

C Piscine C 05

Summary: This document is the subject of the C 05 module of the C Piscine at 42.

Version: 6.4

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Chapter I

Instructions

- Only this page serves as your reference, do not trust rumors.
- Watch out! This document may change before submission.
- Ensure you have the appropriate permissions on your files and directories.
- You must follow the **submission procedures** for all your exercises.
- Your exercises will be checked and graded by your fellow classmates.
- Additionally, your exercises will be evaluated by a program called **Moulinette**.
- Moulinette is meticulous and strict in its assessment. It is fully automated, and there is no way to negotiate with it. To avoid unpleasant surprises, be as thorough as possible.
- Moulinette is not open-minded. If your code does not adhere to the Norm, it won't attempt to understand it. Moulinette relies on a program called norminette to check if your files comply with the Norm. TL;DR: Submitting work that doesn't pass norminette's check makes no sense.
- These exercises are arranged in order of difficulty, from easiest to hardest. We will not consider a successfully completed harder exercise if an easier one is not fully functional.
- Using a forbidden function is considered cheating. Cheaters receive a grade of **-42**, which is non-negotiable.
- You only need to submit a main() function if we specifically ask for a program.
- Moulinette compiles with the following flags: -Wall -Wextra -Werror, using cc.
- If your program does not compile, you will receive a grade of **0**.
- You **cannot** leave **any** additional file in your directory beyond those specified in the assignment.
- Have a question? Ask the peer on your right. If not, try the peer on your left.

- \bullet Your reference guide is called **Google / man / the Internet / ...**
- Check the "C Piscine" section of the forum on the intranet or the Piscine on Slack.
- Carefully examine the examples. They may contain crucial details that are not explicitly stated in the assignment...
- By Odin, by Thor! Use your brain!!!



Norminette must be run with the -R CheckForbiddenSourceHeader flag. Moulinette will use it as well.

Chapter II

Foreword

Here is an excerpt from the lyrics of 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 C 05

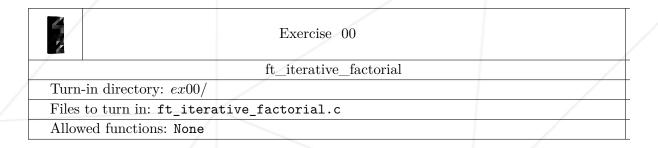
To achieve their ends.

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 has nothing to do with the *Harry Potter* saga, which is a shame, because your exercises won't be completed by magic!

Chapter III

Exercise 00: ft_iterative_factorial

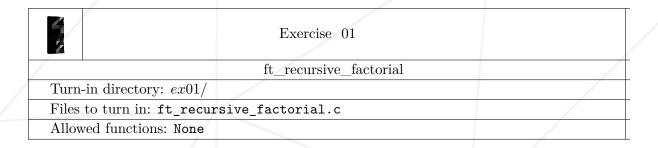


- Create an iterative function that returns a number. This number should be the result of a factorial operation based on the given parameter.
- If the argument is not valid, the function should return 0.
- Overflows do not need to be handled; the function's return value will be undefined in such cases.
- The function should be prototyped as follows:

int ft_iterative_factorial(int nb);

Chapter IV

Exercise 01: ft_recursive_factorial

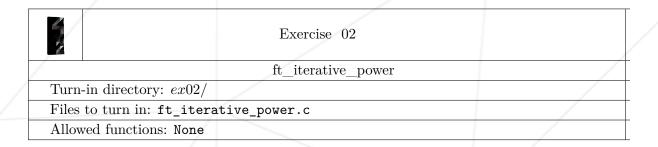


- Create a recursive function that returns the factorial of the given parameter.
- If the argument is not valid, the function should return 0.
- Overflows do not need to be handled; the function's return value will be undefined in such cases.
- The function should be prototyped as follows:

int ft_recursive_factorial(int nb);

Chapter V

Exercise 02: ft_iterative_power



- Create an iterative function that returns the result of raising a number to a given power.
- If the power is less than 0, the function should return 0.
- Overflows do not need to be handled.
- By definition, 0 raised to the power of 0 should return 1.
- The function should be prototyped as follows:

int ft_iterative_power(int nb, int power);

Chapter VI

Exercise 03: ft_recursive_power

	Exercise 03	
	ft_recursive_power	
Turn-in directory: $ex03/$		
Files to turn in: ft_recursive_power.c		
Allowed functions: None		

- Create a recursive function that returns the result of raising a number to a given power.
- If the power is less than 0, the function should return 0.
- Overflows do not need to be handled; the function's return value will be undefined in such cases.
- By definition, 0 raised to the power of 0 should return 1.
- The function should be prototyped as follows:

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_fibo		
Allowed functions: None		

- Create a function ft_fibonacci, that returns the n-th element of the Fibonacci sequence, with the first element at index 0.

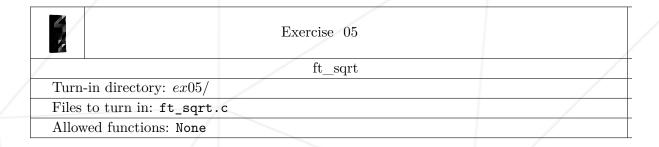
 The Fibonacci sequence will be considered to start as follows: 0, 1, 1, 2.
- Overflows do not need to be handled; the function's return value will be undefined in such cases.
- The function should be prototyped as follows:

int ft_fibonacci(int index);

- ft_fibonacci must be implemented recursively.
- If index is less than 0, the function should return -1.

Chapter VIII

Exercise 05: ft_sqrt

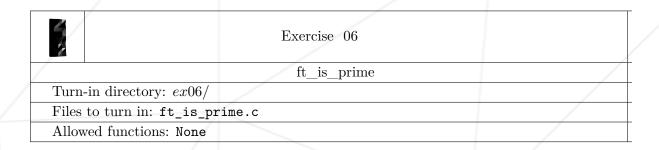


- Create a function that returns the square root of a given number (if it exists), or 0 if the square root is an irrational number.
- The function should be prototyped as follows:

int ft_sqrt(int nb);

Chapter IX

Exercise 06: ft_is_prime



- Create a function that returns 1 if the given number is a prime number and 0 if it is not.
- The function should be prototyped as follows:

int ft_is_prime(int nb);



0 and 1 are not prime numbers.

Chapter X

Exercise 07: ft_find_next_prime

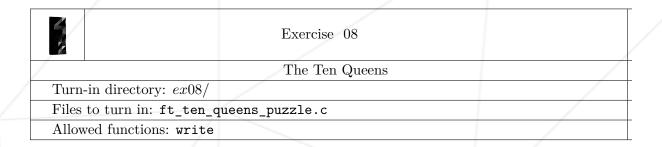
Exercise 07	
ft_find_next_prime	
Turn-in directory: $ex07/$	
Files to turn in: ft_find_next_prime.c	
Allowed functions: None	

- Create a function that returns the next prime number greater than or equal to the given number.
- The function should be prototyped as follows:

int ft_find_next_prime(int nb);

Chapter XI

Exercise 08: The Ten Queens



- Create a function that displays all possible placements of ten queens on a 10×10 chessboard, ensuring that no two queens can attack each other in a single move. The function should return the total number of valid solutions.
- Recursion is required to solve this problem.
- The function should be prototyped as follows:

```
int ft_ten_queens_puzzle(void);
```

• Output format:

```
$>./a.out | cat -e
0257948136$
0258693147$
...
4605713829$
4609582731$
...
9742051863$
$>
```

- The sequence is read from left to right, where:
 - The first digit represents the row position of the queen in the first column (index starting at 0).
 - The Nth digit represents the row position of the queen in the Nth column.
- The function should return the total number of valid solutions found.

Chapter XII

Submission and peer-evaluation

Submit your assignment to your Git repository as usual. Only the work inside your repository will be evaluated during the defense. Make sure to double-check the names of your files to ensure they are correct.



You must submit only the files required by the project specifications.