UFPE – CENTRO DE INFORMÁTICA
ESTRUTURAS DE DADOS ORIENTADAS A OBJETOS
ATIVIDADE PRÁTICA

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Exercícios selecionados de: KIRCH-PRINZ, U., PRINZ, P.
A Complete Guide to Programming in C++.
1a Edição. Editora Jones & Bartlett Learning, 2001.

Exercise 1

Install the C/C++ extension provided by Microsoft to VS Code: `ms-vscode.cpptools`.

https://marketplace.visualstudio.com/items?itemName=ms-vscode.cpptools

We recommend using Ubuntu as an Operating System. In such a system, there is no need to install a C/C++ compiler, nor set up the associated environment. This has already been done by default. Test your environment by compiling and running

```
$ g++ hello.cpp -o hello
$ ./hello
```

the following C++ program.

```
#include <iostream>
using namespace std;

int main() {
    cout << "Hello world!" << endl;
    return 0;
}
```

Exercise 2

Write a C++ program that outputs the following text on screen:

```
Oh what
a happy day!
Oh yes,
what a happy day!
```

Use the manipulator endl where appropriate.

Exercise 3

The following program contains several errors:

```
*/ Now you should not forget your glasses //
#include <stream>
int main {
  cout << "If this text",
  cout >> " appears on your display, ";
  cout << " endl;"
  cout << 'you can pat yourself on '
       << " the back!" << endl.
  return 0;
)
```

Resolve the errors and run the program to test your changes.

Exercise 4

The following program contains several errors! Correct the errors and ensure that the program can be executed.

```
// A program containing errors!
# include <iostream>, <string>
# include <stdlib>
# void srand( seed);

int main() {
  string message "\nLearn from your mistakes!";
  cout << message << endl;
  int len = length( message);
  cout << "Length of the string: " << len << endl;
  // And a random number in addition:
  int a, b;
  a = srand(12.5);
  b = rand( a );
  cout << "\nRandom number: " << b << endl;
 return 0;
}
```

Exercise 5

Create a C++ program that defines a string containing the following character sequence:

```
I have learned something new again!
```

and displays the length of the string on screen. Read two lines of text from the keyboard. Concatenate the strings using " * " to separate the two parts of the string. Output the new string on screen.

Exercise 6

Install the Competitive Programming Helper (CPH) extension. There is no need to install additional extensions since we are going to use VJudge.

https://marketplace.visualstudio.com/items?itemName=DivyanshuAgrawal.competitive-programming-helper

Read the following instructions.
https://github.com/agrawal-d/cph/blob/main/docs/user-guide.md#ui-explained
https://github.com/agrawal-d/cph/blob/main/docs/user-guide.md#using-with-your-own-problems

Write a program that computes the (`int`) average of `n` numbers. See the sample input/output. Use the CPH extension to test your program. Create additional input/output samples.

Sample Input

```
4
1
2     3
   10
```

Sample Output

```
Average = 4
```

Note: An alternative to this extension is redirecting the standard input and output streams.

```
$ ./average < input_file.in > output_file.out
$ diff output_file.out expected_output_file.out
```

Exercise 7

Learn how to use the C++ debugger facilities provided by VS Code.

https://code.visualstudio.com/docs/editor/debugging

Debug the following C++ program. Note that one cannot inspect directly the contents of `array2`. Use the `WATCH` feature to inspect the contents of `array2[0]`, for instance.

```
#include <iostream>
using namespace std;

int main() {

    cout << "Hello world!" << endl;

    int n = 10;
    n += n;

    cout << "Value of n: " << n << endl;

    int array[10];
    for (int i=0; i<10; i++) {
        array[i] = 10+i;
    }

    int *array2 = new int[10];
    for (int i=0; i<10; i++) {
        array2[i] = 10+i;
    }

    return 0;
}
```