# INFO0054-1
# Programmation fonctionnelle

2022-2023
Feedback Test 1

# ADTs and Trees (4)

Given the ADT for binary trees below and the function fold in the companion object. Define a function **mul** that, given an object of Tree[Int], returns the product of all Ints in the tree.

**Your definition of mul must use the function fold.**

Observations :

- An important number of students did not use fold, but used pattern matching instead.

Most of you did (very) well, but those who did not manage failed “hard” (e.g., unable to even write the signature of the function).

**Class average: 2.92/4**

# Recursion on numbers (8)

Consider the following series

- `xo = 1.0`
- `x1 = 0.5 (1/2)`
- `x2 = 0.25 (1/4)`
- `x3 = 0.125 (1/8)`
- `x4 = 0.0625 (1/16)`
- `x5 = 0.03125 (1/32)`
- `...`

1) Define a “naive” recursive version f1 whose f1(n) = xn (n∈N) and the results are of the type Double.

2) Define an iterative version f2 with accumulator.

Observations :

- Some people returned lists of numbers. f1(n) = xn indicates that the returned object is not a list, but a number. I was somewhat lenient in correcting this.
  - The biggest issue when this happened were students not appropriately constructing the list (i.e., stacking issues).
- For f2, quite a few students defined a function that took as input an accumulator. I have accepted this given “f2 with accumulator” could be understood as such. The idea, however, is that f1 and f2 are to be equivalent.

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2) Define an iterative version f2 with accumulator.

Observations :

- Some struggled with the signature of the function (which counted for 1 point).

- Some struggled with the return type (e.g., returning objects of the type Int or returning objects of the type Int that were cast to Double.

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1) Define a “naive” recursive version f1 whose f1(n) = xn (n∈N) and the results are of the type Double.

2) Define an iterative version f2 with accumulator.

Observations :

- ***A handful of students used imperative style (for loops with side-effects).***


**Overall, most of you did well!**

**Class average just below 6.68/8**

# Recursion on lists (4)

Jimmy downloaded a list from his bank's website containing all the transactions performed on his account. In this list, transactions are represented by a Transaction ADT containing 2 elements: the account number and the amount of the transaction. When the amount is negative, money was transferred from Jimmy's account. When the amount is positive, Jimmy received the money.

**Do not use filter and map for this question.**

- Create a function **computebalances**. The function takes as input an amount representing the initial balance and a list of transactions. The function returns a list representing the balance after each transaction.
- Did you provide an iterative or a recursive solution? Describe the type of recursion. Explain your answer. You get no points if you do not provide an explanation.0

Observations :

- Some used filter and map…
- Recurring issues:
  - Embedded if-statements 🤮
  - Calculating the same expression twice!
  - **Many used append!**
  - **Forgetting to reverse the list!**

- Most students forgot to answer one little question: "Describe the type of recursion."

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**Do not use filter and map for this question.**

- Create a function **computebalances**. The function takes as input an amount representing the initial balance and a list of transactions. The function returns a list representing the balance after each transaction.
- Did you provide an iterative or a recursive solution? Describe the type of recursion. Explain your answer. You get no points if you do not provide an explanation.0

Observations :

- **Many of you did well.**
- **Class average 2/4**

# Exception Handling (4)

Définissez une fonction **max** qui, prenant une List[Int], renvoie un objet représentant le plus grand entier. Assurez-vous que votre fonction gère les listes vides en utilisant Either. Vous pouvez utiliser une chaîne pour représenter une exception.

Indice : `Int.MinValue` peut être utile.

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Définissez une fonction **max** qui, prenant une List[String], renvoie un objet représentant la plus grande chaîne. Assurez-vous que votre fonction gère les listes vides en utilisant Either. Vous pouvez utiliser une chaîne pour représenter une exception.

Indice : vous pouvez utiliser >=, >, <, et <= pour comparer deux chaînes.

Observations :

- Min, max, longest string → the group who had to find “max” struggled the most. Given that finding “min” was very, very similar, this is deemed accidental.
- Some of you compared lengths of strings instead of the strings themselves. I considered this “correct.”
- Many (but luckily still a minority) used Option instead of Either. That’s blindly copy/pasting a solution.

**Class average: 2.68/4**

# Bonus question: Higher Order Programming (2)

**Questions very similar to the mock-tests**

For this question, you must use all functions provided by Scala: filter, map, foldright, scan, flatmap, etc.

Given the ADT for Pokémon and List[Pokemon] below. Write in one line an expression that computes:

The average speed of all Pokémon with an hp lower than 50. You do not need to cast integers to doubles for the division. Make sure you do not traverse the list twice! You can assume that the list is not empty.

The expected result is:

val res1: Int = 51

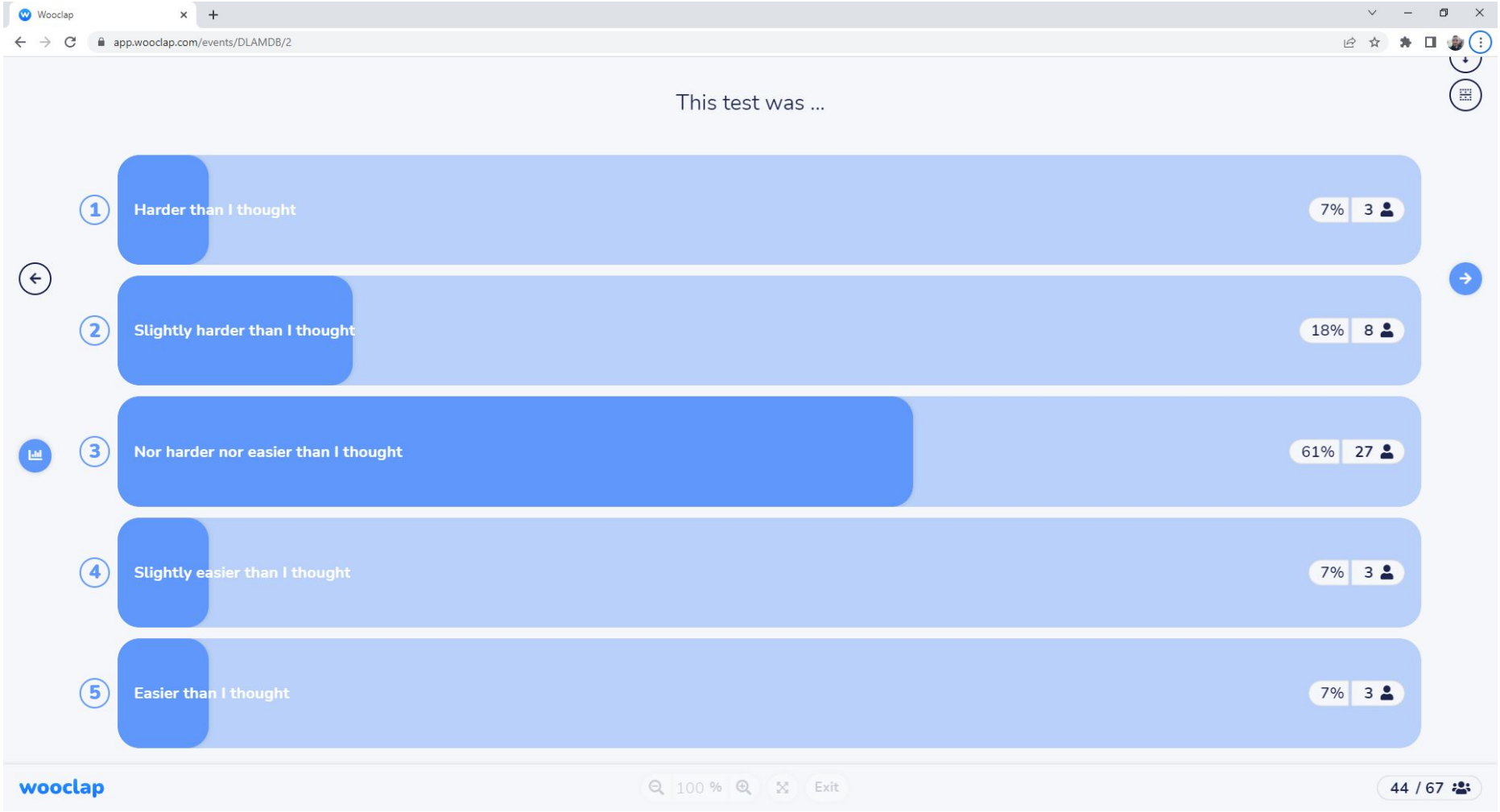
Observations :

- This “though” question was meant to challenge you without any penalty. Very few obtained ½ → 0/2 from the moment you traversed the list twice!
- Many students did not even attempt this question!

**Class average 0.21/2**

How many hours did you study for this test? Whole numbers only and round down if needed.


Wooclap
app.wooclap.com/events/DLAMDB/2
How did it go?
1 Bad
9% 4
2 Could have been better
16% 7
3 Okay
13% 6
4 Good
47% 21
5 Aced it
16% 7
wooclap
100 %
Exit
45 / 67


Wooclap
app.wooclap.com/events/DLAMDB/2
This test was ...
1
Harder than I thought
7%
3
2
Slightly harder than I thought
18%
8
3
Nor harder nor easier than I thought
61%
27
4
Slightly easier than I thought
7%
3
5
Easier than I thought
7%
3
wooclap
100 %
Exit
44 / 67

Wooclap

app.wooclap.com/events/DLAMDB/2

Describe in one word this experience.


wooclap

100 %

Exit

44 / 67

Wooclap

app.wooclap.com/events/DLAMDB/2

Describe in one word this experience.


wooclap

100 %

Exit

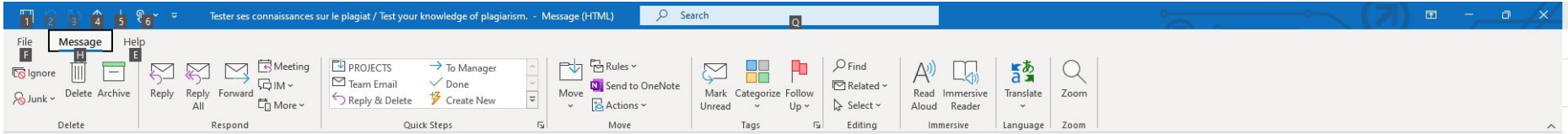
44 / 67

# But…

Source: https://www.pexels.com/nl-nl/foto/licht-zee-stad-landschap-4811660/

- Anomalies (fraud and plausible fraud were observed)
- Investigations are still ongoing

- Fraudsters ruin everything, **so modalities for the second test are changed**.




# Tester ses connaissances sur le plagiat / Test your knowledge of plagiarism.

Plagiat <plagiat@uliege.be>
To Undisclosed recipients:

Reply | Reply All | Forward

Wed 16/11/2022 10:57

Chère étudiante,

Cher étudiant,

Vous êtes inscrit.e.s cette année pour la première fois à l'Université de Liège. Au cours de vos études, vous aurez l'occasion de rédiger bon nombre de travaux. Ceux-ci devront répondre à des consignes précises ainsi qu'aux exigences d'un travail scientifique rigoureux. Il faudra éviter l'écueil du plagiat souvent involontaire. L'ULiège s'est résolument engagée à promouvoir le respect de la propriété intellectuelle. C'est pour cela que durant votre cursus vous recevrez des cours qui vous aideront à utiliser et référencer correctement les travaux d'autrui, mais d'autres aides vous sont aussi proposées, telles :

- un site d'informations: www.enseignement.uliege.be/etudiant/plagiat,
- une brochure de sensibilisation « Le plagiat ? Pas pour moi ! »,
- **un quiz pour tester vos connaissances sur le plagiat.**

Ce quiz, très court (QCM de 6 questions), vous sera proposé d'ici quelques jours lors de votre accès à myULiège. Vous garderez bien sûr la possibilité de consulter vos messages et aurez accès à toutes les autres modalités myULiège dès que le quiz aura été rempli et ce quel que soit le résultat obtenu. Vous aurez l'occasion de vous tester à chaque première connexion journalière, jusqu'à ce que le score de 4 bonnes réponses sur 6 soit atteint. Ce questionnaire, organisé maximum une fois par an, n'aura bien entendu aucun impact sur votre cursus.

Les liens mentionnés dans le quiz vous aideront à améliorer encore vos connaissances : n'hésitez pas à les consulter.

Cet outil vous permettra, nous l'espérons, de faire le point sur différents aspects du plagiat. Trop bref pour être considéré comme une « formation », il s'agit plutôt d'un outil pour éveiller votre vigilance. Vos remarques et suggestions éventuelles sont les bienvenues sur l'adresse plagiat@uliege.be.

Bon travail !

L'équipe Plagiat

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Dear Student,

During the course of your studies, you will have plenty of written work to do! This work must meet specific criteria as well as the requirements of thorough scientific research. In particular, it is important to avoid the often unintentional pitfall of plagiarism. Uliège is resolutely committed to promoting respect for intellectual property. With this in mind, during your course you will follow classes that will help you use and correctly reference other people's work. Other assistance is also available, such as:

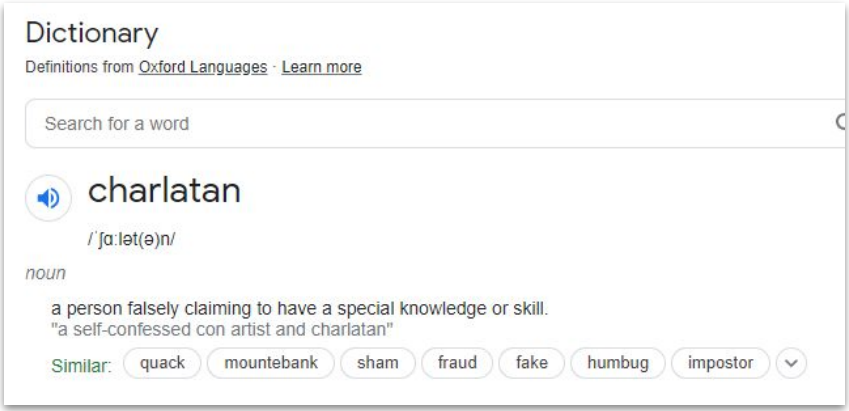
- an information site: www.enseignement.uliege.be/etudiant/plagiat,
- a guide "Plagiarism? Not for me!"
- **a quiz to test your knowledge of plagiarism.**

This very short quiz (six multiple choice questions) will be available in a few days when you access myULiège. Of course, you will still be able to check your messages and have access to all the other myULiège features as soon as you have completed the quiz, and regardless of the result. You will be given the chance to test yourself when you first log on every day, until four of the six questions have been answered correctly. This questionnaire, which will be organised only once a year, will of course have no impact on your course work.

The links given in the quiz will help you to further improve your knowledge: please do take a look at them.

We hope that this tool will help you to find out more about the different aspects of plagiarism. It is too short to be considered as a training course and is simply a tool to raise your awareness. We welcome your comments and suggestions. Please send them to plagiat@uliege.be.

# Cheating




- Cheaters and frauds not only devalorize the honest and hard work of others, but also their degrees.
- If you are capable of unethical methods while in university, what will you be capable of in research, industry, society, …?
- If you need to cheat to get by in university, do you really belong here? Did you earn your spot? Will you have earned your degree?