



# C Piscine

## Day 04

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*Abstract: 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.
- You cannot leave any 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 `-R CheckForbiddenSourceHeader` flag. Moulinette will use it too.

# Chapter II

## Foreword

Here are some quotes by Archer :

"For I am a sinner in the hands of an angry God. Bloody Mary, full of vodka, blessed are you among cocktails. Pray for me now and at the hour of my death, which I hope is soon. Amen." - Archer

"I need access to a two inch drain, hot water, three GFCI outlets-this bathroom should do nicely-and a pot of coffee just like I like my women: Black, bitter, preferably fair trade. Oh, and your sauce needs less salt." - Krieger

"I swear to god, you could drown a toddler in my panties right now! I mean, not that you would." - Pam

"And he's like... - You're a moped. - How'd you know ? And what does that mean anyway ? - Mopeds are fun, but you don't want your buddies to see you riding one. - Oh. I thought he meant I was fuel-efficient !" - Pam & Cheryl

"For god's sake, Pam! Have you no sense of decency? That bathroom's like a... a war crime." - Cyril

"I have to go. But if I find one single dog hair when I get back, I'll rub... sand... in your dead little eyes. I also need you to go buy sand. I don't know if they grade it, but... ...coarse." - Archer


"I love that I have an erection... that didn't involve homeless people." - Krieger

"No no no no, like a big sweaty fireman carries you out of a burning building, lays you on the sidewalk and you think "yeah, ok, he's going to give me mouth to mouth", but instead, he just starts choking the SHIT out of you, and the last sensation you feel before you die, is that he's squeezing your throat so hard that a big, wet, blob of drool drips off his teeth and just, 'blurp', falls right onto your popped-out eyeball." - Cheryl

Unfortunately, this subject's got nothing to do with the series **Archer**, which is too bad, 'cause Archer is (or should be) everybody's role model. No kidding.

# Chapter III

## Exercise 00 : ft\_iterative\_factorial

	Exercice : 00
ft_iterative_factorial	
Turn-in directory : <i>ex00/</i>	
Files to turn in : <b>ft_iterative_factorial.c</b>	
Allowed functions : <b>Nothing</b>	
Remarks : <b>n/a</b>	


- 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);
```

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

# Chapter IV

## Exercise 01 : ft\_recursive\_factorial


	Exercice : 01
ft_recursive_factorial	
Turn-in directory : <i>ex01/</i>	
Files to turn in : <b>ft_recursive_factorial.c</b>	
Allowed functions : <b>Nothing</b>	
Remarks : <b>n/a</b>	

- 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

	Exercice : 02
ft_iterative_power	
Turn-in directory : <i>ex02/</i>	
Files to turn in : <b>ft_iterative_power.c</b>	
Allowed functions : <b>Nothing</b>	
Remarks : <b>n/a</b>	

- 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);
```

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



# Chapter VI

## Exercise 03 : ft\_recursive\_power


	Exercice : 03
ft_recursive_power	
Turn-in directory : <i>ex03/</i>	
Files to turn in : <b>ft_recursive_power.c</b>	
Allowed functions : <b>Nothing</b>	
Remarks : <b>n/a</b>	

- 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

	Exercice : 04
	ft_fibonacci
Turn-in directory : <i>ex04/</i>	
Files to turn in : <b>ft_fibonacci.c</b>	
Allowed functions : <b>Nothing</b>	
Remarks : <b>n/a</b>	


- 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

	Exercice : 05
ft_sqrt	
Turn-in directory : <i>ex05/</i>	
Files to turn in : <b>ft_sqrt.c</b>	
Allowed functions : <b>Nothing</b>	
Remarks : <b>n/a</b>	


- 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);
```

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

# Chapter IX

## Exercise 06 : ft\_is\_prime

	Exercise : 06
ft_is_prime	
Turn-in directory : <i>ex06/</i>	
Files to turn in : <code>ft_is_prime.c</code>	
Allowed functions : Nothing	
Remarks : n/a	

- 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

	Exercice : 07
ft_find_next_prime	
Turn-in directory : <i>ex07/</i>	
Files to turn in : <code>ft_find_next_prime.c</code>	
Allowed functions : Nothing	
Remarks : n/a	


- 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);
```

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

# Chapter XI

## Exercise 08 : The Eight Queens

	Exercice : 08
The Eight Queens 1	
Turn-in directory : <i>ex08/</i>	
Files to turn in : <code>ft_eight_queens_puzzle.c</code>	
Allowed functions : <b>Nothing</b>	
Remarks : <b>n/a</b>	


- 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, recursion 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.
- Here's how it should be prototyped :

```
int ft_eight_queens_puzzle(void);
```

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

# Chapter XII

## Exercise 09 : The Eight Queens 2

	Exercice : 09
The Eight Queens 2	
Turn-in directory : <i>ex09/</i>	
Files to turn in : <code>ft_eight_queens_puzzle_2.c</code>	
Allowed functions : <code>ft_putchar</code>	
Remarks : n/a	

- 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.