

C Piscine
Day 11

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Abstract: This document is the subject for Day11 of the C Piscine @ 42.

# Contents

T	Instructions	Z
II	Foreword	4
III	Exercice 00 : ft_create_elem	6
IV	Exercice 01 : ft_list_push_back	7
$\mathbf{V}$	Exercice $02:$ ft_list_push_front	8
VI	Exercice 03 : ft_list_size	9
VII	Exercice 04 : ft_list_last	10
VIII	Exercice 05 : ft_list_push_params	11
IX	Exercice 06 : ft_list_clear	12
X	Exercice 07 : ft_list_at	13
XI	Exercice 08 : ft_list_reverse	14
XII	Exercice 09 : ft_list_foreach	15
XIII	Exercice 10 : ft_list_foreach_if	16
XIV	Exercice 11 : ft_list_find	17
XV	Exercice 12 : ft_list_remove_if	18
XVI	Exercice 13 : ft_list_merge	19
XVII	Exercice 14 : ft_list_sort	20
XVIII	Exercice 15 : ft_list_reverse_fun	21
XIX	Exercice 16 : ft_sorted_list_insert	22
XX	Exercice 17: ft_sorted_list_merge	23

#### 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 every exercise.
- 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.

C Piscine Day 11

• Moulinette compiles with these flags: -Wall -Wextra -Werror, and uses gcc.

- If your program doesn't compile, you'll get 0.
- 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!!!
- 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

	Exercice: 00	
/	ft_create_elem	
Turn-in directory : $ex00/$		
Files to turn in : ft_crea	te_elem.c, ft_list.h	
Allowed functions: mallo	С	
Remarks : n/a		

- $\bullet$  Create the function  ${\tt ft\_create\_elem}$  which creates a new element of  ${\tt t\_list}$  type.
- $\bullet$  It should assign  $\mathtt{data}$  to the given argument and  $\mathtt{next}$  to NULL.
- Here's how it should be prototyped :

t\_list \*ft\_create\_elem(void \*data);

#### Chapter IV

# Exercice 01: ft\_list\_push\_back

Exerc	cice: 01
ft_list_	_pushback
Turn-in directory : $ex01/$	
Files to turn in : ft_list_push_back.c,	ft_list.h
Allowed functions : ft_create_elem	
Remarks: 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 V

# Exercice 02: ft\_list\_push\_front

	Exercice: 02	
	ft_list_push_front	
Turn-in directory : $ex02/$		
Files to turn in : ft_list_pus	h_front.c, ft_list.h	
Allowed functions : ft_create	_elem	
Remarks : 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 VI

Exercice 03: ft\_list\_size

	Exercice: 03	
/	ft_list_size	
Turn-in directory : e	ex03/	
Files to turn in: ft	_list_size.c, ft_list.h	
Allowed functions: 1	Nothing	
Remarks : 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 VII

Exercice 04: ft\_list\_last

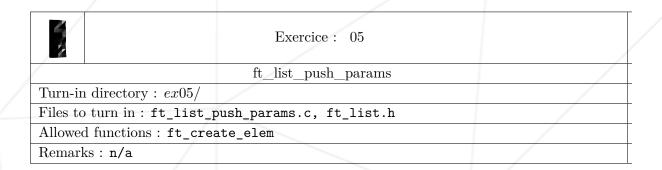
	Exercice: 04	
	ft_list_last	
Turn-in directory : ex	c04/	
Files to turn in : ft_	list_last.c, ft_list.h	
Allowed functions: N	othing	
Remarks : n/a		

- 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 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

Exercice: 06

ft\_list\_clear

Turn-in directory: ex06/

Files to turn in: ft\_list\_clear.c, ft\_list.h

Allowed functions: free

Remarks: n/a

- $\bullet$  Create the function  $\verb|ft_list_clear| which clears all links from the list.$
- $\bullet\,$  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

Exercice: 07

ft\_list\_at

Turn-in directory: ex07/

Files to turn in: ft\_list\_at.c, ft\_list.h

Allowed functions: Nothing

Remarks: 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

Exercice: 08

ft\_list\_reverse

Turn-in directory: ex08/

Files to turn in: ft\_list\_reverse.c, ft\_list.h

Allowed functions: Nothing

Remarks: n/a

- Create the function ft\_list\_reverse which reverses the order of a list's elements. You may only use pointers related stuff.
- Here's how it should be prototyped :

void ft\_list\_reverse(t\_list \*\*begin\_list);

#### Chapter XII

Exercice 09 : ft\_list\_foreach

Exercice: 09

ft\_list\_foreach

Turn-in directory: ex09/

Files to turn in: ft\_list\_foreach.c, ft\_list.h

Allowed functions: Nothing

Remarks: n/a

- Create the function ft\_list\_foreach which applies a function given as argument to the information within each of the list's links.
- Here's how it should be prototyped :

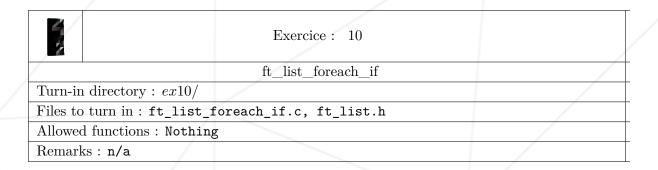
```
void ft_list_foreach(t_list *begin_list, void (*f)(void *));
```

• 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 a function given as argument to the information held in some links of the list. A reference information as well as a comparative function should allow us to select the right links of the list: those that are "equal" to the reference information.
- Here's how it should be prototyped :

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

• 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  ${\tt ft\_strcmp...}$ 

# Chapter XIV

Exercice 11: ft\_list\_find

E	xercice: 11	
	ft_list_find	
Turn-in directory : $ex11/$		
Files to turn in : ft_list_find.c, ft	:_list.h	
Allowed functions: Nothing		
Remarks : n/a		

- Create the function ft\_list\_find which returns the address of the first link, 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

Exercice: 12	
ft_list_remove_if	
Turn-in directory : $ex12/$	
Files to turn in: ft_list_remove_if.c, ft_list.h	
Allowed functions: free	
Remarks: 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

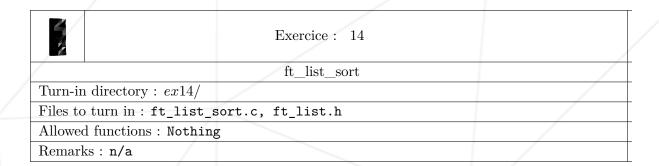
Exercice: 13	
ft_list_merge	
Turn-in directory : $ex13/$	
Files to turn in: ft_list_merge.c, ft_list.h	
Allowed functions: Nothing	
Remarks: n/a	

- 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



- Create the function ft\_list\_sort which sorts the list's contents by ascending order by comparing two links thanks to a function that can compare the data held in those two links.
- Here's how it should be prototyped :

void ft\_list\_sort(t\_list \*\*begin\_list, int (\*cmp)());



La fonction cmp pourrait être par exemple ft\_strcmp.

# Chapter XVIII

Exercice 15: ft\_list\_reverse\_fun

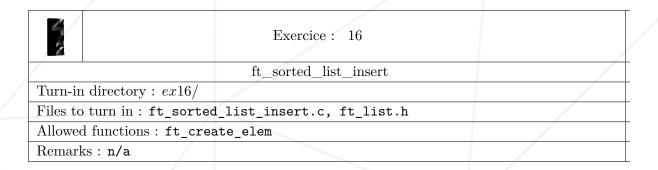
Exercice: 15	
ft_list_reverse_fun	
Turn-in directory : $ex15/$	
Files to turn in : ft_list_reverse_fun.c, ft_list.h	
Allowed functions: Nothing	
Remarks: n/a	

- Create the function ft\_list\_reverse\_fun which reverses the order of the elements of the list. You may only use pointers related stuff.
- 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 sortend 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

Exercice: 17	
ft_sorted_list_merge	
Turn-in directory: $ex17/$	
Files to turn in: ft_sorted_list_merge.c, ft_list.h	
Allowed functions: Nothing	
Remarks: 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)());