CSC 2023
PHOTO CONTEST

ARTISTIC

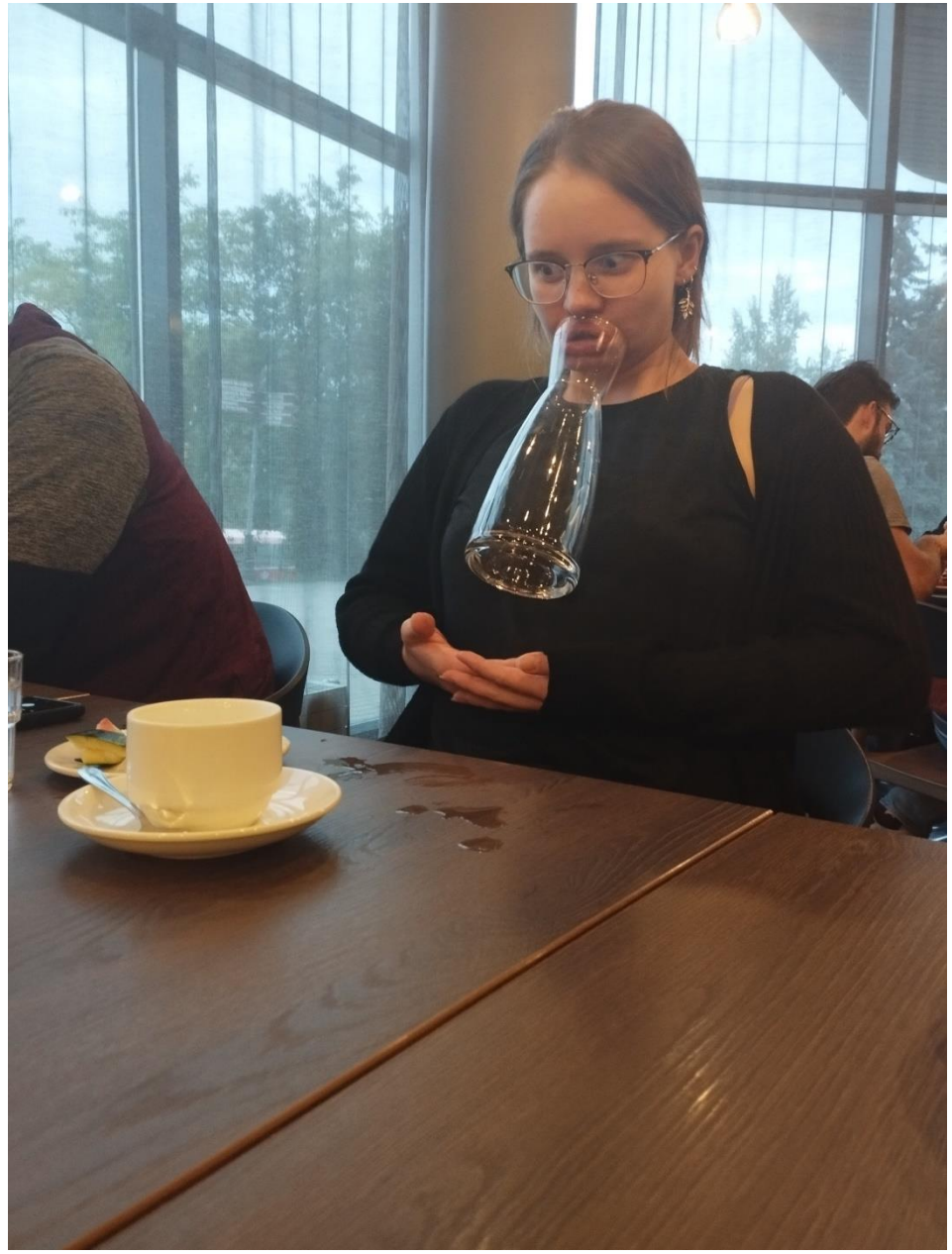
Artistic 3rd - Siavas

Artistic 2nd - Natalia

Artistic 1st - Iza

HUMOUR

Humour 3rd - Berk

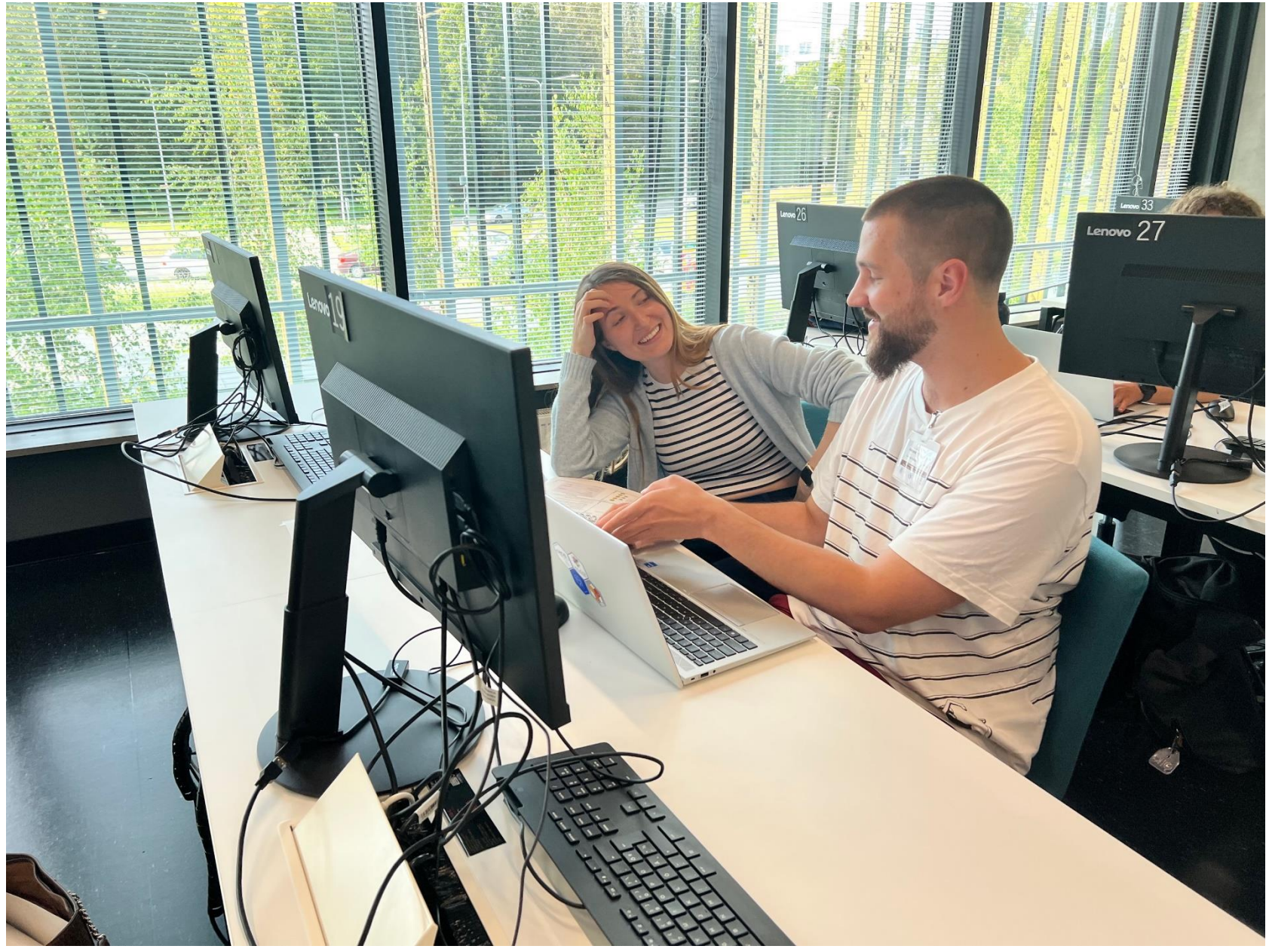


Humour 2nd - Matteo

Humour 1st - Cristi

SCHOOL LIFE

School life 3rd - Alexander



School life 2nd - Matteo

School life 1st - Cristi

SOCIAL ACTIVITIES

Social activities 3rd - Matteo

Social activities 2nd - Natalia

Social activities 1st - Natalia

MEMEs

Memes 3rd - Jamie

CSC Organisers: We've set up all these sports so you can stay fit and healthy

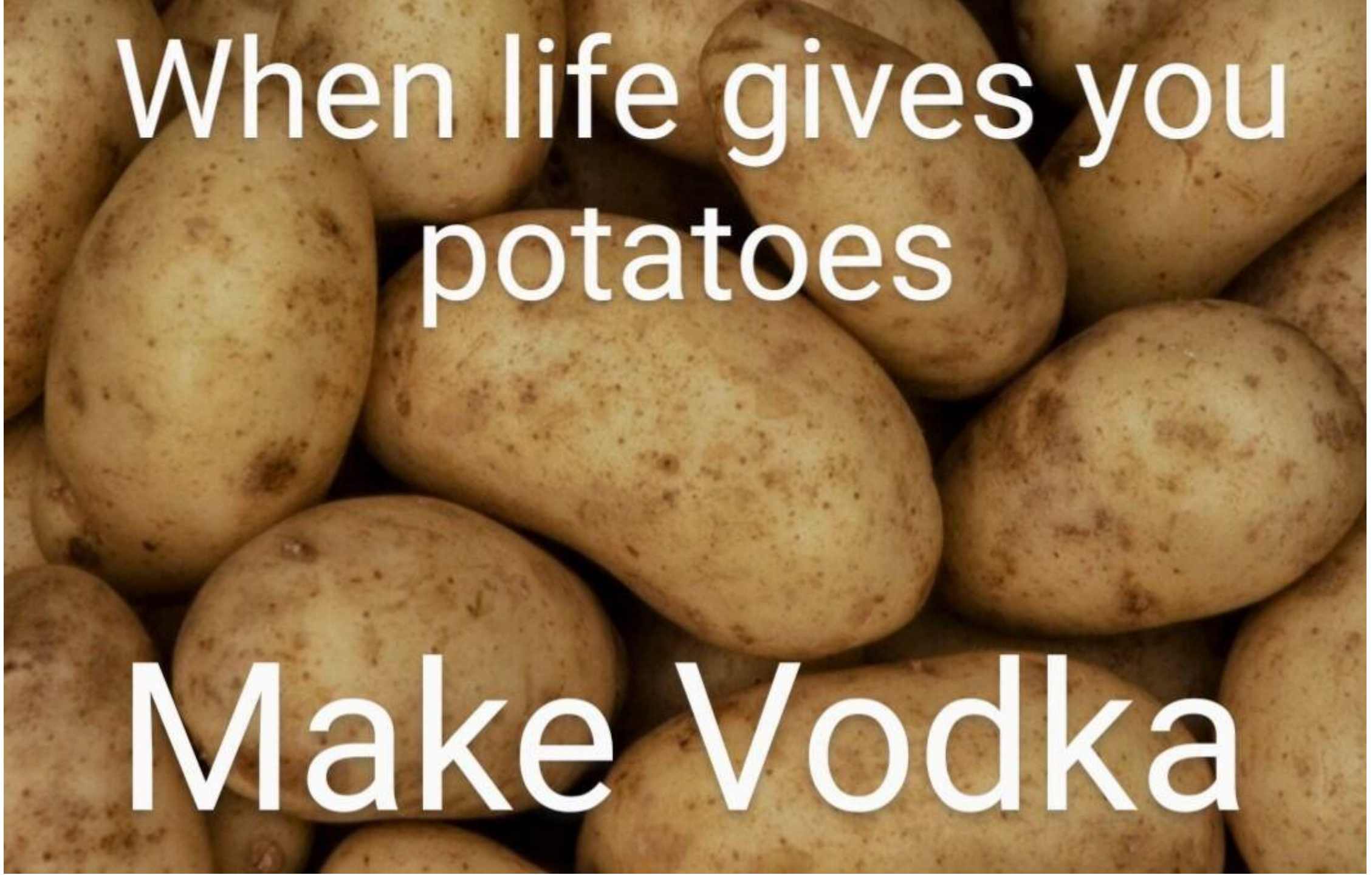
Also CSC Organisers:

Memes 2nd - Patin

Memes 1st - Jamie

There was more…

POTATOES


When life gives you potatoes
Make Vodka


Your body appears to be 90% potato...
@PunHubOnline
CSC


LEFT
EXIT 12
Varied meals throughout the day
Potatoes
Tartu
imgflip.com


BOILED POTATOES ARE NICE
BUT THEN THERE ARE ALSO FRIED POTATOES, OVEN BAKED POTATOES, MASHED POTATOES, HASSELBACK POTATOES, ANNA POTATOES, POTATOES GRATIN, RÖSTI POTATOES...
imgflip.com

School rule #1

- P
  -
    o
  - t a
  - T o

Potatoes
at the
delta building

Potatoes
at the
hotel dorpat

MEMEs COMPETITION

Saturday, 26 August 2023

08:45	Memes: principles of design and development
09:45	Student Lightning Talks
10:45	Announcements


MEME
COMPETITION
CSC
STUDENTS
PHOTO
COMPETITION
CSC
EXAM
imgflip.com

LIGHTNING TALKS

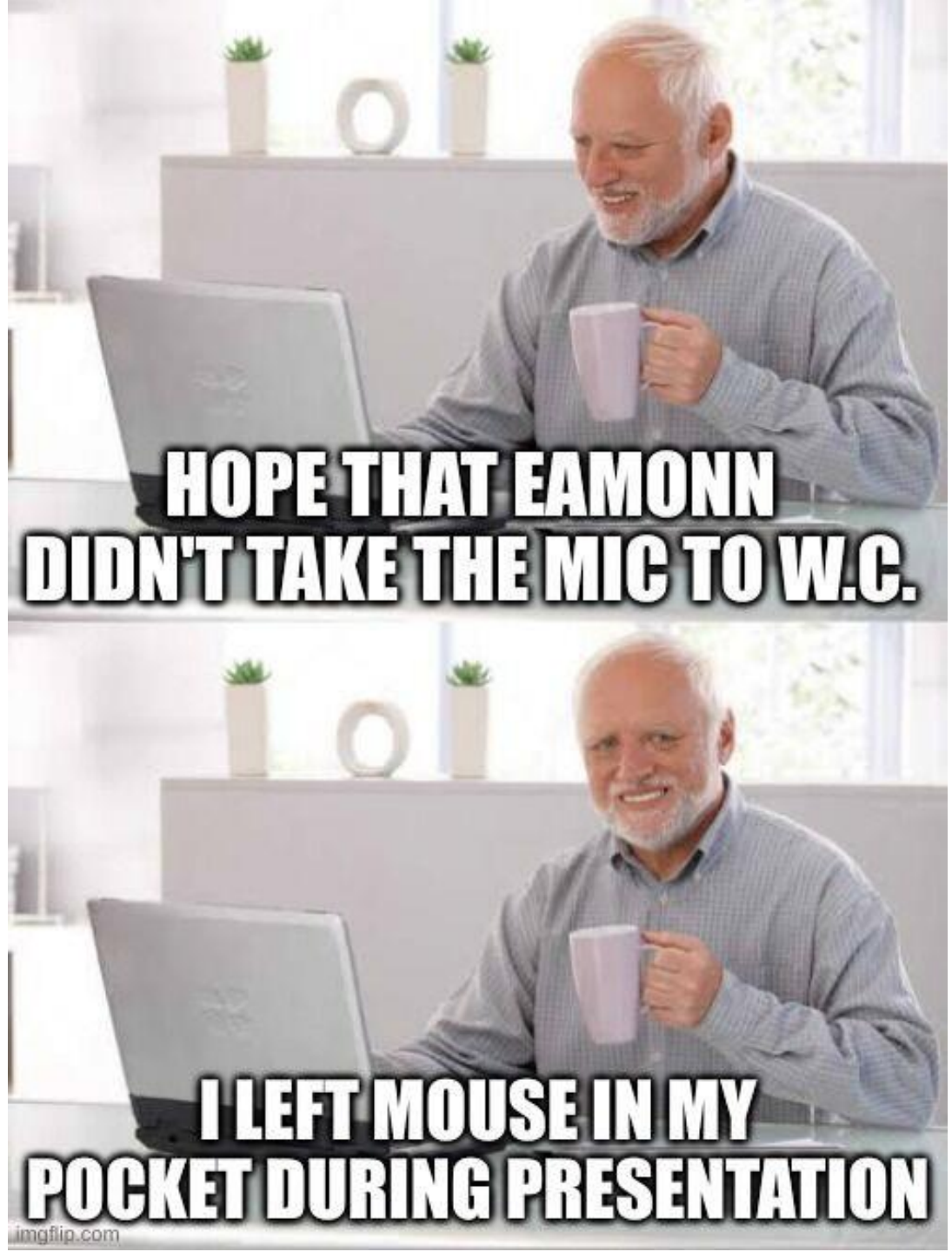
We have so many lightning talks, if we all want to fit them into the time slot, we have to start at 7 am.

There is another solution

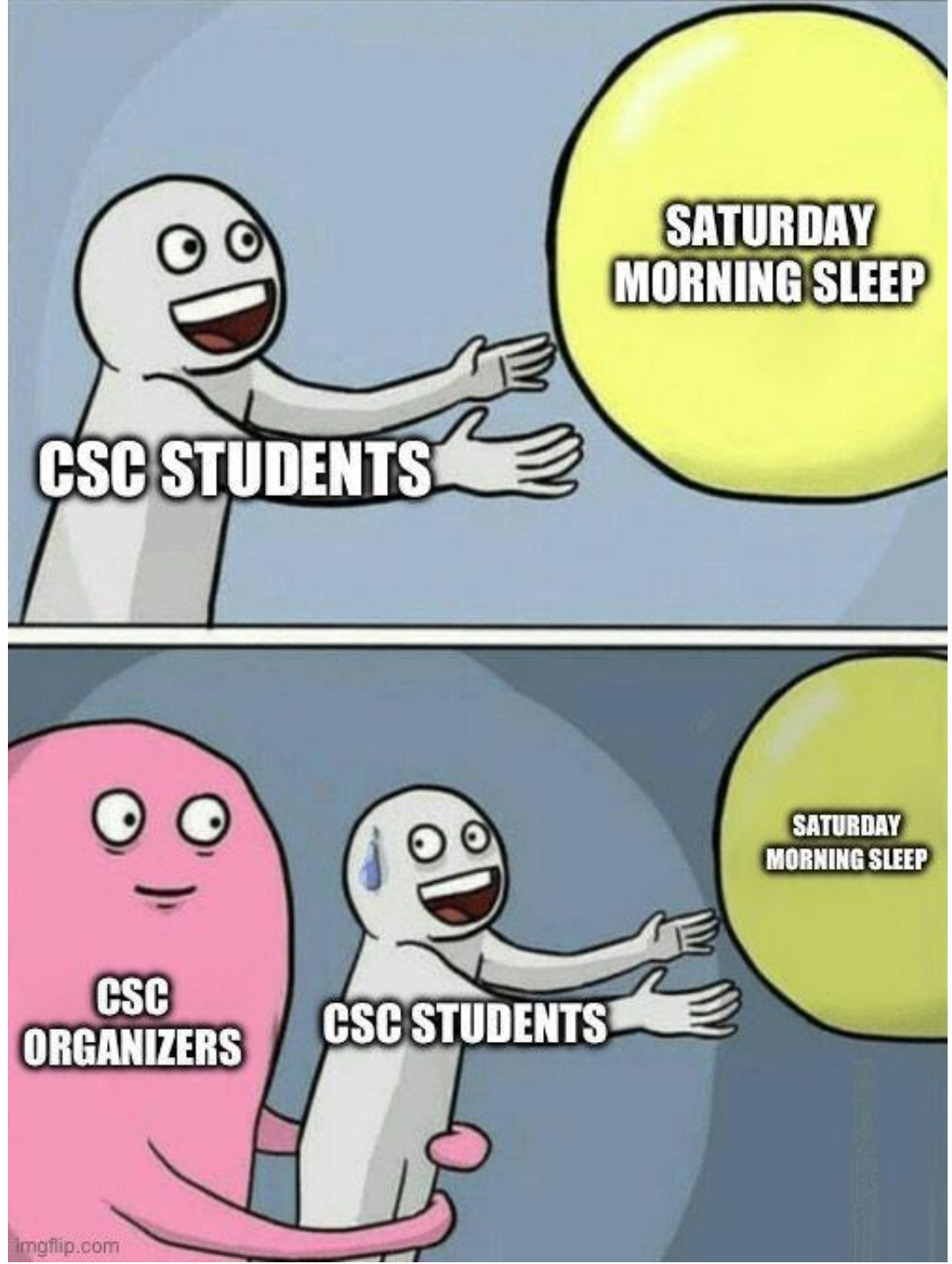
We can start earlier on Saturday.


We have too many submissions for lightning talks. Ideas?
Start the last day at 7 am.
Use the spare time on the weekend?
Why don't we do parallel sessions?
imgflip.com

SCHOOL LIFE


HOPE THAT EAMONN
DIDN'T TAKE THE MIC TO W.C.
I LEFT MOUSE IN MY
POCKET DURING PRESENTATION
imgflip.com


Pointless mechanical bull riding contest
being fit for lectures


SATURDAY
MORNING SLEEP
CSC STUDENTS
SATURDAY
MORNING SLEEP
CSC
ORGANIZERS
CSC STUDENTS
imgflip.com


WHAT CSC PARTICIPANTS SHOULD DO ON FRIDAYS
WHAT CSC PARTICIPANTS DO ON FRIDAYS
imgflip.com

Tartu is the second biggest city in Estonia and is also known as the capital of the students. Needless to say, the nightlife is very lively and there are plenty of awesome parties that you can attend every night. Here

AA theculturetrip.com

CSC students:

gumpownder celer

Italians at pizza dinner bingo

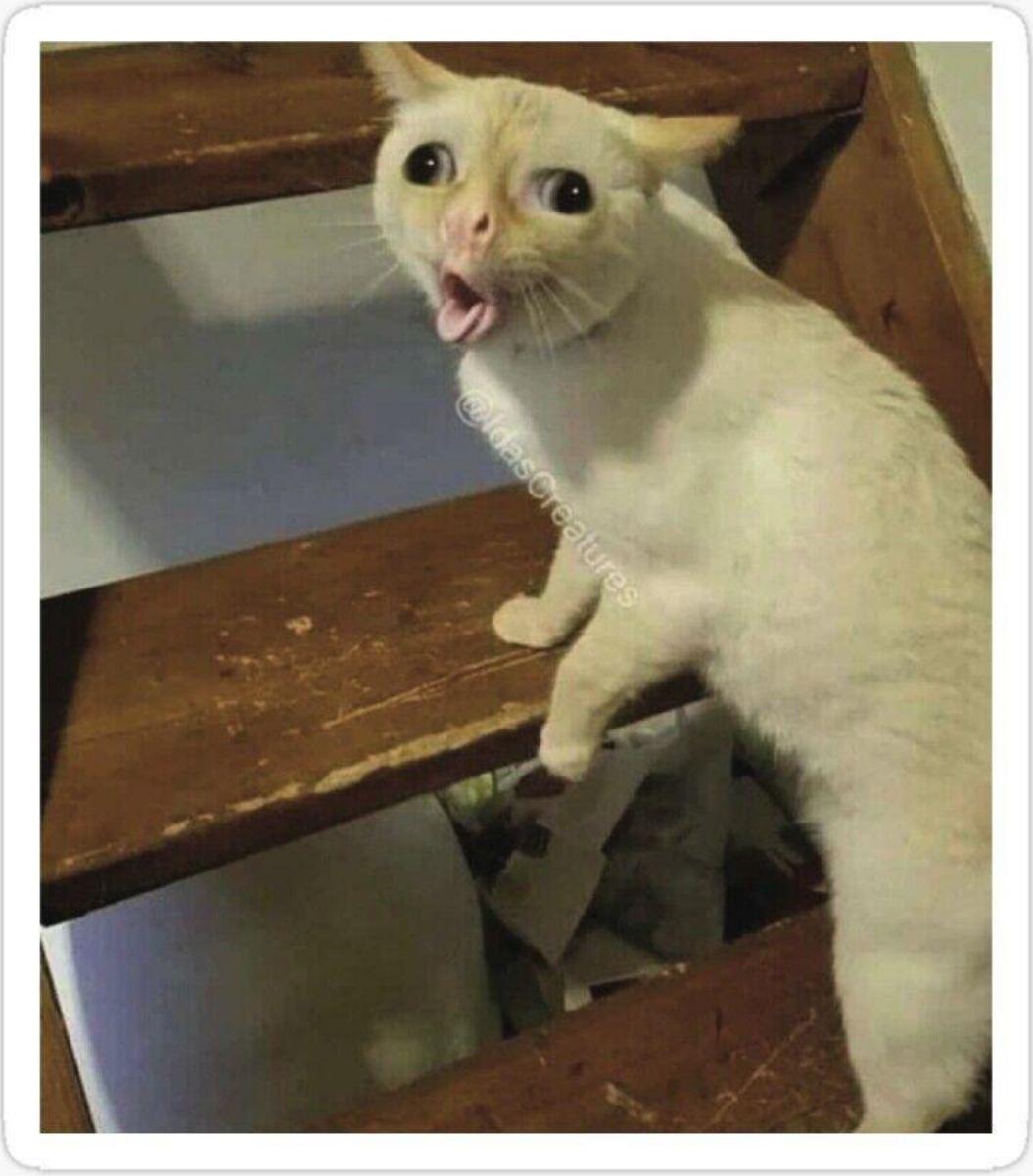
Complaints about sauce	Complaints about toppings in general	General angry swearing
Complaints about crust		Pineapple
Complaints about Italians complaining	"Italians do it better"	Daje Roma daje!


TRUE LIFE OF
A CSC STUDENT
imgflip.com

CANOEING


ALBERTO
KIIDJÄRVE
IS THIS KOORVERE?
imgflip.com

TRYING TO PRONOUNCE THE NAME OF THE RIVER

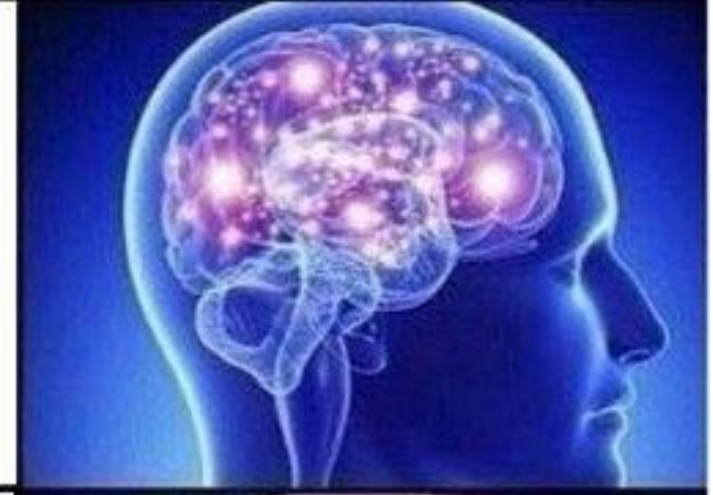


Computing Higgs boson mass

Steering a canoe

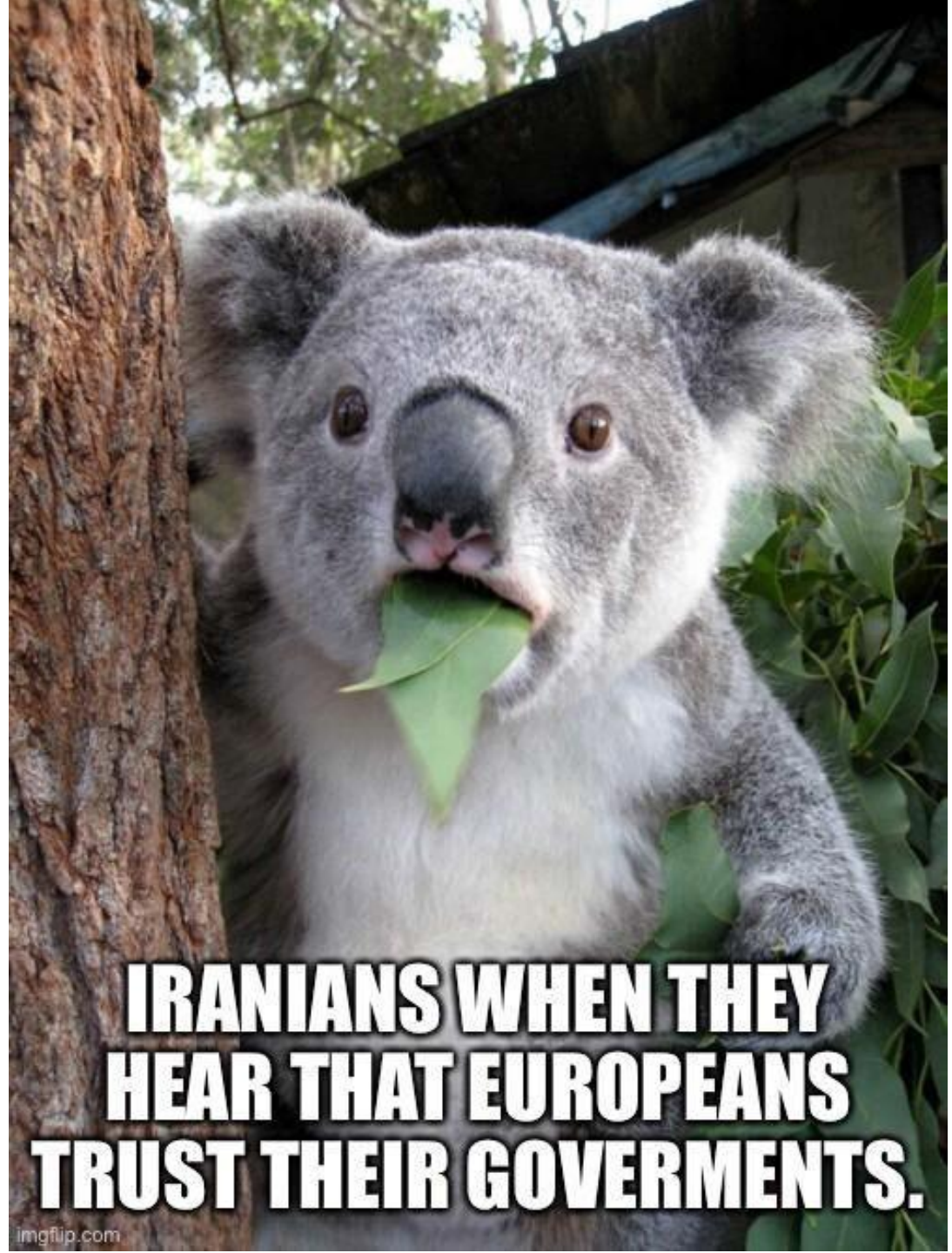
LECTURES

JUST LISTENING TO THE LECTURE AND READING THE SLIDES.



TAKING NOTES TO DOCUMENT THE KEY POINTS OF THE LECTURE.

MAKING MEMES TO DOCUMENT THE KEY POINTS OF THE LECTURE.


IRANIANS WHEN THEY
HEAR THAT EUROPEANS
TRUST THEIR GOVERMENTS.
imgflip.com

Someone didn't mute their phone


Francois:
Why is Britain?
Jamie

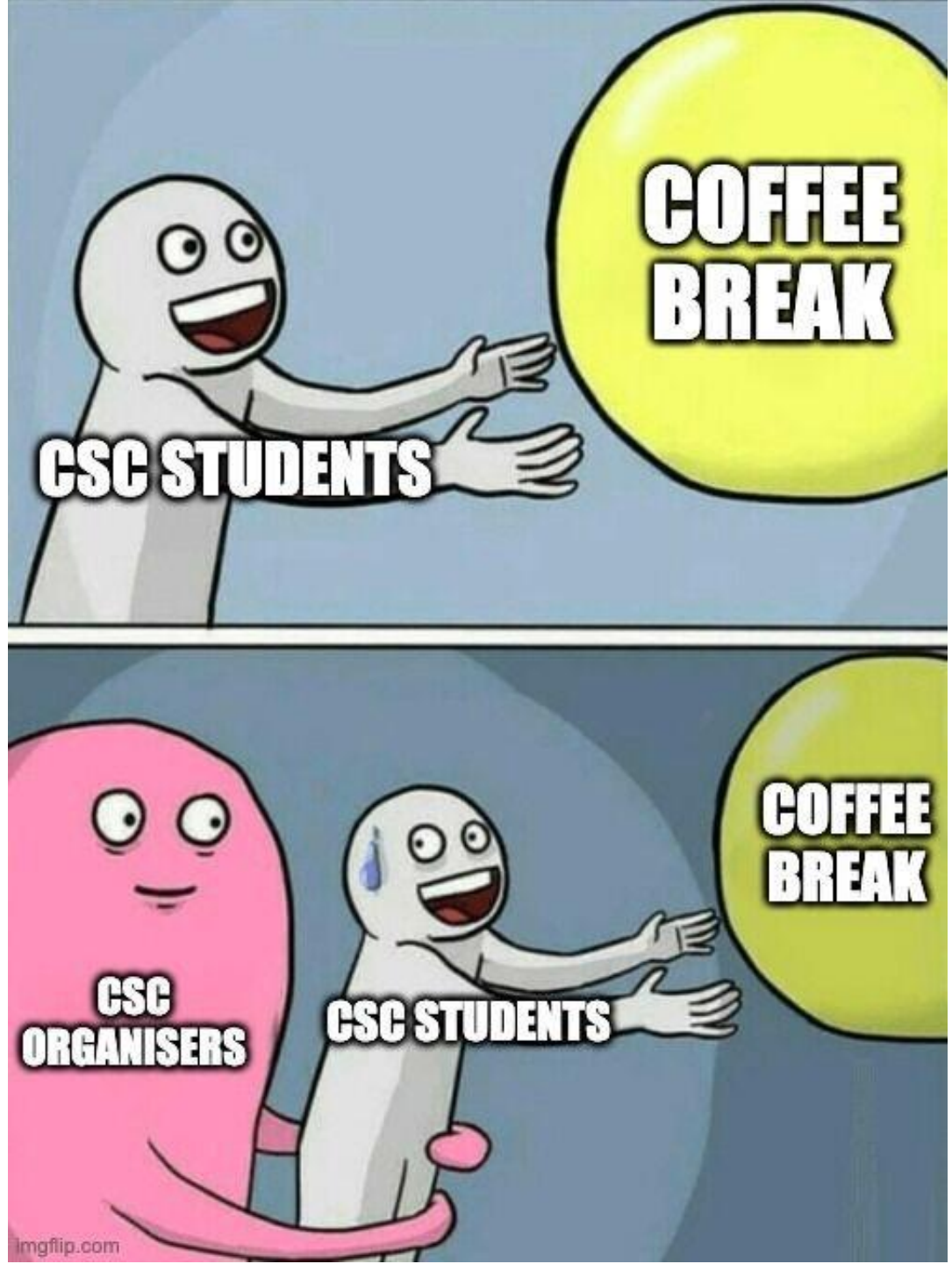

NOTHING
IS CERTAIN
FRANÇOIS
TONI
imgflip.com

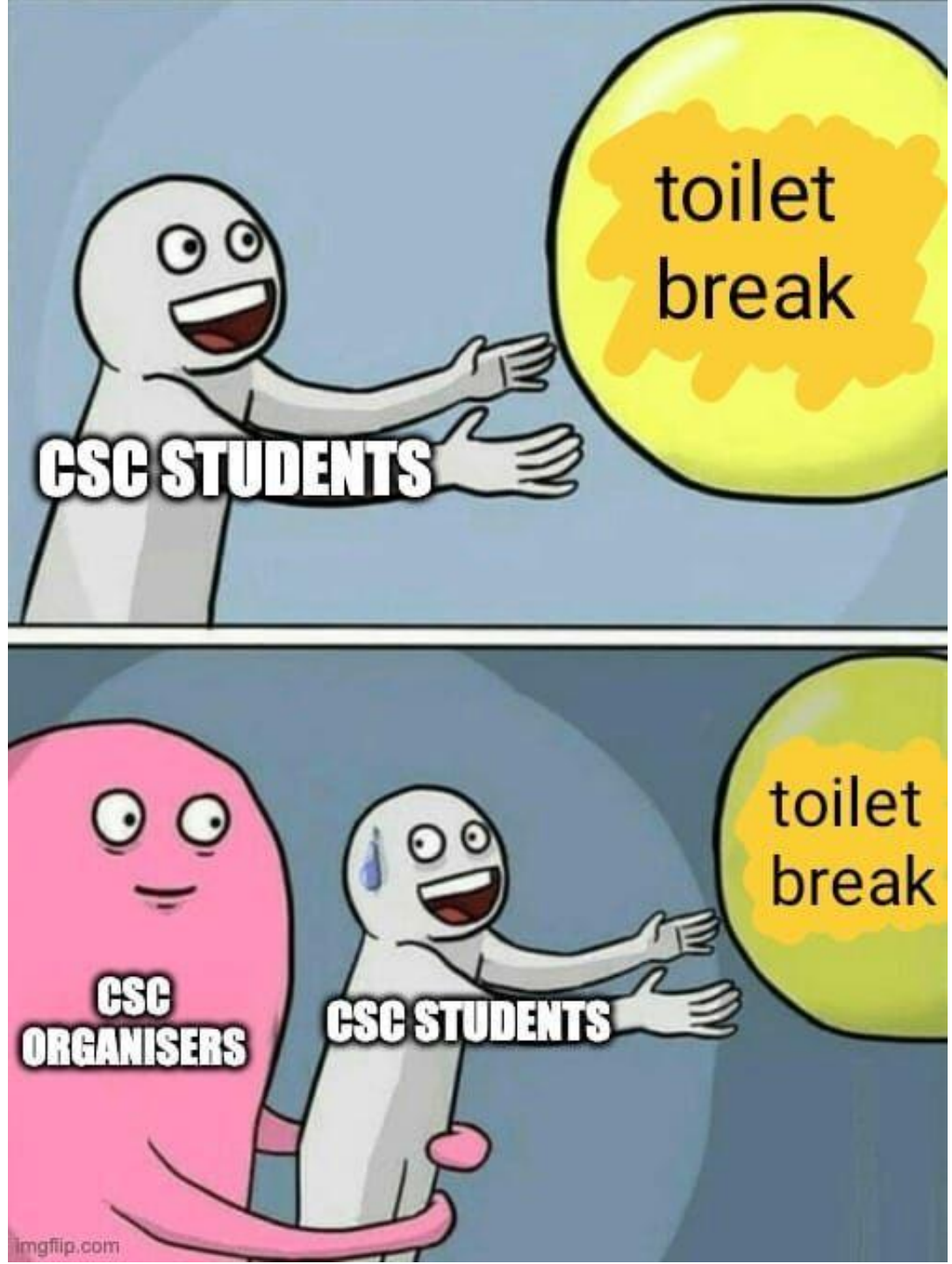

FRANCOIS
@UK.AC.UCL
C'EST QUOI CE BORDEL?
imgflip.com

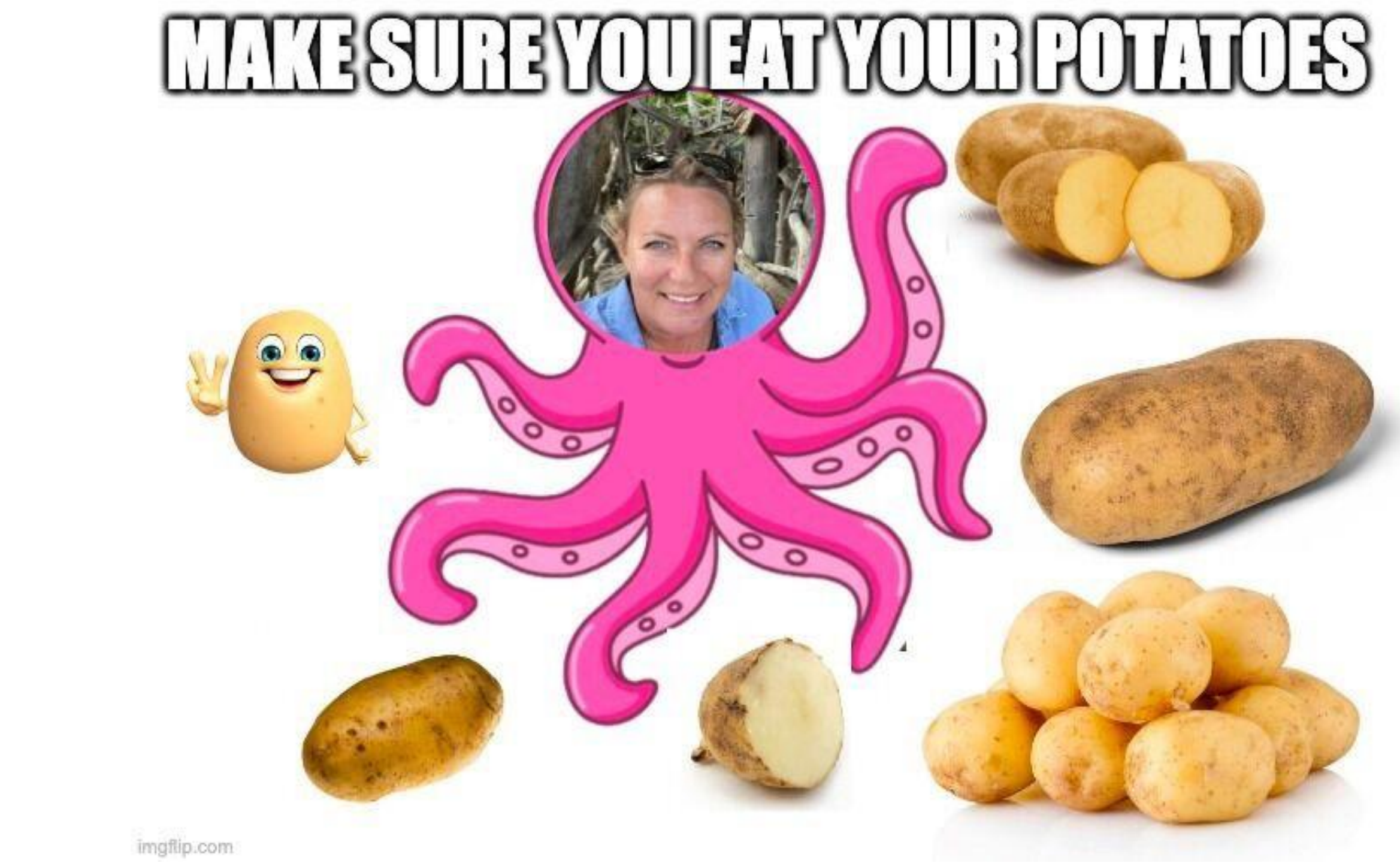
ORGANISERS

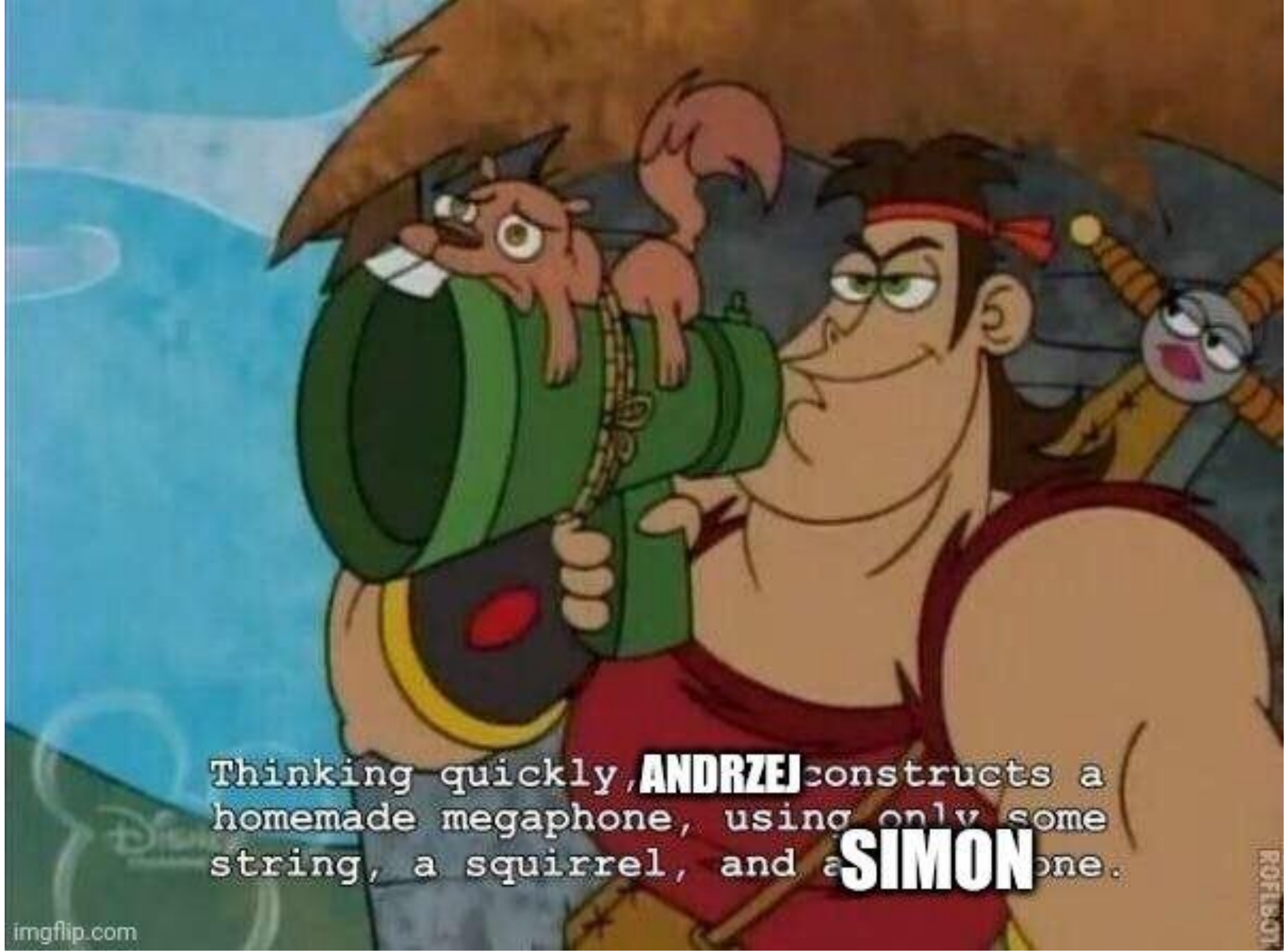

I am going to direct
a school that is so memeable

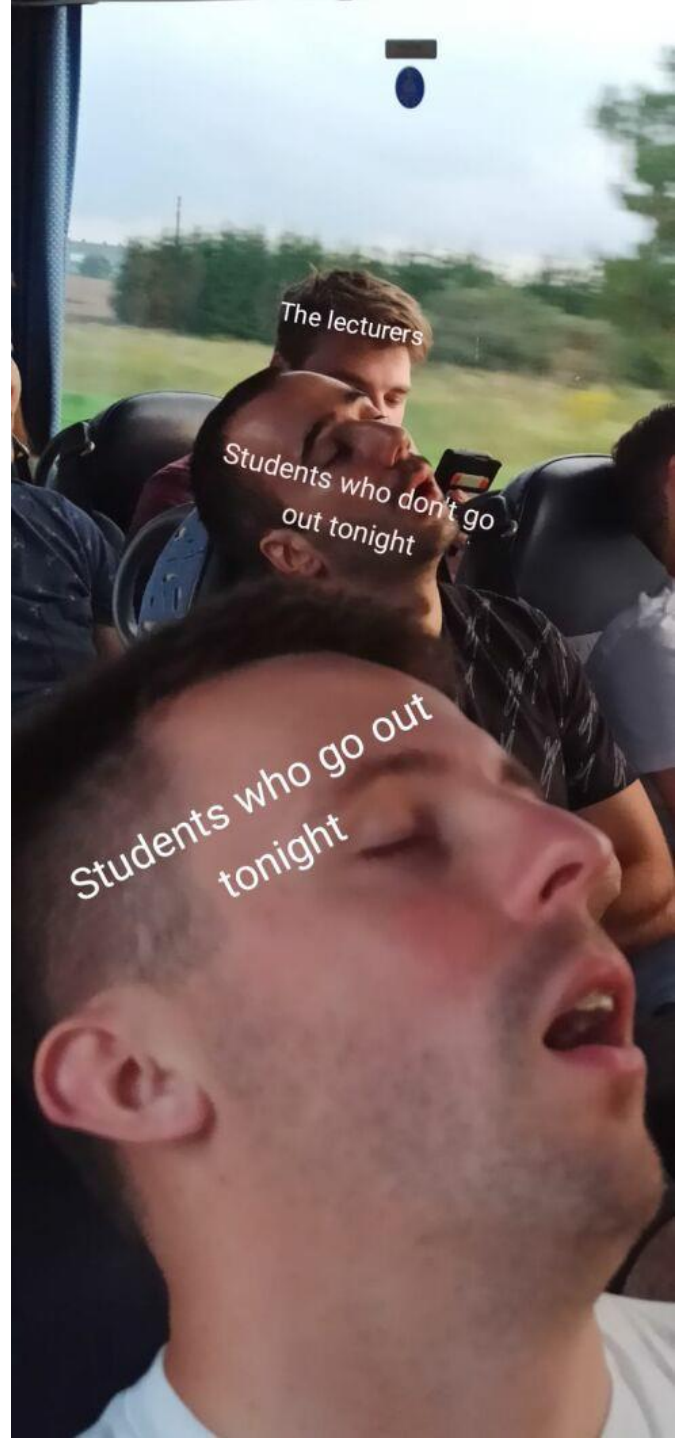

ALBERTO
MEME
IS THIS MÈMÈ?
imgflip.com


COFFEE BREAK
CSC STUDENTS
COFFEE BREAK
CSC ORGANISERS
CSC STUDENTS
imgflip.com

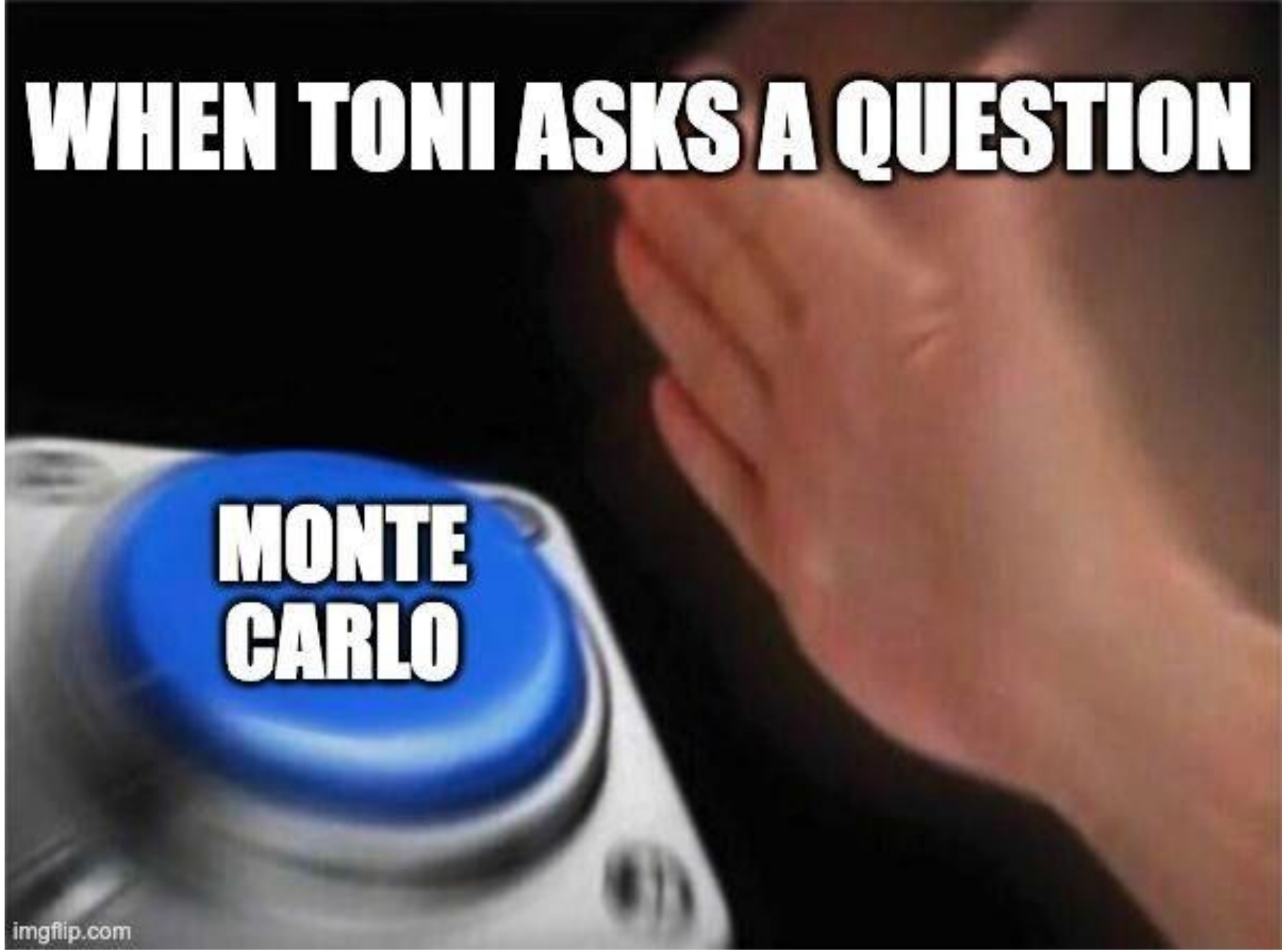

toilet
break
CSC STUDENTS
toilet
break
CSC
ORGANISERS
CSC STUDENTS
imgflip.com


MAKE SURE YOU EAT YOUR POTATOES
imgflip.com


Thinking quickly, ANDRZEJ constructs a homemade megaphone, using only some string, a squirrel, and a SIMON one.
imgflip.com


The lecturers
Students who don't go out tonight
Students who go out tonight

TONI

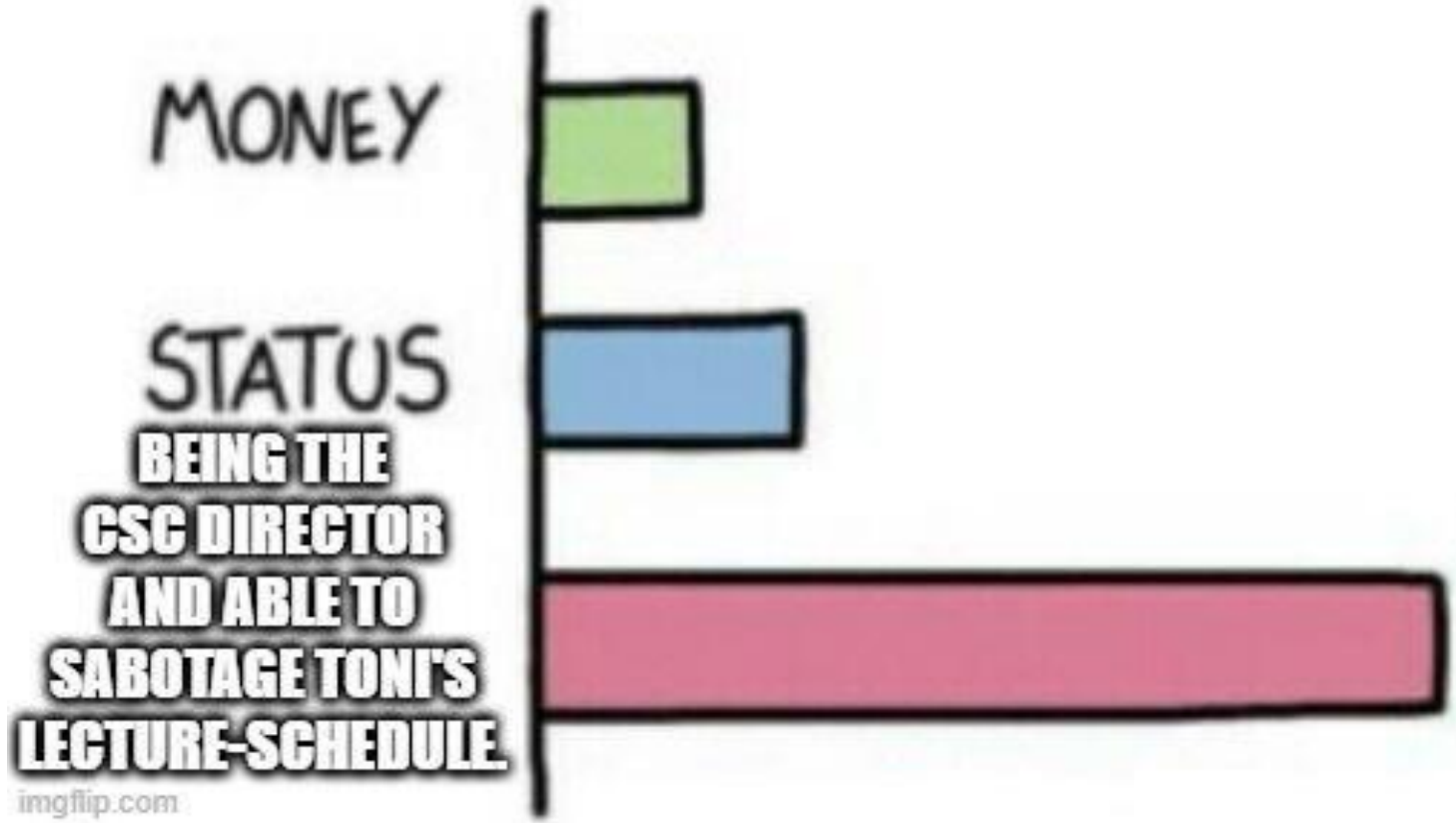

WHEN TONI ASKS A QUESTION
MONTE CARLO
imgflip.com


TONI
TONI
TONI
TONI
SAY THE LINE!
THE CSC STUDENTS
MONTE CARLO
TONI
TONI
TONI
TONI
CSC STUDENTS
TONI
TONI
imgflip.com


WAITING FOR TONI TO SAY "MONTE CARLO"
imgflip.com

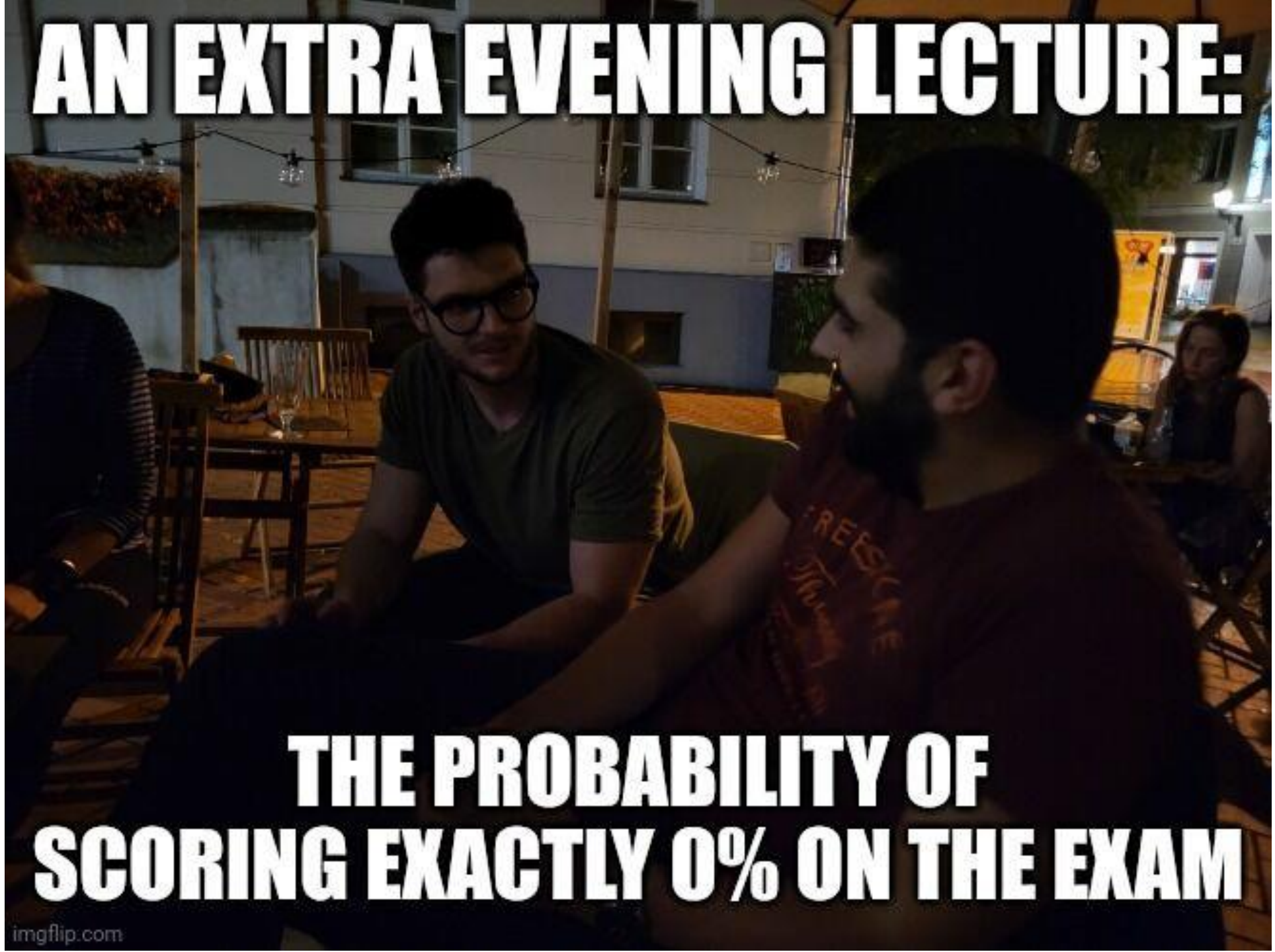
WHAT GIVES PEOPLE FEELINGS OF POWER

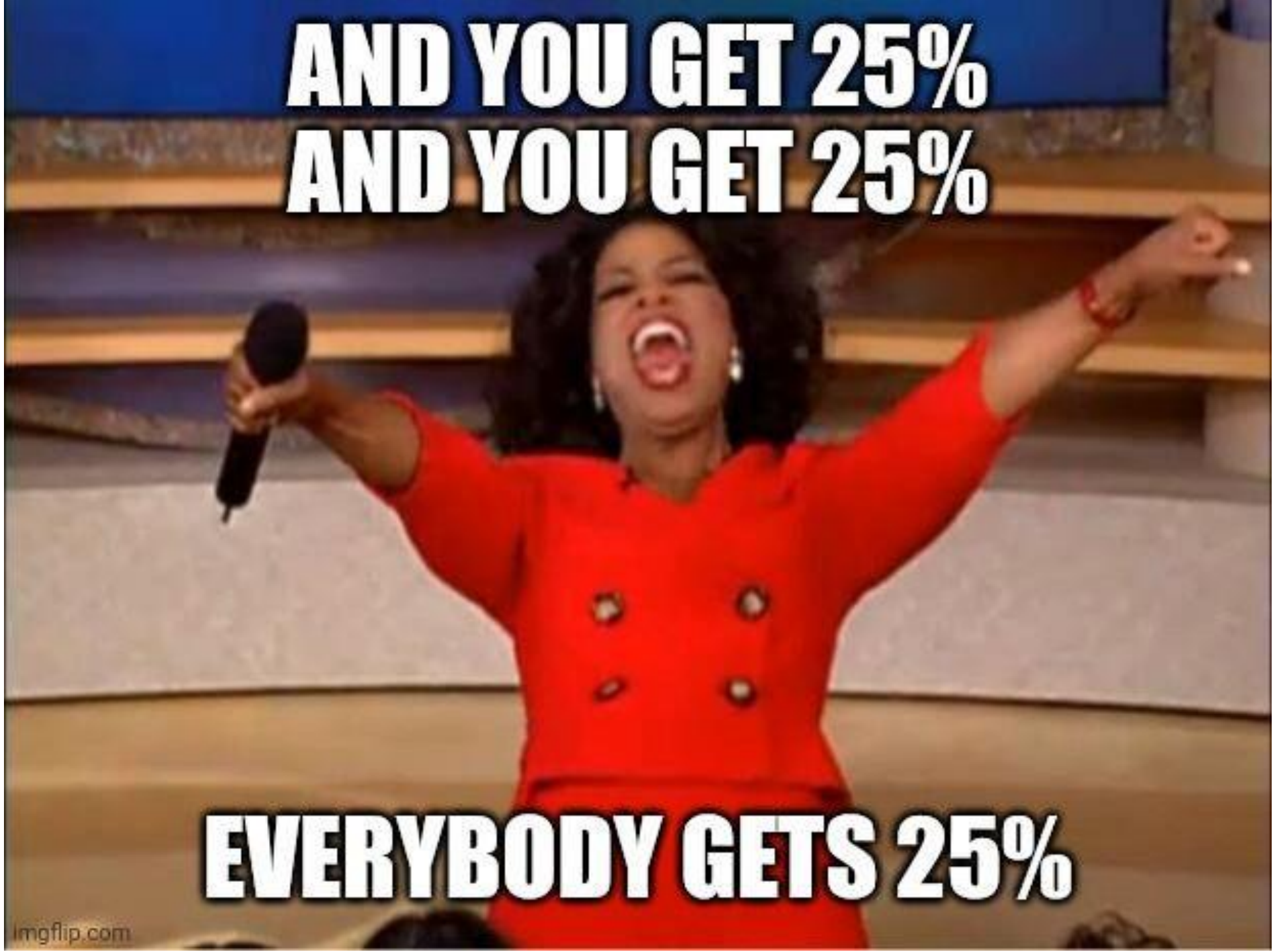
ACCORDING TO TONI SCULAC.

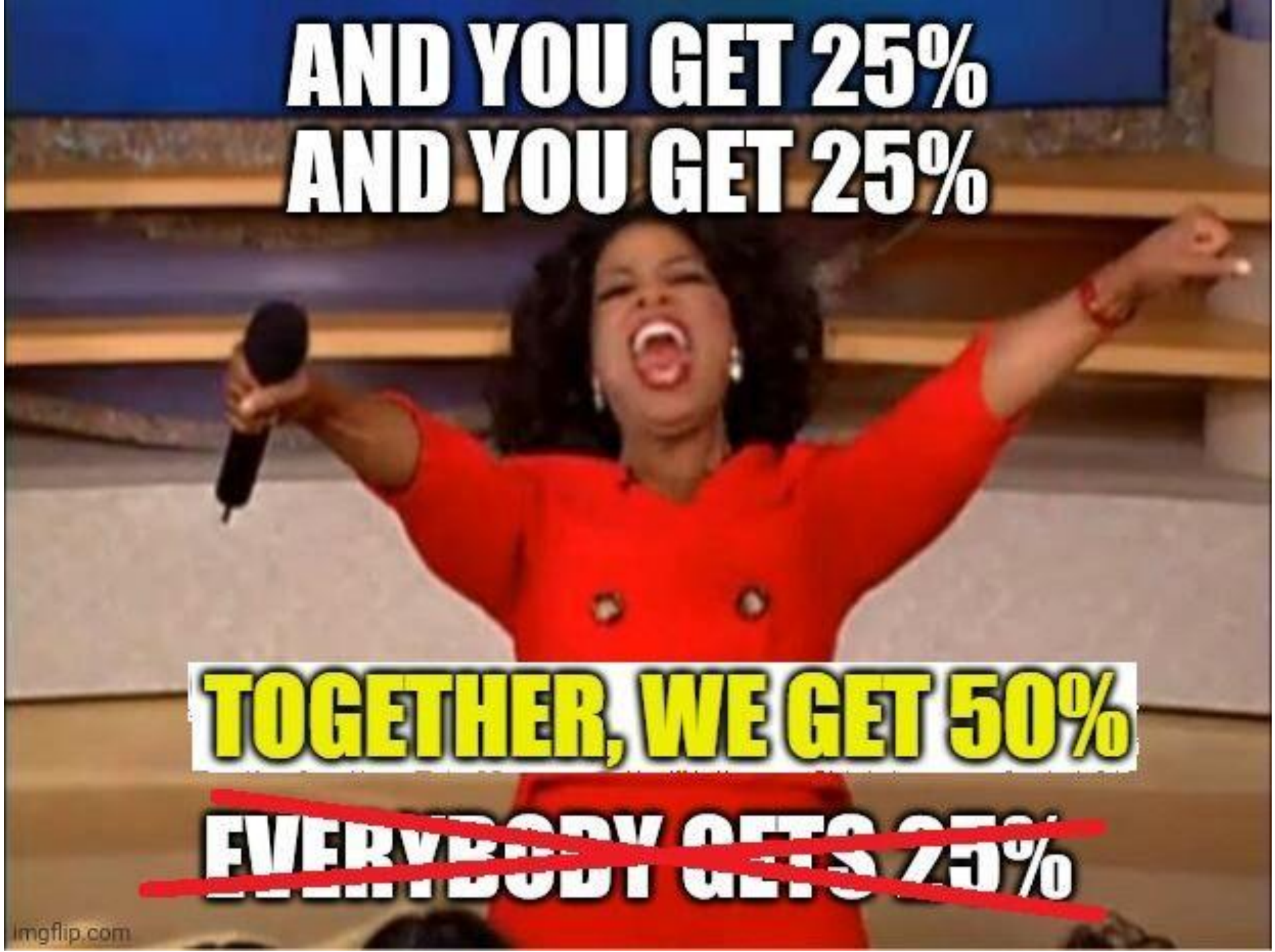



MONTE
CARLO
imgflip.com

EXAM


AN EXTRA EVENING LECTURE:
THE PROBABILITY OF
SCORING EXACTLY 0% ON THE EXAM
imgflip.com

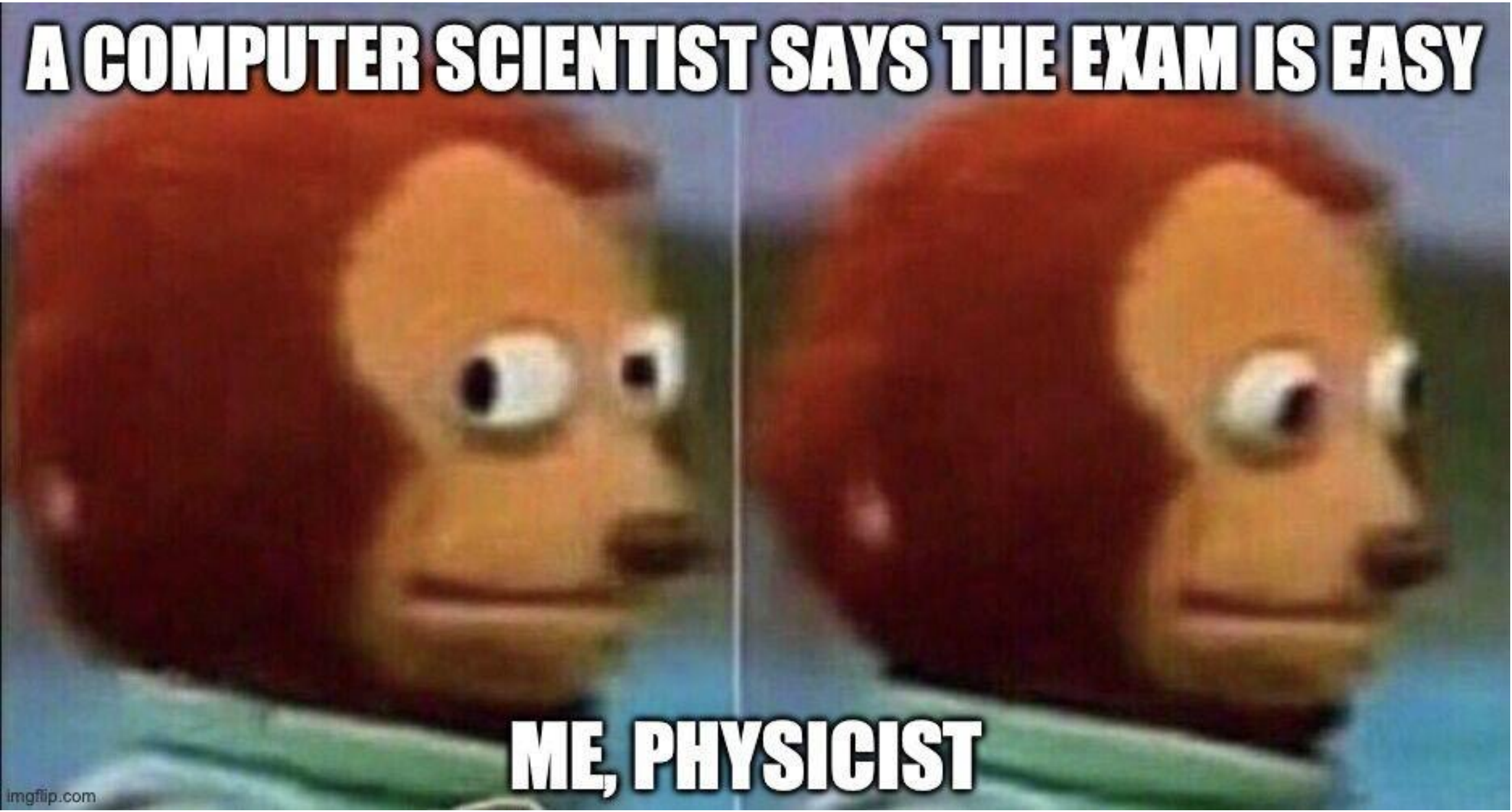

AND YOU GET 25%
AND YOU GET 25%
EVERYBODY GETS 25%
imgflip.com


AND YOU GET 25%
AND YOU GET 25%
TOGETHER, WE GET 50%
EVERYBODY GETS 25%
imgflip.com

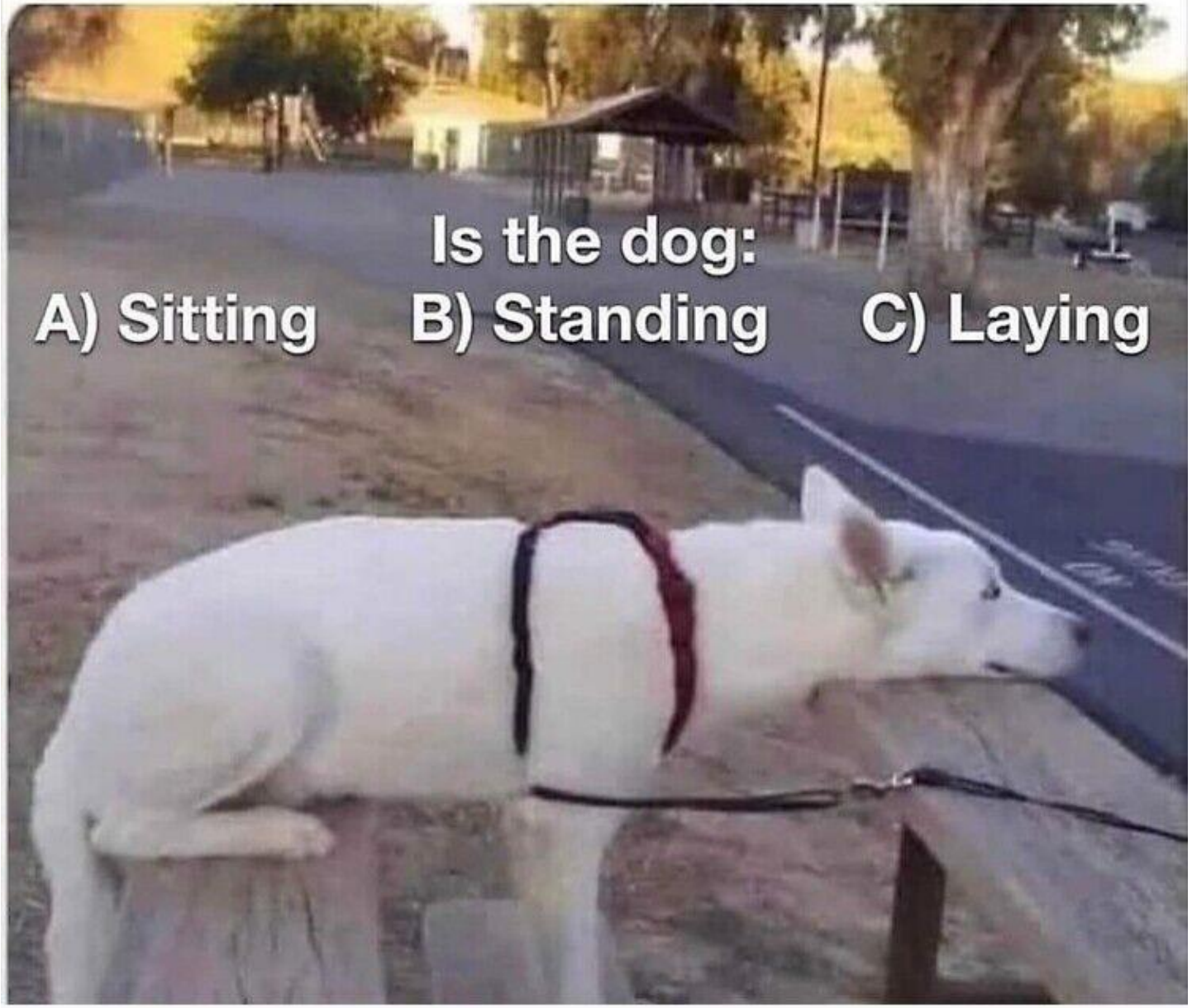
ERROR SUMMARY

		True state	
		H_0 is true (Student did learn)	**H_1 is true** (Student didn't learn)
Decision	**Accept H_0** (Exam passed)		
	Reject H_0 (Exam failed)		

CSC students studying	
Andrzej passed	
He is the technical coordinator OF COURSE HE FUCKING PASSED	


A COMPUTER SCIENTIST SAYS THE EXAM IS EASY
ME, PHYSICIST
imgflip.com

Teacher: The test isn't very hard.
The test:



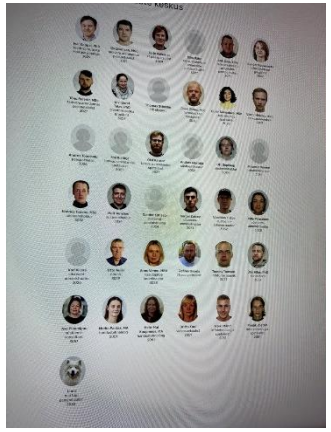
HONOURABLE MENTION

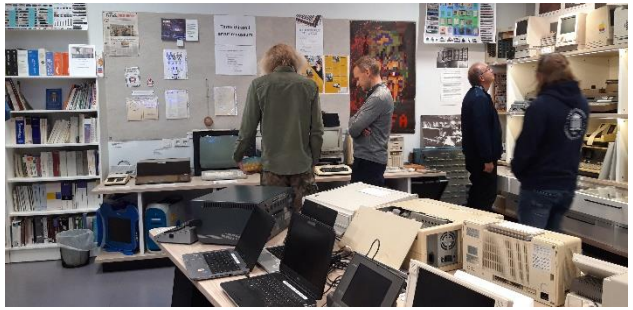

~~ALBERTO~~ BEFORE EVERY ANNOUNCEMENT
TAUNO
HELLO, IT'S ME
again.
imgflip.com

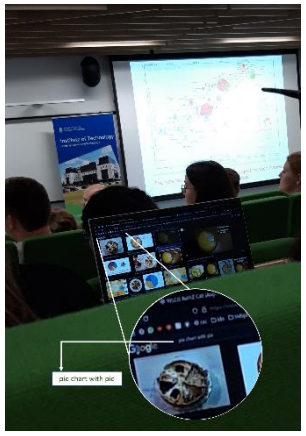
School Closing Remarks

Friday 1st of September

Keep posting pictures to CERNBOX







CSC 2023 Booklet

CSC 2023 poster

Photo contest

School Photo Gallery

Very_simple_running_area_map_CSC.png

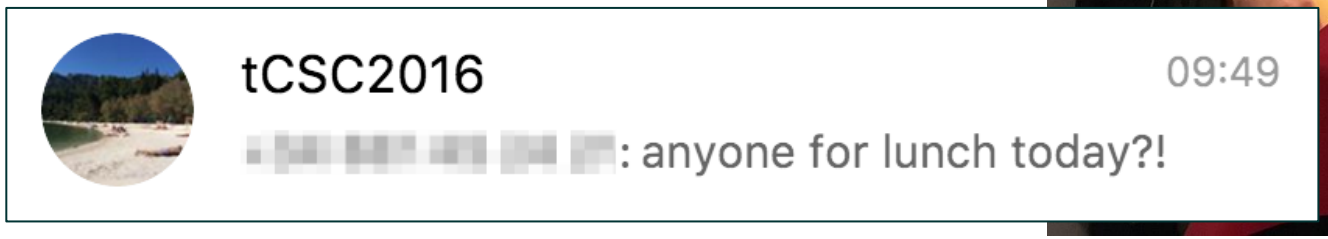
Important points

- Feedback questionnaire
  - anonymous feedback about the School, lectures, exercises
  - details will come by e-mail
  - you **must** complete this feedback questionnaire
  - really, please do – we need your input, so that we can evolve, and get even better!
- Electronic version of the booklet (PDF) is published on tCSC website
  - accessible only for logged-in people

Now, what's next ?

Post-school networking

tCSC lunches at CERN



84

Four CERN Schools of Computing

CSC 2023

August 2023

Come back for 2024 !

Hamburg, Germany

sCSC 2023

October 2023

Subscription closed

iCSC 2024

March 2024

Call for contribution
In October 2023

tCSC 2024

May or June 2023

Come back for 2024 !

Attend other CSCs ☺

Advertise CSC
to your colleagues

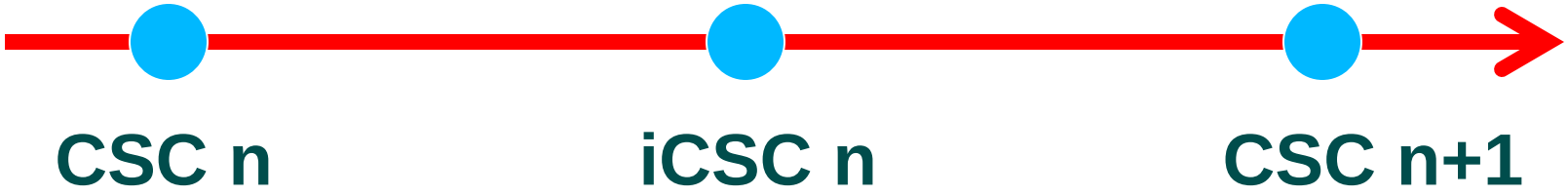
85

The inverted CERN School of Computing

Why an inverted CSC ?

- At every CSCs, the sum of the knowledge of the students often exceeds the one of lecturer teaching, and that it is frequent to find in the room real experts on particular topics. This is the idea behind iCSC.

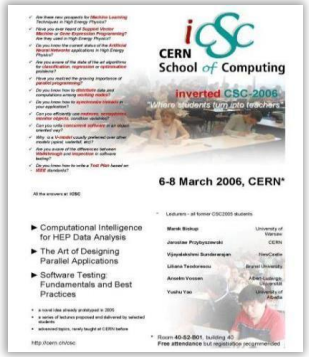
Reversing the roles



2024: will be the 15th edition of the iCSC

2005

2006



2008

2010

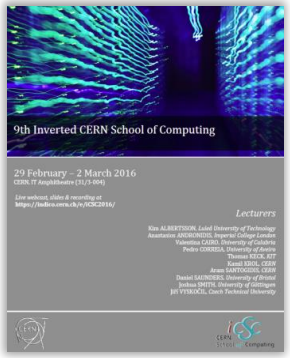
2011

2013

2014

2015

2016

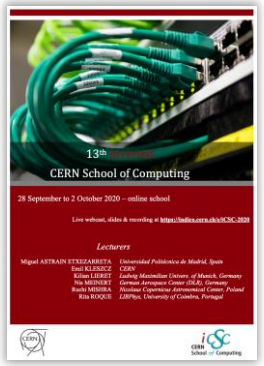


2017

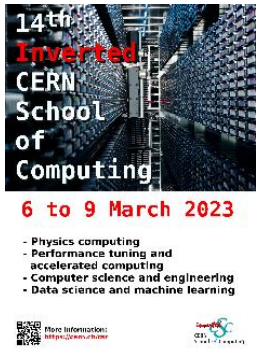
2018

2019

2020



2023



The inverted CSC

- At the end of each main school, we call students present to make proposals. When we receive sufficient proposals of appropriate quality, we organize an inverted school.

- The students combine their skills and elaborate on CSC related subjects.

The 2023 topics were 13, new record !

- Cloud & Containers - Everything you need to know
- Everything that can go wrong in a message passing system
- Authentication and Authorization for the WLCG
- Quantum Computing
- How a real-world C++ compiler works
- CPU Performance Profiling on Linux in the HEP Context
- Multiplatform Programming with Python
- A simple introduction to accelerated computing
- The most beautiful line you can draw with Kalman filter
- An introduction to Bayesian neural networks and uncertainty quantification in neural networks
- Graph Neural Networks: From fundamentals to Physics application
- MLOps - Going from Good to Great
- A Crash Course on Reinforcement Learning

This year's lecturer, 10 different institutes

Ahmed Abdelmotteleb
Warwick University

Tom Dack
STFC

Ivan Kabadzhov
Freiburg University

Martin Cejp
CERN

Jack Henschel
CERN

Peter Kicsiny
CERN and EPFL

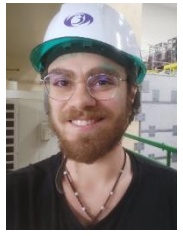
Piotr Konopka
CERN

Charis Kleio Koraka
Wisconsin Madison

Valeriia Lukashenko
NIKHEF, NL

Michal Maciejewski
Roche

Jacopo Talpini
Milano-Bicocca



Ilias Tsaklidis
CERN

Felix Wagner
HEPHY

Lecturers at the iCSC

- Many iCSC lecturers have become lecturers at various CSC schools
  - Sebastian Lopienski (2005), Brice Copy (2005), Zornitsa Zaharieva (2005), Andrzej Nowak (2008), Benjamin Radburn-Smith (2010), Thomas Keck (2016), Daniel Campora (2017) , Eamonn Maguire (2017), Hannah Short (2018), Tom Dack (2023)

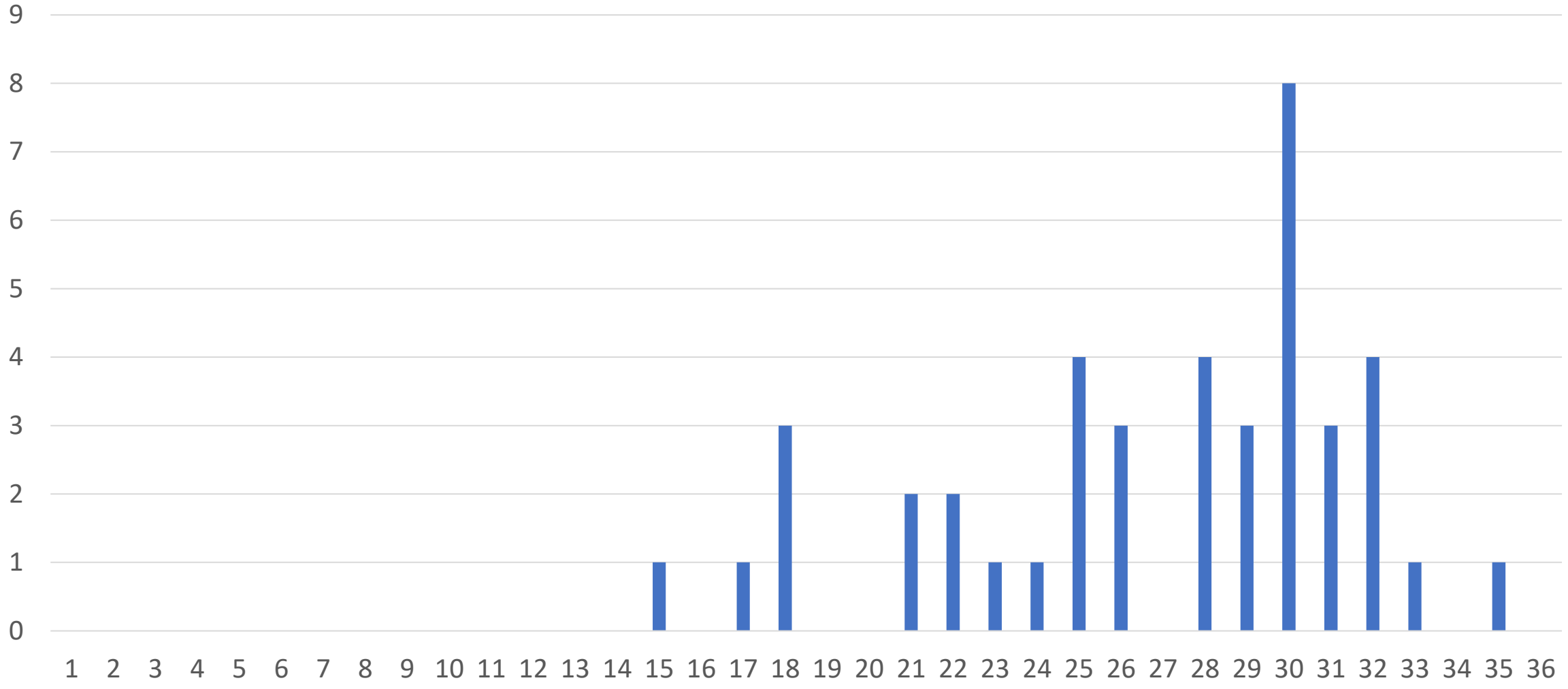
- ... And one of them became director of the school

Diplomas and/or Certificate of Attendance

The Exam …

- 36 questions
- Question 34 had 2 answers that could be considered correct
  - Both “Length” and “Position” have been accepted as valid answers for the most powerful representation of quantitative data
- Pass/No pass threshold: 50% or more of correct answers
  - To pass 18 or more correct answers

CSC 2023 exam result distribution



Diplomas

- Not all participants took the exam
- 65 participants successfully passed the exam

- You will be all called and receive
  - Certificate of attendance
  - School diploma + Certificate of ECTS credits

Distribution of diplomas and/or certificates

Response to reference letters

- I normally write back to your supervisor
  - You will also receive a copy
  - Please let us know if I shouldn’t

Laboratoire Européen pour la Physique des Particules
European Laboratory for Particle Physics

GENEVE, SUISSE
GENEVA, SWITZERLAND

Mail address: CERN, IT Department
CH-1211 GENEVE 23
Switzerland

Telex / Telex : 419000 CER CH
Télégramme/Telegram : CERNLAB-GENEVE
Téléfax/fax : +41 (22) 767 4230
Téléphone/Telephone :
Direct : +41 (22) 767 4989
Central/Exchange : +41 (22) 767 6111
E-mail : francois.fluckiger@cern.ch

Votre référence/Your reference:
Notre référence/Our reference: IT-FF/fbl-CSC11

[redacted]
Group Leader
STFC
Rutherford Appleton Laboratory
Harwell Oxford
Didcot OX110QX
United Kingdom

Geneva, August 21, 2012

Dear [redacted],

The 2011 CERN School of Computing (CSC), which was organized this summer in Copenhagen, has now come to an end. It gathered during two weeks 59 young scientists and engineers from 25 different countries, and was concluded by the traditional optional examination to which 49 students did register.

The school was attended by Mr. [redacted] whom you recommended last spring in the reference letter.

I am pleased to inform you that not only [redacted] passed successfully the examination, but obtained the third highest score of all the participants together with one other student.[1]

The CSC examination is difficult, organized extremely rigorously, and students must work hard to succeed. Therefore, obtaining the CSC diploma with a high mark constitutes an evidence of high proficiency on a wide range of computing domains.

I therefore would like to thank you for having recommended such an excellent participant, and I hope that in the future you are in a position to recommend other good candidates.

Laboratoire Européen pour la Physique des Particules
European Laboratory for Particle Physics

GENEVE, SUISSE
GENEVA, SWITZERLAND

Mail address: CERN, IT Department
CH-1211 GENEVE 23
Switzerland

Telex / Telex : 419000 CER CH
Télégramme/Telegram : CERNLAB-GENEVE
Téléfax/fax : +41 (22) 767 4230
Téléphone/Telephone :
Direct : +41 (22) 767 4989
Central/Exchange : +41 (22) 767 6111
E-mail : francois.fluckiger@cern.ch

Votre référence/Your reference:
Notre référence/Our reference: IT-FF/fbl-CSC11

[redacted]
IT Department
CERN

Geneva, August 21, 2012

Dear [redacted],

The 2011 CERN School of Computing (CSC), which was organized this summer in Copenhagen, has now come to an end. It gathered during two weeks 59 young scientists and engineers from 25 different countries, and was concluded by the traditional optional examination to which 49 students did register.

The school was attended by Mr. [redacted] whom you recommended last spring in the reference letter.

I am pleased to inform you that not only [redacted] passed successfully the examination, but **he ranked first,** having obtained the highest score of all the participants.[1]

The CSC examination is difficult, organized extremely rigorously, and students must work hard to succeed. Therefore, obtaining the CSC diploma with a high mark constitutes an evidence of high proficiency on a wide range of computing domains.

I therefore would like to thank you for having recommended such an excellent participant, and I hope that in the future you are in a position to recommend other good candidates.

We have a students with Distinction

- With a score of 33 / 36
  - Anfeng Li

More students with Distinction

- With a score of 34 / 35
  - Jernej Debevc
  - Andreas Stefl
  - Tim Voigtlaender

Gold medals - Champions

- Nearly all answers correct 35/36
  - Zenny Jovi Joestar Wettersten

Arnulf made a movie during the 1st week …

- https://youtu.be/duOm0kb8k8U

Arnulf Quadt

Advisory Committee Chair, Programme Committee

Universität Göttingen


CERN
School of Computing


TARTU ÜLIKOOL
1632
UNIVERSITY OF TARTU


CERN

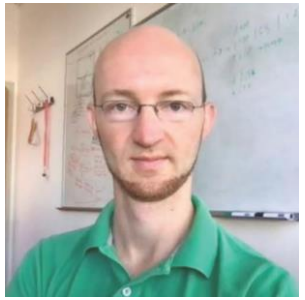
Thanks

The lecturers …

- It is a major commitment to come and lecture at the school










The Organizing team

- … from CERN

Kristina Gunne

Jarek Polok

Andrzej Nowicki

- The local organisers from Tartu University

Margit Meiesaar

Veronika Zadin

Tauno Tiirats

And … for someone special …

- Jarek Polok

And … if we are in Tartu

- Sebastian Lopienski

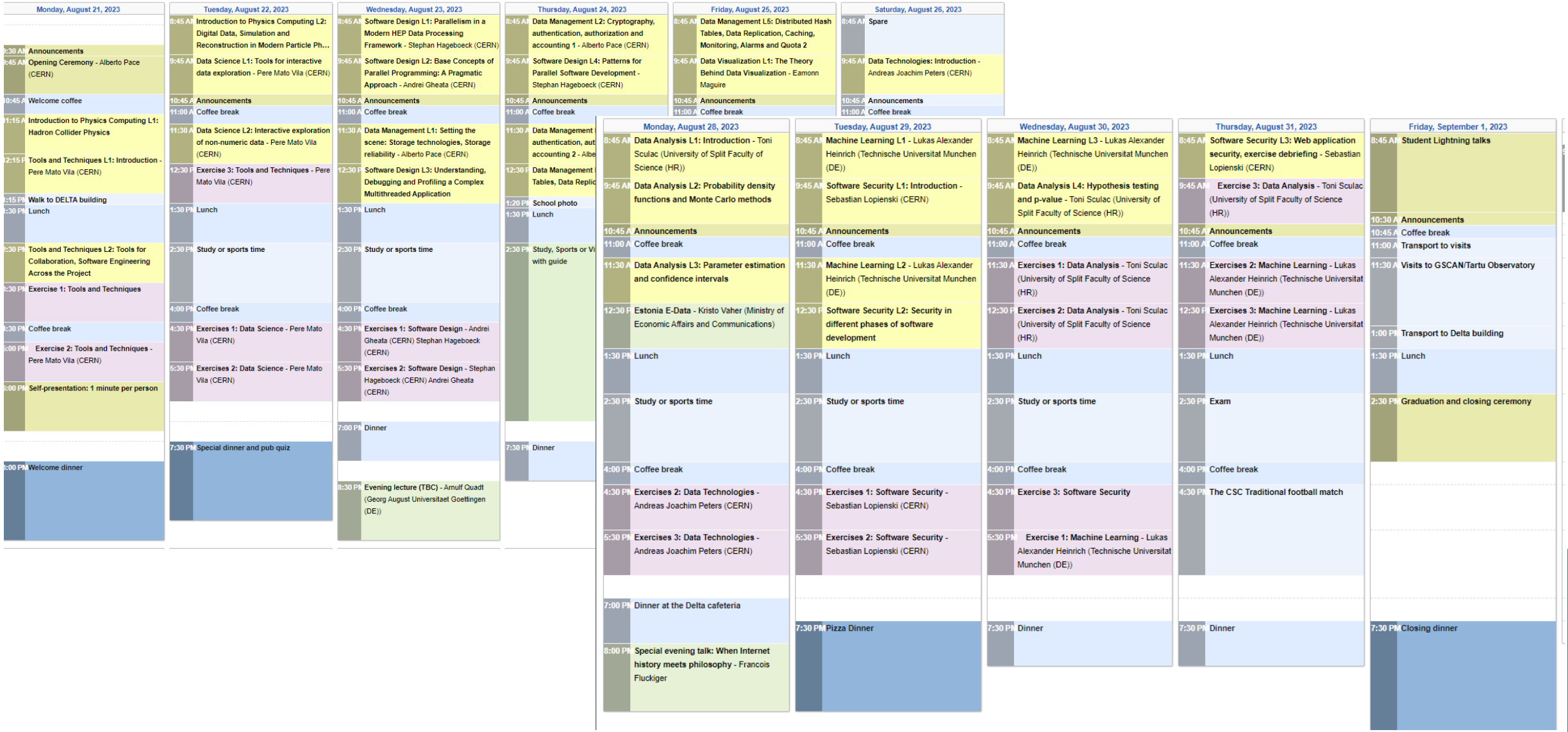
Finally …

- Thanks to you, the CSC 2023 participants

A last message as School Director

- It is the end of a Marathon that started more than 2 years ago
- Some take-home messages … about the school

What a fortnight !



Monday, August 21, 2023

- 9:30 AM Announcements
- 9:45 AM Opening Ceremony - Alberto Pace (CERN)
- 10:45 AM Welcome coffee
- 11:15 AM Introduction to Physics Computing L1: Hadron Collider Physics
- 12:15 PM Tools and Techniques L1: Introduction - Pere Mato Vila (CERN)
- 2:15 PM Walk to DELTA building
- 2:30 PM Lunch
- 2:30 PM Tools and Techniques L2: Tools for Collaboration, Software Engineering Across the Project
- 3:30 PM Exercise 1: Tools and Techniques
- 4:30 PM Coffee break
- 5:00 PM Exercise 2: Tools and Techniques - Pere Mato Vila (CERN)
- 6:00 PM Self-presentation: 1 minute per person
- 8:00 PM Welcome dinner

Tuesday, August 22, 2023

- 8:45 AM Introduction to Physics Computing L2: Digital Data, Simulation and Reconstruction in Modern Particle Ph…
- 9:45 AM Data Science L1: Tools for interactive data exploration - Pere Mato Vila (CERN)
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Data Science L2: Interactive exploration of non-numeric data - Pere Mato Vila (CERN)
- 12:30 PM Exercise 3: Tools and Techniques - Pere Mato Vila (CERN)
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Exercises 1: Data Science - Pere Mato Vila (CERN)
- 5:30 PM Exercises 2: Data Science - Pere Mato Vila (CERN)
- 7:30 PM Special dinner and pub quiz

Wednesday, August 23, 2023

- 8:45 AM Software Design L1: Parallelism in a Modern HEP Data Processing Framework - Stephan Hageboeck (CERN)
- 9:45 AM Software Design L2: Base Concepts of Parallel Programming: A Pragmatic Approach - Andrei Gheata (CERN)
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Data Management L1: Setting the scene: Storage technologies, Storage reliability - Alberto Pace (CERN)
- 12:30 PM Software Design L3: Understanding, Debugging and Profiling a Complex Multithreaded Application
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Exercises 1: Software Design - Andrei Gheata (CERN) Stephan Hageboeck (CERN)
- 5:30 PM Exercises 2: Software Design - Stephan Hageboeck (CERN) Andrei Gheata (CERN)
- 7:00 PM Dinner
- 8:30 PM Evening lecture (TBC) - Arnulf Quadt (Georg August Universitaet Goettingen (DE))

Thursday, August 24, 2023

- 8:45 AM Data Management L2: Cryptography, authentication, authorization and accounting 1 - Alberto Pace (CERN)
- 9:45 AM Software Design L4: Patterns for Parallel Software Development - Stephan Hageboeck (CERN)
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Data Management … authentication, aut… accounting 2 - Albe…
- 12:30 PM Data Management … Tables, Data Replic…
- 1:20 PM School photo
- 1:30 PM Lunch
- 2:30 PM Study, Sports or Vi… with guide
- 7:30 PM Dinner

Friday, August 25, 2023

- 8:45 AM Data Management L5: Distributed Hash Tables, Data Replication, Caching, Monitoring, Alarms and Quota 2
- 9:45 AM Data Visualization L1: The Theory Behind Data Visualization - Eamonn Maguire
- 10:45 AM Announcements
- 11:00 AM Coffee break

Saturday, August 26, 2023

- 8:45 AM Spare
- 9:45 AM Data Technologies: Introduction - Andreas Joachim Peters (CERN)
- 10:45 AM Announcements
- 11:00 AM Coffee break

Monday, August 28, 2023

- 8:45 AM Data Analysis L1: Introduction - Toni Sculac (University of Split Faculty of Science (HR))
- 9:45 AM Data Analysis L2: Probability density functions and Monte Carlo methods
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Data Analysis L3: Parameter estimation and confidence intervals
- 12:30 PM Estonia E-Data - Kristo Vaher (Ministry of Economic Affairs and Communications)
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Exercises 2: Data Technologies - Andreas Joachim Peters (CERN)
- 5:30 PM Exercises 3: Data Technologies - Andreas Joachim Peters (CERN)
- 7:00 PM Dinner at the Delta cafeteria
- 8:00 PM Special evening talk: When Internet history meets philosophy - Francois Fluckiger

Tuesday, August 29, 2023

- 8:45 AM Machine Learning L1 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))
- 9:45 AM Software Security L1: Introduction - Sebastian Lopienski (CERN)
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Machine Learning L2 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))
- 12:30 PM Software Security L2: Security in different phases of software development
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Exercises 1: Software Security - Sebastian Lopienski (CERN)
- 5:30 PM Exercises 2: Software Security - Sebastian Lopienski (CERN)
- 7:30 PM Pizza Dinner

Wednesday, August 30, 2023

- 8:45 AM Machine Learning L3 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))
- 9:45 AM Data Analysis L4: Hypothesis testing and p-value - Toni Sculac (University of Split Faculty of Science (HR))
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Exercises 1: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))
- 12:30 PM Exercises 2: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Exercise 3: Software Security
- 5:30 PM Exercise 1: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))
- 7:30 PM Dinner

Thursday, August 31, 2023

- 8:45 AM Software Security L3: Web application security, exercise debriefing - Sebastian Lopienski (CERN)
- 9:45 AM Exercise 3: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Exercises 2: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))
- 12:30 PM Exercises 3: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))
- 1:30 PM Lunch
- 2:30 PM Exam
- 4:00 PM Coffee break
- 4:30 PM The CSC Traditional football match
- 7:30 PM Dinner

Friday, September 1, 2023

- 8:45 AM Student Lightning talks
- 10:30 AM Announcements
- 10:45 AM Coffee break
- 11:00 AM Transport to visits
- 11:30 AM Visits to GSCAN/Tartu Observatory
- 1:00 PM Transport to Delta building
- 1:30 PM Lunch
- 2:30 PM Graduation and closing ceremony
- 7:30 PM Closing dinner

Sometimes we hear

- There is too much to do, not enough time to rest or study
  - Reminder: Several activities are optional
  - Choice is freedom


Work
Hard


Play
Hard


The CERN CSC is not an everyday opportunity


If you liked it, tell your friends

The School Academic Dimension

- The school …
  - … is not a conference
  - … is not a place for lecturers to present their work, promote their projects
  - Does not replicate of common training available at home institutes, or in member state's universities
  - Does not deliver "technical training" courses

- Focus on **persistent knowledge**, less notions and knowhow

Education Science: Focus on Knowledge

- Knowledge versus Knowhow

Knowledge	Knowhow
Articulated to other knowledge of the learner	Generally stand-alone information
By nature, when taken by the learner, different between learners	Initially, the same for every learner
Transferable, adaptable to other environments	Transfer requires effort
When taken by the learner, persistent	Will be forgotten if not practiced
Requires related knowledge pre-exist	Limited pre-requirements

Global Values versus Local Values

- Global Values
  - Science, Sports, Music, Literature, …
- Local Value
  - Religion, Language, Literature, Music, …

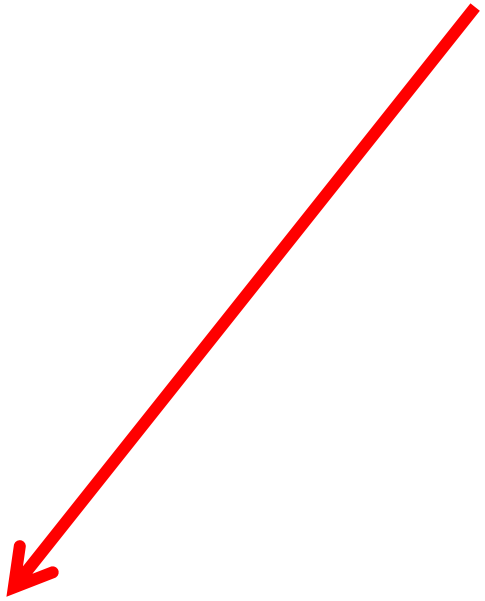
Becoming a Science ambassador

- Science is universal, and the scientific approach to problem, in many fields, could resolve many conflicts and misunderstanding
- Go beyond the pure science or computing skills
  - Bridging different domains is a rare skill
- Learn and improve also
  - Your communication skills
  - Teamwork
  - Leadership
  - Professionalism
  - Respect for diversity

Be ambitious, be brave

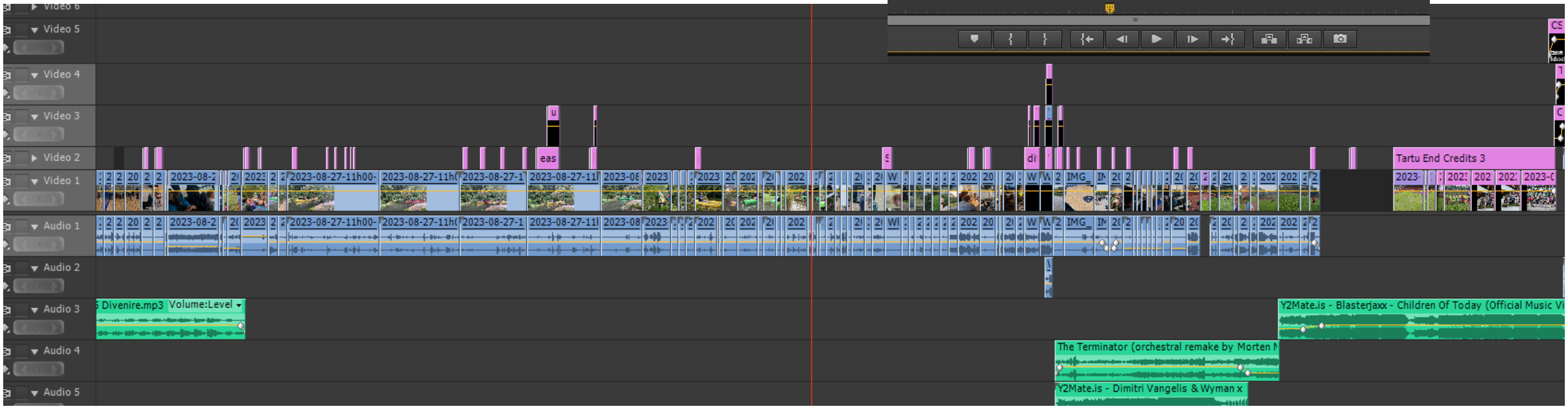
Be just and fear not

That's all Folks !



All good things come to an end…

But before closing the school



Summary of the School

- https://youtu.be/09qJsIMGQUM

CERN School of Computing 2023

Tartu, Estonia