

C Piscine C 12

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Summary: This document is the subject for the module C 12 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 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 norminette to check if your files respect the norm. TL;DR: it would be idiotic to submit a piece of work that doesn't pass norminette'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.
- 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.

C Piscine

• 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 the right. Otherwise, try your peer on the left.
- Your reference guide is called Google / man / the Internet /
- Check out the "C Piscine" part of the forum on the intranet, or the slack Piscine.
- 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!!!
- For the following exercises, you have to use the following structure :

- You'll have to include this structure in a file ft_list.h and submit it for each exercise.
- From exercise 01 onward, we'll use our ft_create_elem, so make arrangements (it could be useful to have its prototype in a file ft_list.h...).

Chapter II Foreword

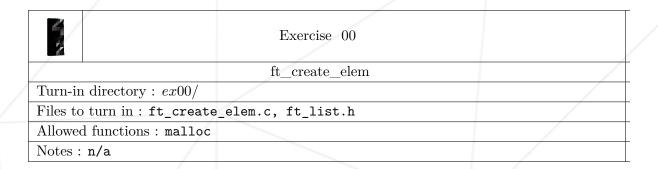
SPOILER ALERT
DON'T READ THE NEXT PAGE

You've been warned.

- In Star Wars, Dark Vador is Luke's Father.
- In The Usual Suspects, Verbal is Keyser Soze.
- In Fight Club, Tyler Durden and the narrator are the same person.
- In Sixth Sens, Bruce Willis is dead since the beginning.
- In The others, the inhabitants of the house are ghosts and vice-versa.
- In Bambi, Bambi's mother dies.
- In The Village, monsters are the villagers and the movie actually takes place in our time.
- In Harry Potter, Dumbledore dies.
- In Planet of apes, the movie takes place on earth.
- In Game of thrones, Robb Stark and Joffrey Baratheon die on their wedding day.
- In Twilight, Vampires shine under the sun.
- In Stargate SG-1, Season 1, Episode 18, O'Neill and Carter are in Antartica.
- In The Dark Knight Rises, Miranda Tate is Talia Al'Gul.
- In Super Mario Bros, The princess is in another castle.

Chapter III

Exercice 00: ft_create_elem



- ullet Create the function ${\tt ft_create_elem}$ which creates a new element of ${\tt t_list}$ type.
- It should assign data to the given argument and next to NULL.
- Here's how it should be prototyped:

Chapter IV

Exercice 01: ft_list_push_front

Exercise 01	
ft_list_push_front	
Turn-in directory : $ex01/$	
Files to turn in: ft_list_push_front.c, ft_list.h	/
Allowed functions: ft_create_elem	/
Notes: n/a	

- Create the function ft_list_push_front which adds a new element of type t_list to the beginning of the list.
- It should assign data to the given argument.
- If necessary, it'll update the pointer at the beginning of the list.
- Here's how it should be prototyped :

void ft_list_push_front(t_list **begin_list, void *data);

Chapter V

Exercice 02 : ft_list_size

	Exercise 02	
	${ m ft_list_size}$	
Turn-in directory : $ex02$	/	
Files to turn in: ft_lis	t_size.c, ft_list.h	
Allowed functions: None	/	
Notes : n/a		

- Create the function ft_list_size which returns the number of elements in the list
- Here's how it should be prototyped :

int ft_list_size(t_list *begin_list);

Chapter VI

Exercice 03: ft_list_last

	Exercise 03	
/	ft_list_last	
Turn-in directory : $ex03/$		
Files to turn in : ft_list_	last.c, ft_list.h	
Allowed functions: None		
Notes : n/a		

- Create the function ft_list_last which returns the last element of the list.
- Here's how it should be prototyped :

t_list *ft_list_last(t_list *begin_list);

Chapter VII

Exercice 04 : ft_list_push_back

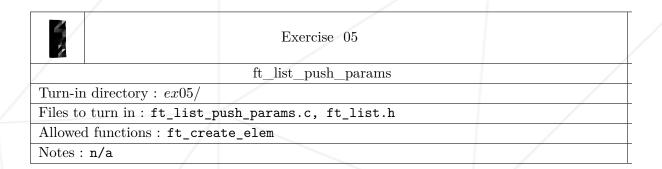
Exercise 04	
ft_list_push_back	
Turn-in directory : $ex04/$	
Files to turn in : ft_list_push_back.c, ft_list.h	
Allowed functions: ft_create_elem	
Notes: n/a	

- Create the function ft_list_push_back which adds a new element of t_list type at the end of the list.
- It should assign data to the given argument.
- If necessary, it'll update the pointer at the beginning of the list.
- Here's how it should be prototyped :

void ft_list_push_back(t_list **begin_list, void *data);

Chapter VIII

Exercice 05: ft_list_push_params



- Create the function ft_list_push_params which creates a new list that includes command-line arguments.
- The first argument should be at the end of the list.
- The first link's address in the list is returned.
- Here's how it should be prototyped:

t_list *ft_list_push_params(int ac, char **av);

Chapter IX

Exercice 06: ft_list_clear

	Exercise 06	
	ft_list_clear	
Turn-in directory : ext	06/	
Files to turn in : ft_1:	ist_clear.c, ft_list.h	
Allowed functions: from	ee	
Notes : n/a		

- \bullet Create the function $\verb|ft_list_clear| which clears all links from the list.$
- It'll then assign the list's pointer to null.
- Here's how it should be prototyped :

void ft_list_clear(t_list **begin_list);

Chapter X

Exercice 07: ft_list_at

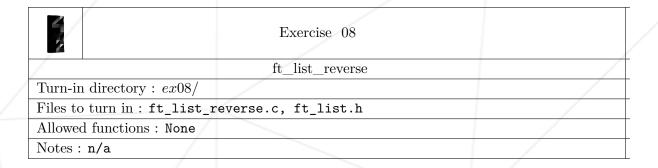
	Exercise 07	
/	ft_list_at	
Turn-in directory : ϵ	ex07/	
Files to turn in: ft	_list_at.c, ft_list.h	
Allowed functions:	None	
Notes : n/a		

- \bullet Create the function ${\tt ft_list_at}$ which returns the Nth element of the list.
- In case of error, it should return a null pointer.
- Here's how it should be prototyped :

t_list *ft_list_at(t_list *begin_list, unsigned int nbr);

Chapter XI

Exercice 08: ft_list_reverse

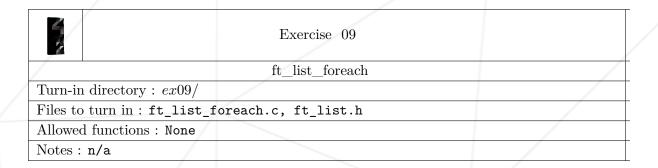


- Create the function ft_list_reverse which reverses the order of a list's elements. The value of each element must remain the same.
- Here's how it should be prototyped :

void ft_list_reverse(t_list **begin_list);

Chapter XII

Exercice 09: ft_list_foreach



- Create the function ft_list_foreach which applies the function given as argument to each of the list's elements.
- Here's how it should be prototyped :

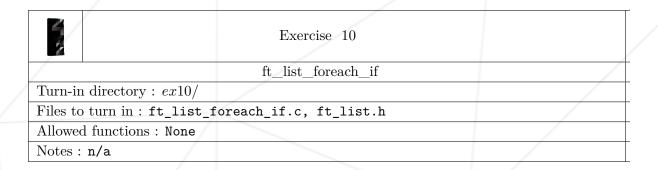
```
void ft_list_foreach(t_list *begin_list, void (*f)(void *));
```

• The function pointed by f will be used as follows :

(*f)(list_ptr->data);

Chapter XIII

Exercice 10: ft_list_foreach_if



- Create the function ft_list_foreach_if which applies the function given as argument to some of the list's elements.
- Only apply the function to the elements that are equal to the reference information, using the comparative function.
- Here's how it should be prototyped:

```
void ft_list_foreach_if(t_list *begin_list, void (*f)(void *), void
*data_ref, int (*cmp)(void *, void *))
```

• Functions pointed by f and by cmp will be used as follows:

```
(*f)(list_ptr->data);
(*cmp)(list_ptr->data, data_ref);
```



For example, the function cmp could be ft_strcmp...

Chapter XIV

Exercice 11: ft_list_find

	Exercise 11	
	ft_list_find	
Turn-in directory : $ex11/$		
Files to turn in : ft_list_find.c, f	ft_list.h	
Allowed functions : None		
Notes : n/a		

- Create the function ft_list_find which returns the address of the first element whose data is equal to the reference data.
- Here's how it should be prototyped :

```
t_list *ft_list_find(t_list *begin_list, void *data_ref, int (*cmp)());
```

Chapter XV

Exercice 12: ft_list_remove_if

	Exercise 12	
/	$ft_list_remove_if$	
Turn-in directory:	ex12/	
Files to turn in: ft	_list_remove_if.c, ft_list.h	
Allowed functions:	free	
Notes : n/a		

- Create the function ft_list_remove_if which erases off the list all elements whose data is equal to the reference data.
- Here's how it should be prototyped :

void ft_list_remove_if(t_list **begin_list, void *data_ref, int (*cmp)());

Chapter XVI

Exercice 13: ft_list_merge

	Exercise 13	
/	ft_list_merge	
Turn-in directory : $ex13/$		
Files to turn in : ft_list_m	erge.c, ft_list.h	
Allowed functions: None		
Notes : n/a		

- Create the function ft_list_merge which places elements of a list begin2 at the end of an other list begin1.
- Element creation is not authorised.
- Here's how it should be prototyped :

void ft_list_merge(t_list **begin_list1, t_list *begin_list2);

Chapter XVII

Exercice 14: ft_list_sort

	Exercise 14	
/	ft_list_sort	
Turn-in directory:	ex14/	
Files to turn in: ft	t_list_sort.c, ft_list.h	
Allowed functions:	None	
Notes : n/a		

- Create the function ft_list_sort which sorts the list's elements by ascending order by comparing two elements by comparing their data with a function.
- Here's how it should be prototyped :

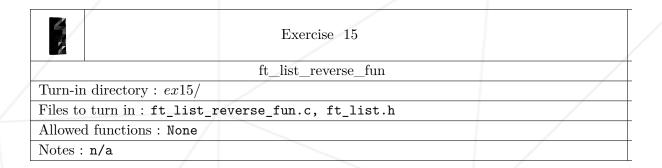
```
void ft_list_sort(t_list **begin_list, int (*cmp)());
```



cmp could be for instance ft_strcmp.

Chapter XVIII

Exercice 15: ft_list_reverse_fun

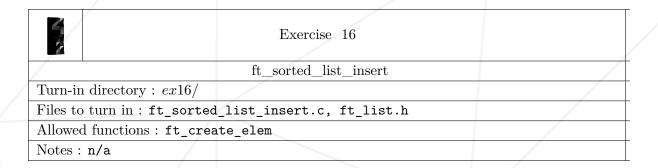


- Create the function ft_list_reverse_fun which reverses the order of the elements of the list.
- the value of each element must remain the same.
- Here's how it should be prototyped:

void ft_list_reverse_fun(t_list *begin_list);

Chapter XIX

Exercice 16: ft_sorted_list_insert



- Create the function ft_sorted_list_insert which creates a new element and inserts it into a list sorted so that it remains sorted in ascending order.
- Here's how it should be prototyped :

void ft_sorted_list_insert(t_list **begin_list, void *data, int (*cmp)());

Chapter XX

Exercice 17: ft_sorted_list_merge

Exercise 17	
ft_sorted_list_merge	
Turn-in directory : $ex17/$	
Files to turn in: ft_sorted_list_merge.c, ft_list.h	/
Allowed functions: None	
Notes: n/a	

- Create the function ft_sorted_list_merge which integrates the elements of a sorted list begin2 in another sorted list begin1, so that begin1 remains sorted by ascending order.
- Here's how it should be prototyped:

void ft_sorted_list_merge(t_list **begin_list1, t_list *begin_list2, int (*cmp)());