SORBONNE UNIVERSITÉ

Automne 2024

C++

Strings and streams

Training

Exercise 1 Reading

Consider the variable `name` *of type* `string`*. The command* `cin >> name` *reads a* `string` *from the standard input and store it in* `name`*. When reading reading a string, blank characters at the beginning of strings are eliminated (spaces, tabs, end of file, etc.). The string is read up to the next blank or the end of file.*

Predict the behavior of the following program when two names are entered (e.g. "Rolling Stones"), then try it out.

```
#include <iostream>
#include <string>

int main()
{
        std::cout << "Comment vous appellez vous ? ";
        std::string name;
        std::cin >> name;

        std::cout << "Salut " << name << std::endl
                                              << "Et quel est le votre ? ";
        std::cin >> name;
        std::cout << "Enchante " << name << std::endl;

        return 0;
}
```

Exercise 2 Goodbye printf and scanf

Write the following program (correct in both C and C++), using only C++ input/output.

```
#include <stdio.h>
int main()
{
        int n; float y;
        printf("Type an integer and float \n");
        scanf("%d %e", &n, &y);
        printf("the product of %d with %e\n is : %e", n,y,n*y);
        return 0;
}
```

Exercise 3 Compute the average

Write a program to calculate a student's EU average. The program will ask for the student's name and then the student's mid-term grade, final exam grade and set of homework grades. It will then display the result, with the mid-term grade counts for 20%, the exam for 40% and the homework average for 40% of the final grade.

1. Write the program without taking homework into account (assuming 40% mid-term, 60% exam).
2. Modify the precision of the result with 4 figures using `setprecision` function of `iomanip` library
3. Add entry and calculation of homework averages. The number of homework is not known a priori (and we don't need to ask for it).

   Remark: `C-d` *represents the end of the stream.*

Exercise 4 Read/write in a file

The `fstream` *library give the possibility to open (*`open(nom, mode d'ouverture)`*) or close (*`close()`*) a file and to use it as a stream. One can choose the opening mode:*

- *read :* `fstream::in`
- *write :* `fstream::out`

1. Write a program to count the number of words in the file `travail.txt`. Check the result with the UNIX command `wc`.
2. Write a program that reads the file `prenom.txt` and copies the names containing the letter "a" into the file `lasnames_A.txt`.

Exercise 5 Cowsay

Write a program that takes as parameters a phrase in quotation marks and a file name. a file name, and displays the phrase as shown in figure 5.

- The sentence is placed in a frame of a maximum length of 20 characters, without cutting the words.
- The file contains an ascii-art drawing.

```
 _____________________
| Here appears the    |
|   sentence put in   |
|       parameter     |
 ---------------------
        \
         \
                          ,
                         /|       __
                        / |    ,-~ /
                       Y :|   //  /
                       | jj /( .^
                       >-"~"-v"
                      /        Y
                     jo  o     |
                    ( ~T~      j
                     >._-' _./
                    /    "~"  |
                   Y      _,  |
                  /| ;-"~ _  l
                 / l/ ,-"~    \
                 \//\/       .- \
                  Y         /    Y
                  l        I     !
                  ]\       _\    /"\
                 (" ~----( ~    Y.  )
```

Figure 1: Results the program with the file `lapin.txt`