VG101 — Introduction to Computer and Programming

Assignment 7

Manuel — UM-JI (Fall 2017)

- MATLAB: write each exercise in a different file
- C/C++: use the provided assignment template
- Include simple comments in the code
- If applicable, split the code over several functions
- Extensively test your code and impove it
- Write a single README file per assignment
- Zip all the files and upload the archive on Canvas

Ex. 1 — *Simple I/O in C++*

Write a short C++ program which prompts the user for the current year, the user's current age, and another year. The program should calculate the age that the user was or will be in the second year entered.

Ex. 2 — *Basic C++ programming*

Write a short C++ program which displays a menu for the user to choose between converting US dollars into Chinese RMB and Chinese RMB into US dollars. The user inputs the amount and the precision, then the program display the corresponding result.

Hint: use 1.00 USD = 6.20350 CNY as the exchange rate

Specifications.

- First prompt the user to choose the option, and then gets the input (amount and precision)
- Precision means "how many digit are expected in the final result", e.g. 123.456 has precision 6

Ex. 3 — *File I/O in C++*

Rewrite exercise 4 from homework 6 using C++ file I/O style.

Specifications.

- The binary, input, and output files are expected to be in the same directory
- Do not use absolute paths
- Do not prompt the user
- Output the resulting matrices in the order "addition, multiplication, transpose"

Partial sample output (ex. 4)

```
$ ./h7 -ex3
1 2 3
2 3 4
5 6 7

9 8 7
4 3 2
5 7 2
```

Ex. 4 — *Basic programming*

Let the sequence $(u_n)_{n\geq 0}$ of integers be defined by

$$\begin{cases} u_0 = a \\ u_{i+1} = \begin{cases} \frac{1}{2}u_i, & \text{if } u_i \text{ is even} \\ 3u_i + 1, & \text{if } u_i \text{ is odd} \end{cases} \end{cases}$$

1. Write a function which prompts the user for a and determines N such that $u_N = 1$.
2. Write a function which prompts the user for a value M, and returns A, the value of $2 \leq a \leq M$, such that N is maximized.

Input specifications

- Prompt the user for a function to run
- Get the parameters from the user

Ex. 5 — *IDEA survey*

Complete the IDEA survey and get a +5 bonus on the assignments.