the second line of the code on slide 2.**??** using a nested `if`.
2. Rewrite the code from slide 2.**??** using the `if` statement instead of the `switch` statement.
3. Rewrite the code from slide 2.**??** such that it return the number of vowels and consonants in a word.

Ex. 9 — *Logical masks*

Generate a random 10×10 matrix, double all the elements less than 5, triple all the ones between 5 and 10, and set all the others to 0 if they are even or 1 if they are odd.