

C Piscine
Day 04

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Summary: This document is the subject for Day04 of the C Piscine @ 42.

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#### Chapter I

#### Instructions

- Only this page will serve as reference: do not trust rumors.
- Watch out! This document could potentially change up to an hour before submission.
- Make sure you have the appropriate permissions on your files and directories.
- You have to follow the submission procedures for all your exercises.
- Your exercises will be checked and graded by your fellow classmates.
- On top of that, your exercises will be checked and graded by a program called Moulinette.
- Moulinette is very meticulous and strict in its evaluation of your work. It is entirely automated and there is no way to negotiate with it. So if you want to avoid bad surprises, be as thorough as possible.
- Moulinette is not very open-minded. It won't try and understand your code if it doesn't respect the Norm. Moulinette relies on a program called Norminator to check if your files respect the norm. TL;DR: it would be idiotic to submit a piece of work that doesn't pass Norminator's check.
- These exercises are carefully laid out by order of difficulty from easiest to hardest. We will not take into account a successfully completed harder exercise if an easier one is not perfectly functional.
- Using a forbidden function is considered cheating. Cheaters get -42, and this grade is non-negotiable.
- If ft\_putchar() is an authorized function, we will compile your code with our ft\_putchar.c.
- You'll only have to submit a main() function if we ask for a program.

- Moulinette compiles with these flags: -Wall -Wextra -Werror, and uses gcc.
- If your program doesn't compile, you'll get 0.
- ullet You <u>cannot</u> leave <u>any</u> additional file in your directory than those specified in the subject.
- Got a question? Ask your peer on your right. Otherwise, try your peer on your left.
- Your reference guide is called Google / man / the Internet / ....
- Check out the "C Piscine" part of the forum on the intranet.
- Examine the examples thoroughly. They could very well call for details that are not explicitly mentioned in the subject...
- By Odin, by Thor! Use your brain!!!



Norminator must be launched with the  $\mbox{-R CheckForbiddenSourceHeader}$  flag. Moulinette will use it too.

#### Chapter II

#### Foreword

Here are some lyrics extract from the Harry Potter saga:

Oh you may not think me pretty, But don't judge on what you see, I'll eat myself if you can find A smarter hat than me.

Your top hats sleek and tall, For I'm the Hogwarts Sorting Hat And I can cap them all.

The Sorting Hat, stored in the Headmaster's Office. There's nothing hidden in your head The Sorting Hat can't see, So try me on and I will tell you Where you ought to be.

You might belong in Gryffindor, Where dwell the brave at heart, Their daring, nerve, and chivalry Set Gryffindors apart;

You might belong in Hufflepuff, Where they are just and loyal, Those patient Hufflepuffs are true And unafraid of toil;

Or yet in wise old Ravenclaw, If you've a ready mind, Where those of wit and learning, Will always find their kind;

Or perhaps in Slytherin You'll make your real friends, Those cunning folks use any means C Piscine

Day 04

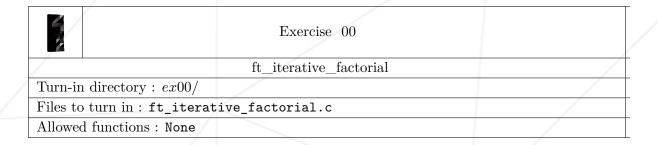
To achieve their ends.

So put me on! Don't be afraid! And don't get in a flap! You're in safe hands (though I have none) For I'm a Thinking Cap!

Unfortunately, this subject's got nothing to do with the Harry Potter saga, which is too bad, because your exercises won't be done by magic.

## Chapter III

Exercise 00: ft\_iterative\_factorial

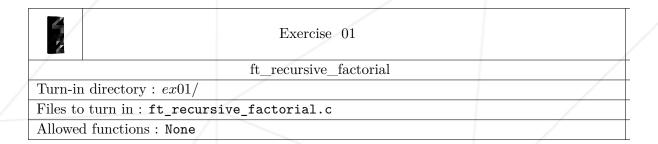


- Create an iterated function that returns a number. This number is the result of a factorial operation based on the number given as a parameter.
- If there's an error, the function should return 0.
- Here's how it should be prototyped:

int ft\_iterative\_factorial(int nb);

#### Chapter IV

## Exercise 01: ft\_recursive\_factorial

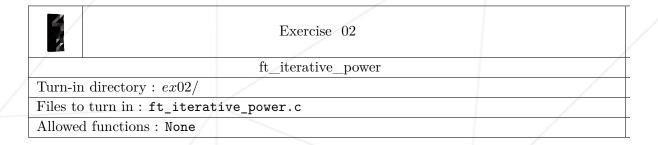


- Create a recursive function that returns the factorial of the number given as a parameter.
- If there's an error, the function should return 0.
- Here's how it should be prototyped :

int ft\_recursive\_factorial(int nb);

#### Chapter V

# Exercise 02: ft\_iterative\_power

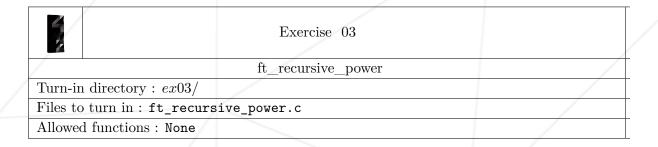


- Create an iterated function that returns the value of a power applied to a number. An power lower than 0 returns 0. Overflows don't have to be handled.
- Here's how it should be prototyped :

int ft\_iterative\_power(int nb, int power);

### Chapter VI

Exercise 03: ft\_recursive\_power



- Create a recursive function that returns the value of a power applied to a number.
- Same conditions as before.
- Here's how it should be prototyped:

int ft\_recursive\_power(int nb, int power);

#### Chapter VII

## Exercise 04: ft\_fibonacci

	Exercise 04	
	ft_fibonacci	
Turn-in directory : $ex04/$		
Files to turn in: ft_fibe		
Allowed functions: None		

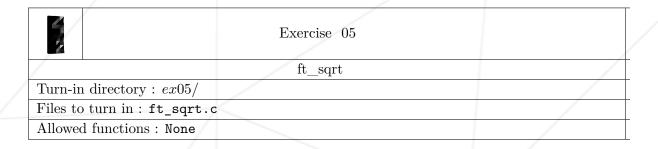
- Create a function ft\_fibonacci that returns the n-th element of the Fibonacci sequence, the first element being at the 0 index. We'll consider that the Fibonacci sequence starts like this: 0, 1, 1, 2.
- Here's how it should be prototyped :

```
int ft_fibonacci(int index);
```

- Obviously, ft\_fibonacci has to be recursive.
- If the index is less than 0, the function should return -1.

# Chapter VIII

Exercise 05: ft\_sqrt

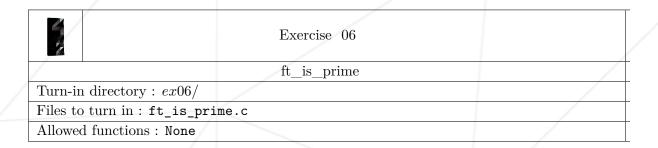


- Create a function that returns the square root of a number (if it exists), or 0 if the square root is an irrational number.
- Here's how it should be prototyped :

```
int ft_sqrt(int nb);
```

### Chapter IX

Exercise 06: ft\_is\_prime



- Create a function that returns 1 if the number given as a parameter is a prime number, and 0 if it isn't.
- Here's how it should be prototyped:

int ft\_is\_prime(int nb);

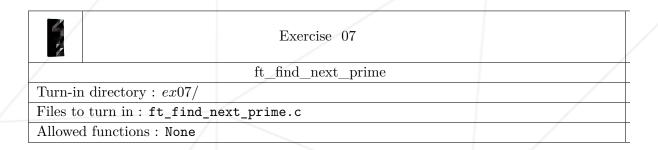
• Your function must return its result in less than two seconds.



0 and 1 are not prime numbers.

### Chapter X

# Exercise 07: ft\_find\_next\_prime



- Create a function that returns the next prime number greater or equal to the number given as argument.
- Here's how it should be prototyped :

int ft\_find\_next\_prime(int nb);

#### Chapter XI

## Exercise 08: The Eight Queens

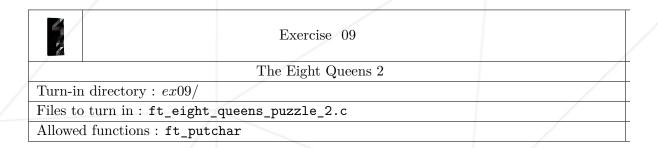
	Exercise 08	
/	The Eight Queens 1	
Turn-in directory: ex08/		
Files to turn in : ft_eigh	/	
Allowed functions: None		

- The aim of this game is to place eight queens on a chessboard, without them being able to meet in one shot.
- Refresh your memories on chess rules.
- Evidently, recurstivity is required to solve this problem.
- Create a function that returns the number of possibilities to place those eight queens on the chessboard without them being able to reach each other.
- $\bullet$  Here's how it should be prototyped :

int ft\_eight\_queens\_puzzle(void);

#### Chapter XII

#### Exercise 09: The Eight Queens 2



- Create a function that displays all possible placements of the eight queens on the chessboard, without them being able to reach each other.
- Recursivity is required to solve this problem.
- Here's how it should be prototyped:

```
void ft_eight_queens_puzzle_2(void);
```

• Here's how it'll be displayed:

```
$>./a.out
15863724
16837425
17468253
```

- The sequence goes from left to right. The first digit represents the first Queen's position in the first column (the index starting from 1). The Nth digit represents the Nth Queen's position in the Nth column.
- There's a line break after the last solution.
- Your function must return its result in less than two seconds.