



Welcome to BIO-210

Applied software engineering for life sciences

December 15th 2025 – Lecture 14

Prof. Alexander MATHIS

EPFL

	Date	Topic	Software version	Software releases	Feedback
0	08/09/2025	Python introduction I			
1	15/09/2025	Python introduction II			
2	22/09/2025	Public holiday			
3	29/09/2025	Git & GitHub (+ installation)			
4	06/10/2025	Project introduction	v1		
5	13/10/2025	Functionify	v2	v1	
6	20/10/2025	EPFL fall break			
7	27/10/2025	Visualization & documentation	v3	v2	code review (API)
8	03/11/2025	Unit-tests, functional tests	v4	v3	
9	10/11/2025	Code refactoring	v5	v4	graded (tests)
10	17/11/2025	Profiling & code optimization	v6	v5	code review
11	24/11/2025	Object oriented programming	v7	v6	graded (speed)
12	01/12/2025	Model analysis & project report	v8	v7	code review (OO)
13	08/12/2025	Work on project (no class)			
14	15/12/2025	Wrap up		v8	graded (project)

Who won the competitions?

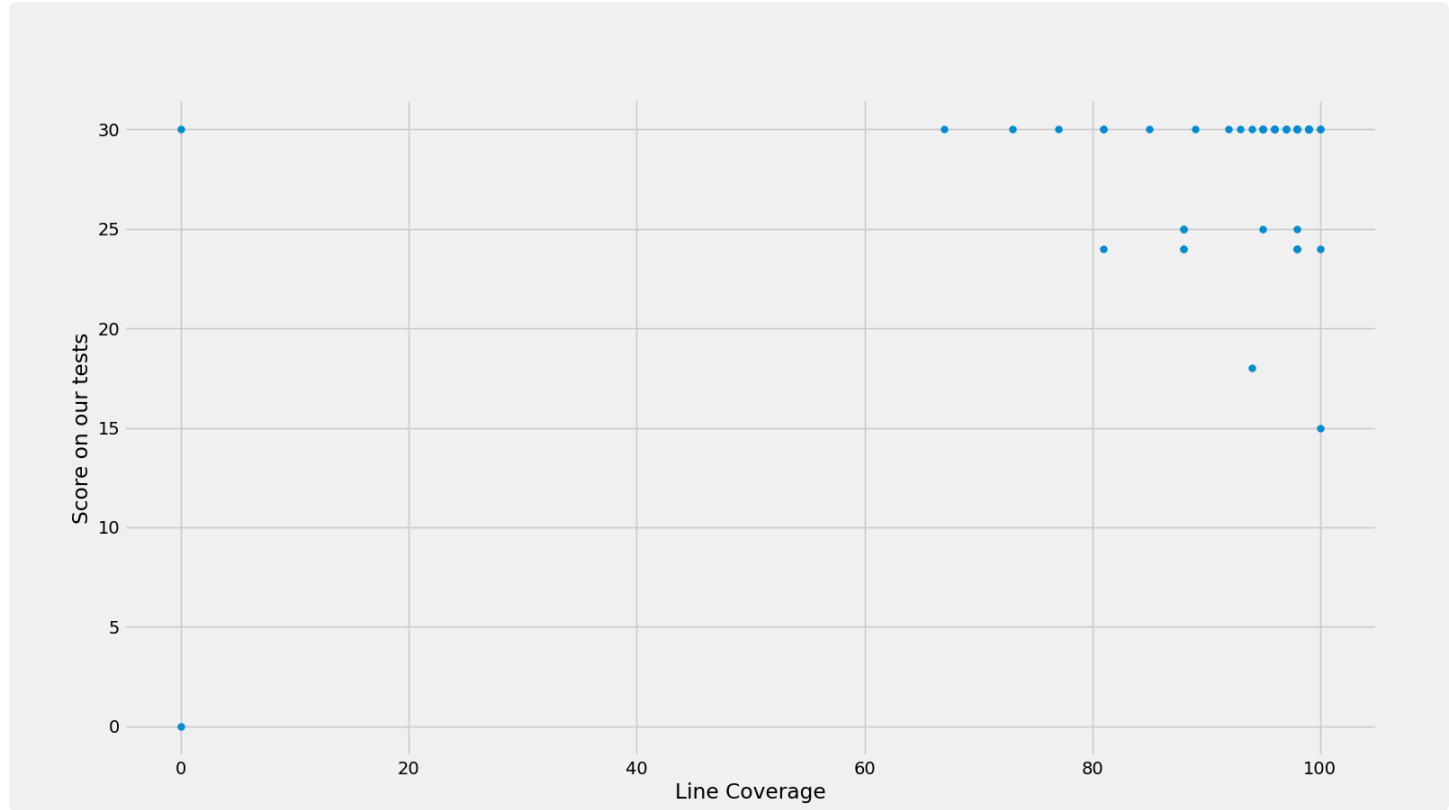
Testing: what did we look at?

- quantitative (automatic) grading: line coverage, passing prescribed tests, API correct,... (0-100)
- qualitative (manual) grading: points (0-100)
- overall score: 0-100 (mean)

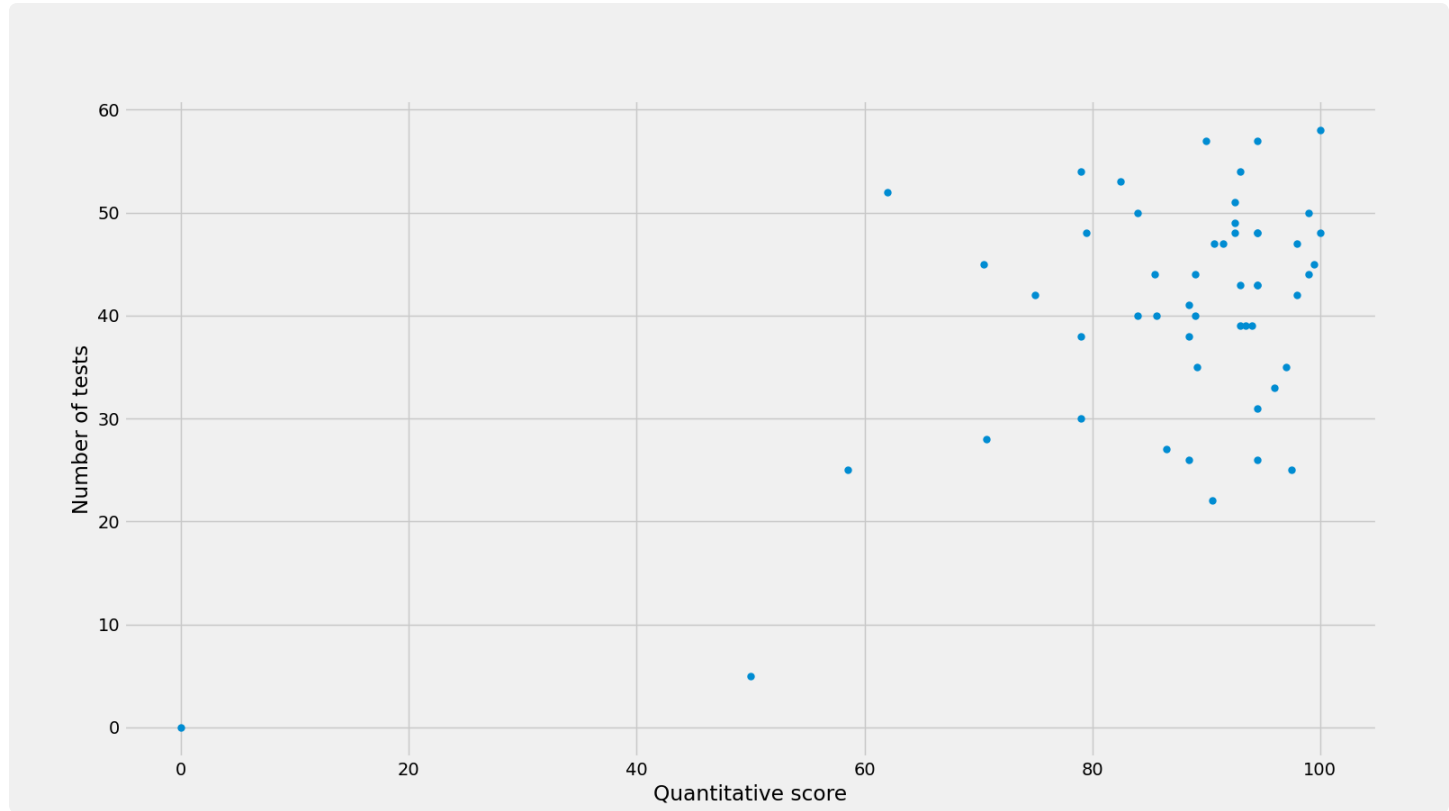
Qualitative score

- Hopfield or Turing project specific (minimum functionality that should be tested)
- Are the tests modular?
- Are the tests well commented/understandable?
- Were additional tests designed?

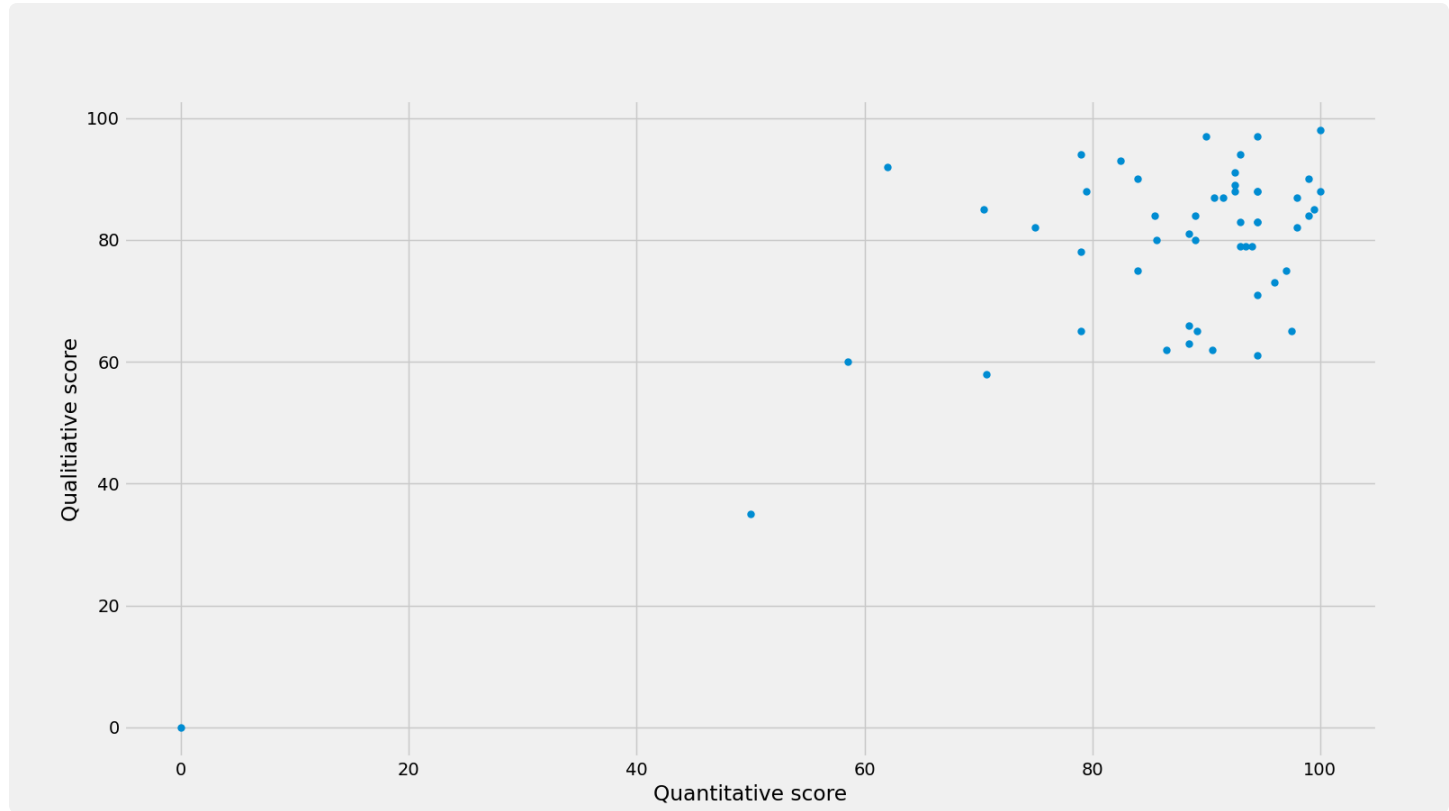
Line coverage vs. passing prescribed tests



Quantitative scores vs. number of tests



Quantitative scores vs. quality score



Who won?

Pick your favorite hoodie at the EPFL shop.



Test-suite winners: Hopfield

- Team 1: Bruno Siniciali, Samuele Sattar and Finn Wäffler. SA: Jean Ciardo

Their project overall looks great!

They implemented 24 tests, which are well motivated and commented 🎉🎉🎉 and reach 100% coverage.

Honorable mention: Gianmarco Placi, Eva Luna, Kinga Nagy (Team 42). SA: Leonardo Tredici

Lots of tests (206 individual ones) and (obviously) received high score!

Test-suite winners: Turing

- Team 23: Lina Sajid, Manon Agbalé and Eléonore Aynès SA: Tuline Dachraoui

They implemented lots of tests and reached the highest score! Fun fact, Tuline won the turing testing award last year!

Code profiling

Hopfield:

- initializing weight matrix (Hebbian and Storkey weights)
- dynamics and updating

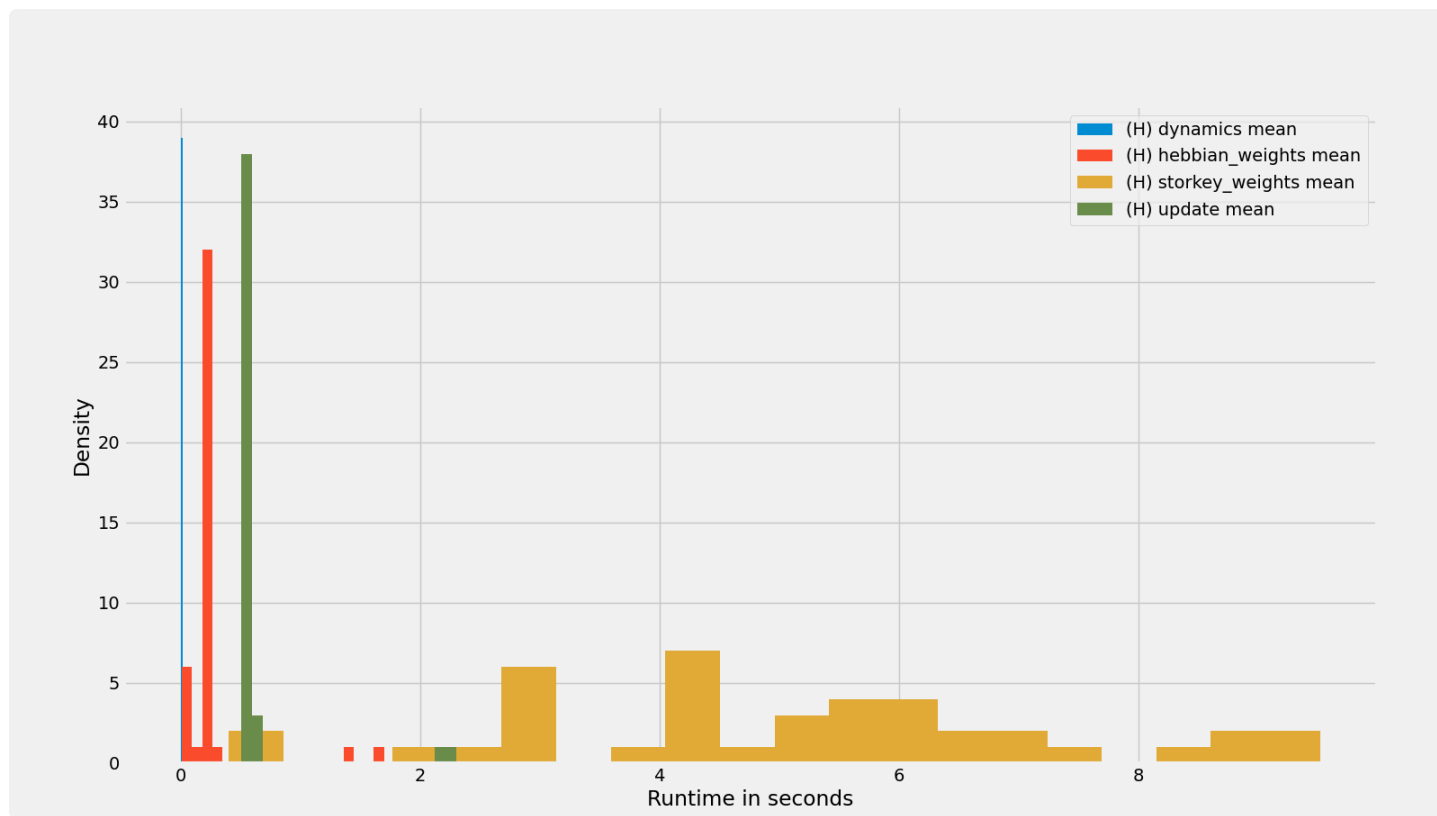
Turing:

- diffusion and updating of dynamics

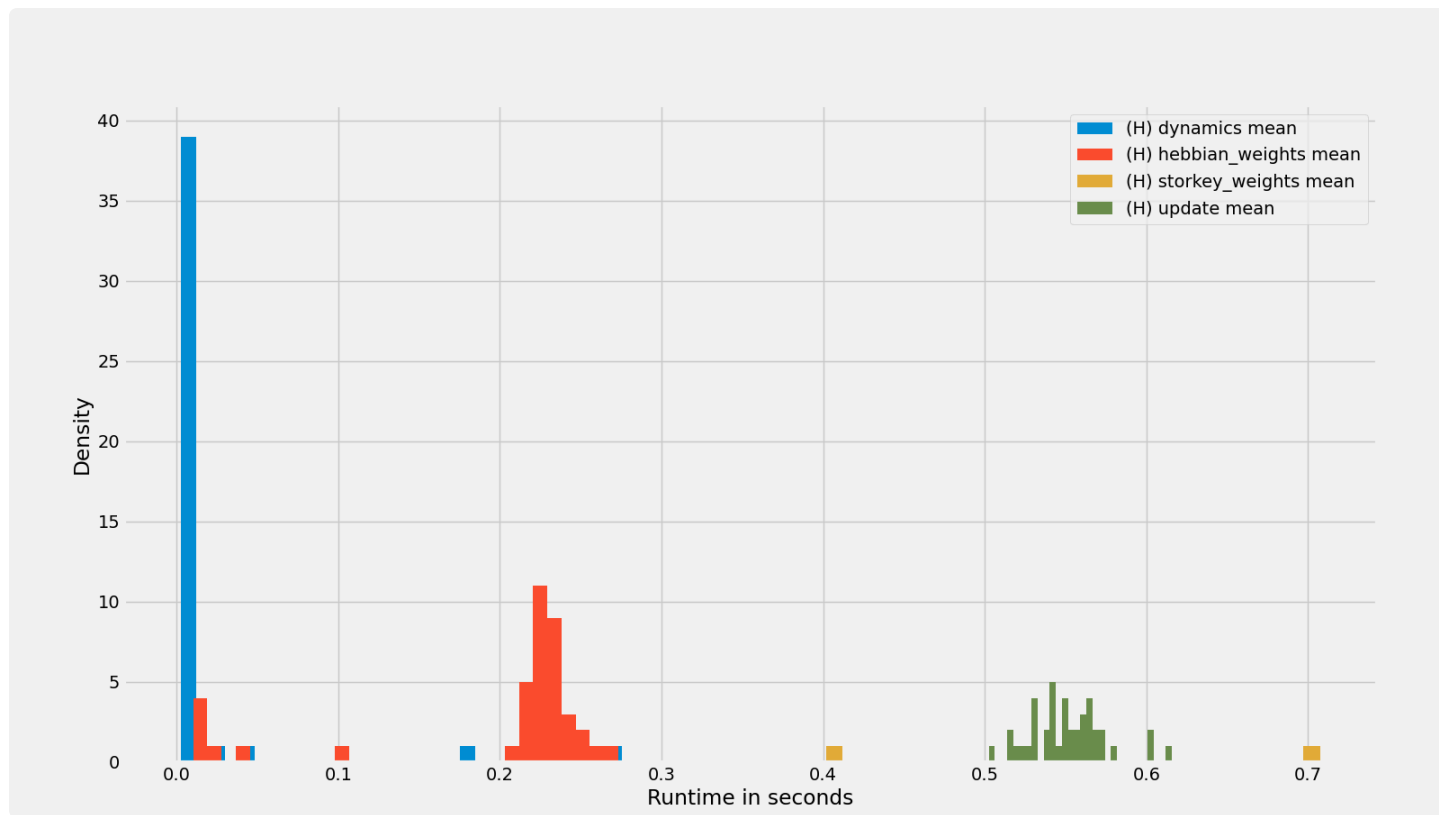
Methods:

- run times averaged over 10 runs
- each condition was ranked
- the team with the lowest overall rank won (for each project)

Histogram of runtimes for all teams (Hopfield)



Histogram of runtimes for all teams (Hopfield)



Who won?

Winners Hopfield network:

- Team 1: Bruno Siniciali, Samuele Sattar and Finn Wäffler. SA: Jean Ciardo

They won 3 times a first prize, and otherwise were also fast for updating. Really clever NumPy based solution for Storkey weight creation.

Benchmarking

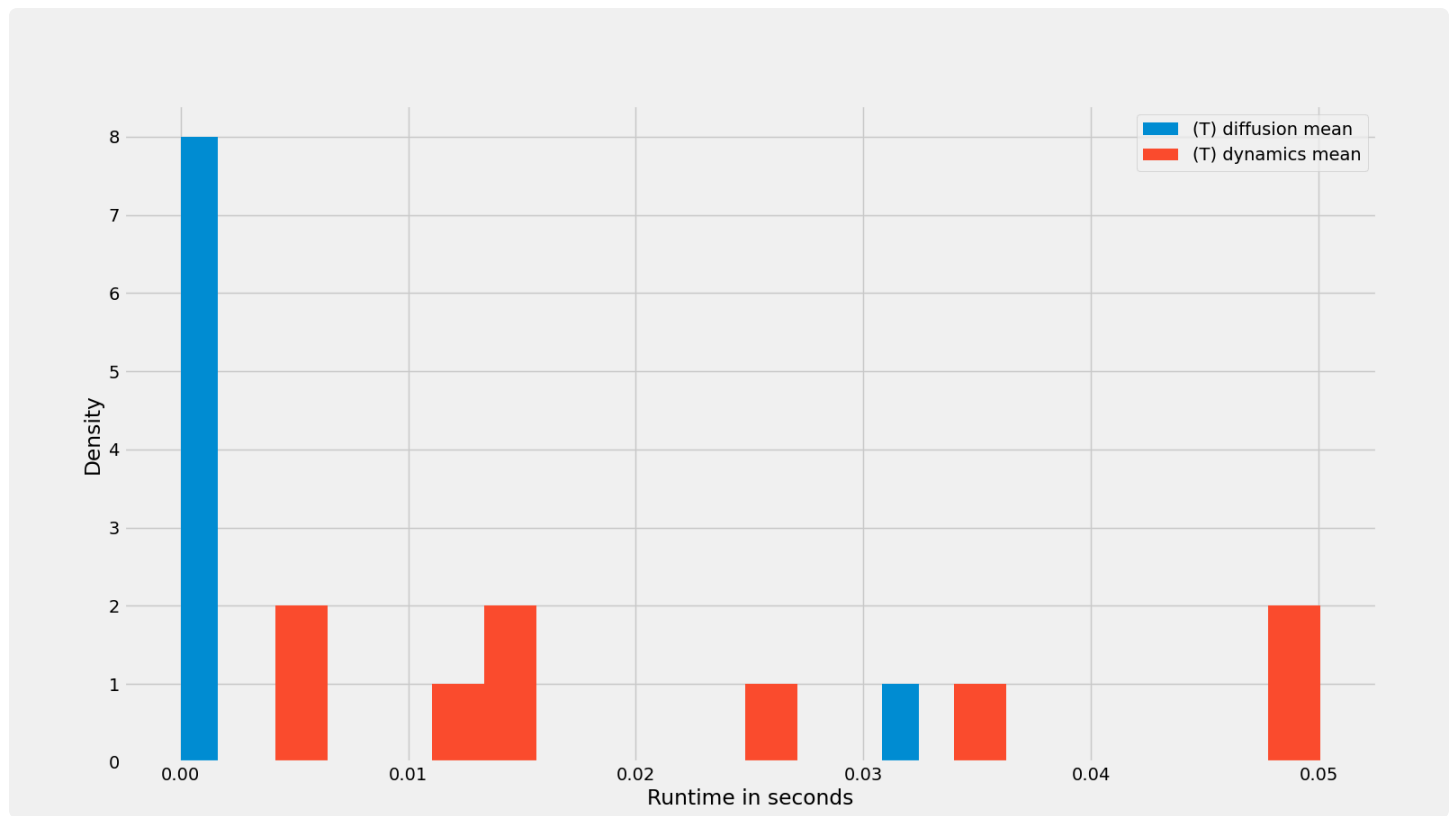
Turing:

- diffusion and updating of dynamics

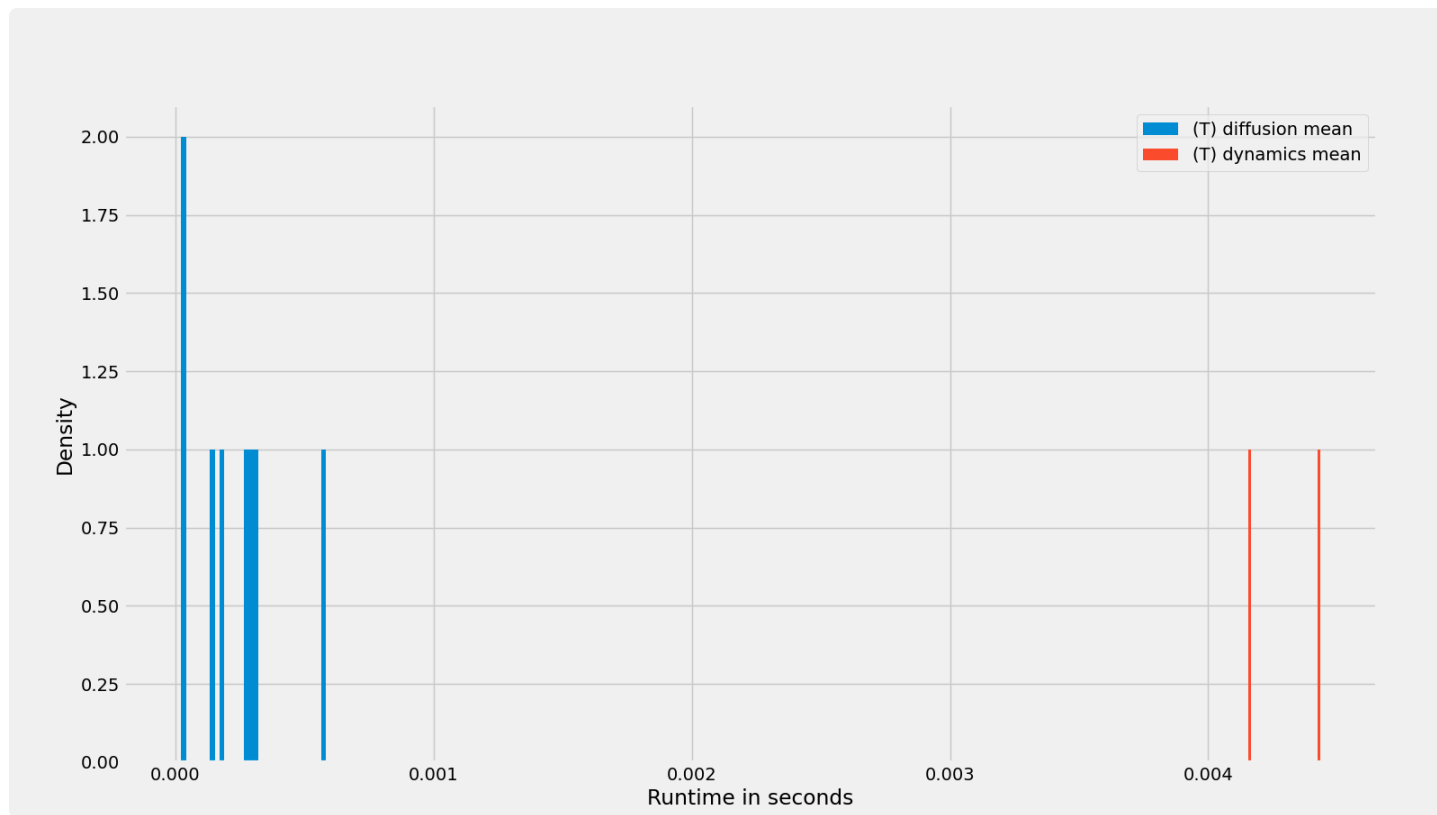
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Histogram of runtimes for all teams (Turing)



Histogram of runtimes for all teams (Turing)



Winners Turing

- Team 4: Edgar Cherix, Studer Aurélien, Julien Pierre Glauser. SA: Isaia Mossi



Fastest diffusion and dynamics functions. Their Laplacian is based on Numpy (`np.pad`), and memory views (rather than copies).

Winners will get an email...

Congrats again to everybody and especially the winners!! Also, please reach out, if you need a letter of recommendation (when applying for your MA, etc.).



What's next for improving your coding skills

- find a suitable Bachelor project. Many labs at SV use Python
- contribute to open source projects
- ...
- join the Lemnic Life Sciences Hackathon 2026
- ...

Lemanic Life Sciences Hackathon 2026



Last year three SV BA students were part of the winning team. They all took this class ;)

Check out the website for more info and sign up

Thanks to the team

Exercises:

- Teaching assistants: Andy Bonnetto, Merkourios Simos, Seda Radoykova, Matea Tashkovska, Oliver Ulrich, Chengkun Li, Daniel Molinuevo
- Student assistants: Aleksandar Mihaylov, Leonardo Tredici, Pires Joana, Tuline Dachraoui, Lucie Manson, Pierre Henry Bernadet, Kaixin Loo, Jean Ciardo, Cynthia Rabay, Iskandar Ghobril, Georges-Alex Nahas, Clemence Kiehl, Isaia Mossi

Class feedback form

Let's take some time to fill out the class feedback form!

Upcoming schedule:

Today:

- Monday, Dec 15, 13 - 15: exercises working on your project

Happy Holidays / Merry Christmas