



The CodER inspirational scenarios





Inspiration n°1: Anna Hadjihambi – Senior Postdoctoral Researcher in Brain-Liver Axis at the Roger Williams Institute of Hepatology London UK

Context:

Anna Hadjihambi obtained her BSc degree in Biochemistry from the University of Warwick and then completed her MSc degree in Neuroscience at UCL. Anna then received her PhD, funded by the prestigious Grand Challenges UCL, which was a collaboration between the departments of Liver and Digestive health and Neuroscience, Physiology and Pharmacology. In 2018 Anna started her postdoctoral fellowship at UNIL, Switzerland. During this time, she investigated the effects of non-alcoholic fatty liver disease on altering cerebral physiology, function, and metabolism, as well as the role of the monocarboxylate transporter-1 in protecting the liver and the brain.

In 2020, Anna joined The Roger Williams Institute of Hepatology in London, as a senior postdoc and sub-team lead starting the Liver-Brain axis group and leading her own research. She is currently investigating cerebral alterations arising due to various types of liver disease, the possible mechanisms behind them, as well as the long-term effects of these conditions on the brain following resolution of liver disease.

She daily works in the university's laboratories, but there was one day that something went wrong. She usually locks the door of the laboratory while she is working in order to make sure that no one will interrupt her during her research. However, on that day, when she had to leave the laboratory and go to conduct her lesson, she couldn't unlock the door. She just has a few specific objects that she can use to escape the room and go to the appropriate classroom.

Inspiration n° 2: Nishant Gohel- software engineer at Accolite Digital

Context:

The [Social Hackers Academy](#) is the first tech education school in Athens for vulnerable groups. Today there are 62,000 refugees stuck in Greece, who often haven't completed all levels of the formal education and don't have access to up-to-date skills training.

The Social Hackers Academy launched a code school teaching student how to become web developers and aims to provide a path out of the camps and towards a dignified, financially independent life.

In October 2022, the Nishant Gohel, a software engineer at Accolite Digital, who has 7 years of experience in Software testing & test automation and loves teaching people, designing memes, attending conferences and creating tutorials with interesting content through the Fun Doo Testers, is going to conduct an online seminar for the introduction to Software Testing through the code school of Social Hackers Academy. He starts welcoming the attendees, but he suddenly can't open his microphone, then the camera is frozen and the computer starts to be stuck and not working very well. Now, the Nishant Gohel has to define the buttons, and the tools (physical and online) that should be use in order to fix the problem.



Inspiration n° 3: Evangelia (Lilian) Balatsou, cognitive neuroscientist, conversational AI expert, founder of the Greek Girls Code

Context:

Evangelia (Lilian) Balatsou is invited to speak about women's participation in STEM in the context of World Women's Day during a TV show. The main purpose of this speech is the % of women's participation in STEM, the current state and the future of artificial intelligence and the definition of the conversational Artificial Intelligence.

Conversational AI combines NLP and virtual assistance to offer real-time, human-like support to the users. Some examples of conversational AI are chatbots and virtual assistants like Alexa, Siri, Google Assistant, Cortana, etc. These assistants understand natural language and user-intent to offer personalized responses. Unlike traditional chatbots that are capable of answering yes/no questions, conversational assistants can resolve much more complex user queries.

During her speech, she decides to showcase how Siri and Google Assistant work. However, Siri doesn't work and start not replying to her questions, statements and requests. The only way to unblock it is to go through the Siri settings and define the tools and applications that she can use for unblocking them.

Inspiration n°4: Ada Lovelace - celebrated as the first computer programmer

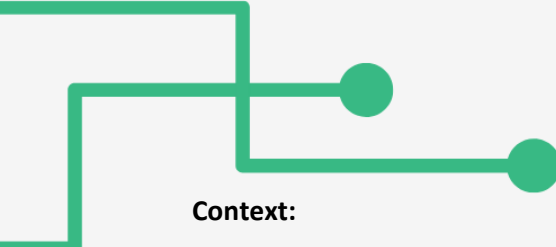
Context:

[Greek Women in STEM](#) is an independent initiative led and managed by a team of Greek women working in STEM fields. It is legally represented and supported by the non-profit organisation [IVUnited](#). Greek Women in STEM seeks to highlight and support the work of Greek women in STEM (Science, Technology, Engineering, Mathematics & Medicine) and all related fields. The second Tuesday in October has been established since 2009 as Ada Lovelace Day, a day to celebrate women in science by promoting programs that encourage young girls and women to pursue careers in STEAM.

On this day, the Greek Women in Steam has organised an event for young people, with various talks, presentations and a digital educational game called FemSteamMysteries created by Challedu, aiming that the participants will meet with role models and gain knowledge about their choices in the STEAM field. One of the presentations starts with Lovelace's contribution and goes on to give key points in the history of programming. But just as the event is about to start, a message appears on everyone's laptops saying that the computers have been hacked and in one hour all data will be lost. The only way to stop this, is for someone to crack the hacker's code, and retrieve all the data.

Inspiration n°5: Christos H. Papadimitriou - Theoretical computer scientist and professor in the "Computer Science" department of Columbia University in New York, USA





Context:

Christos Papadimitriou is a professor in the Electrical Engineering and Computer Sciences Department at University of California, Berkeley. Before joining UC Berkeley in 1996, he taught at Harvard, MIT, Athens Polytechnic, Stanford, and University of California, San Diego. He serves on the Campus Advisory Board of the Berkeley Center for New Media. Papadimitriou received the 2002 Knuth Prize from ACM SIGACT and the IEEE Technical Committee on the Mathematical Foundations of Computing for longstanding and seminal contributions to the foundations of computer science.

This year's [Human Brain Project Open Day](#), coordinated by the "[Athena RC](#)" welcomes the Greek distinguished professor Christos Papadimitriou of Columbia University, for a keynote speech on the contribution of computational science to the study of the brain and intelligence. You and your team are there to attend the conference as you admire Mr Papadimitriou's work. Soon you realise something is not going well as loud voices are heard from the conference lobby, and when you go there you see Christos Papadimitriou having lost the access to his usb stick and all notes from his speech that are inside to his luggage. Only 60' minutes are left before the time of his speech, so you decide to help him. The thing is that you are not looking for just a key to open the luggage, you have to do with a system of microcontrollers that opens a small box inside the suitcase.

Inspiration 6: Ron Rivest, Adi Shamir και Len Adleman (MIT University) algorithm - RSA system developpement

Context:


[Hellenic IT Museum®](#), the only IT Museum in Southeast Europe, started its operations in 2008 and since 2012 the Museum constitutes the first official Greek organisation that exclusively exhibits the IT history timeline from 1970 to mid-90s. During your visit to the museum one of your team members accidentally pushed some buttons and broke down the exhibit laptop containing everything about the RSA system development, and now key information is missing.

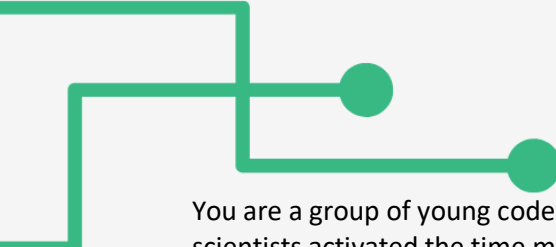
Now you have to find a way to retrieve all the information before the museum has to close. The only way to do that is to enter the museum's database and collect all missing information

Inspiration n°7: Vjera Marjanović-Krajovan, first female Ph.D. in STEM in Croatia

Context:

Institute Ruđer Bošković in Croatia is the biggest public STEM institute in the country while it retains its international recognition for being the leading and most competitive public institution participating in local and international research projects in the EU. Their scientists in the physics laboratory have found a way to use a chemical reaction investigated by Croatian scientists in the 1960-s that activates a time-traveling device designed by Croatian scientist Nikola Tesla in the early 20th century. However, once they activated the device they somehow also created a black hole in the Adriatic sea that is slowly reaching the Croatian coast. The only way to stop the catastrophe is to crack the computer code that allows the staff to control the time machine. Specifically the code will allow the scientists to travel to 1967 and reach scientist Vjera Marjanović-Krajovan who was at the time researching a chemical compound crucial for controlling Tesla's time machine. She might have a way to turn off the time machine and stop the black hole from reaching the coast.





You are a group of young coders that are visiting the institute with their professor. When the scientists activated the time machine you were automatically locked with the backup computer that is controlling the machine due to the automatic lock as part of the security measures. As soon as the machine was activated the whole building went into lockdown and scientists were just able to give last-minute clues and hints to you before the black hole caused the communications to shut down.

Inspiration n°8: Ayumi Moore Aoki, founder of the world's "women in tech movement"

Context:

Women in Tech® is an international non-profit organization on a mission to close the gender gap and to help women embrace technology. NGO aims to promote girls' and women's empowerment around the world, with a focus on Sustainable Development Goal 5b: harnessing technologies. The Head Office is in Paris, while they are a Global Movement with chapters in 6 continents, counting over 70.000 members.

In 2023 a global Women in tech conference has been organized in Split, Croatia. As young coders, you applied to participate on Erasmus+ mobility organized within the event. Mobility is related to robotics and you were supposed to attend several workshops organized by the robotics plenary.

While you were visiting the main control room, suddenly an alarm goes off, and you can see on the camera that people are running everywhere. A voice is heard telling everyone to leave or to die. Several AI's have been hacked, they are destroying everything and one of them is keeping Ayumi Moore Aoki, the founder of the movement, captive. They are not going to let her go unless they are paid a substantial ransom. The ransom is so huge that there is no way an NGO can afford to pay it.

You notice something on a computer screen. It shows you 2 options to click:

Option A: Pay 1 000 000 000€

Option B: Beat the code

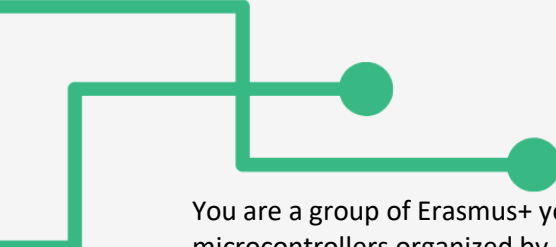
You click B and realize it's a quiz. It is written by one of the greatest hackers in the world who is confident that nobody can solve it besides him/her. If you solve it the AIs will reboot and Aoki will be saved. A timer is set to 45 minutes.

Inspiration n°9: Barbara Liskov one of the female pioneers in Computer programming. Barbara is a professor at MIT. Her innovations can be seen in every modern programming language including Java, C#, and C++.

Context:

Digital nomad lifestyle in Croatia became very popular in the last 5 years. Municipality of Dugopolje, being situated in a key area of the Croatian coast, decided to use this fact as an opportunity to introduce something innovative in the village. They are one of the most successful municipalities in Croatia, measuring only a 5% unemployment rate, strongly positive demographic growth and an overall financial success. They withdrew EU funds and built a smart house that will serve as a coworking space for Digital nomads. The house hasn't been made public yet due to final quality checks and it's expected to become open in 30 days.





You are a group of Erasmus+ youth who is in town at a learning mobility event related to coding and microcontrollers organized by Kalimera enterprise. The enterprise staff organized a study visit for you and you are the first people to ever visit the first smart house in Croatia. The house is completely controlled by microcontrollers. From doors and locks to the coffee machine, water faucet, ice maker, and even the toilet seat – everything is micro-controlled.

Barbara Liskov, the famous MIT professor just arrived to visit the house related to a paper she is currently writing. As her car parked outside enterprise staff and the municipality employees stepped out for to greet her and you were left alone. One of you accidentally pressed something and you are all locked inside. The windows and doors are locked shut and there are bars on the windows. You can't get out and nobody can get it. You can only communicate through written messages on the window.

The only solution to this situation is to control the microcontrollers in the house and unlock the front doors.

First note from the municipality crew is "Find the manual".

Inspiration n°10: Ada Lovelace and Charles Babbage, inventors of the first programming language in 1883.

History accuracy: (Worked together on the Analytical Engine, which was a primitive mechanical computer. Lovelace could discern the importance of numbers, realizing that they could represent more than just numerical values of things. Lovelace wrote an algorithm for the Analytical Engine, the first computer program, to compute Bernoulli numbers.)

Context:

It's October 13th, 1842 and Ada Lovelace, your uncle's cousin, asked you to be part of a special scientific group that is going to help her to create an algorithm based on the analytic machine Babbage. You are invited to her working studio, where she explains the concept to you after offering you a cup of tea. At some point, Ada leaves the room to look for some important notes about her work when, suddenly, the electricity shut down. Also, when leaving the room, she closed the door unintentionally and now it is locked. You can't hear Ada's voice, however, you notice that she's trying to knock on the door. At this point, you remember that once she mentioned that the key to the door is hidden in a safe box. You have to look for the safe box and try to find a way to communicate with Ada so you can access the key.

Inspiration n°11: Dr. Grace Murray Hopper, inventor of COBOL (Common Business Oriented Language) a language that could operate on all types of computers and that is widely used in the banking sector.

Context:




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CLC is an important Belgium bank situated in the center of Brussels. You, as one of the members of the security team, have the responsibility to check that all the procedures are being respected and all the software is running correctly. Noticing that the current system is too old and defective, your team is planning to replace it with a new one following the guidelines of Grace Murray, the inventor of COBOL. In the effort of replacing the system, something goes wrong. A maximum security alert is launched, which activates a self-destructing system consisting of a bomb that sets a timer of 60 minutes. During that time everyone has to leave the place before the explosion. You and your team want to fix this mistake and deactivate the bomb as quickly as possible. The guidelines of this system are very old and you can barely read the text. Nonetheless, some pieces of information will help you in finding an answer. Don't forget that every minute counts and every step can be crucial to fix the situation.

Inspiration n°12: Massimo Banzi is the co-founder of the Arduino project. He is an Interaction Designer, Educator, and Open Source Hardware advocate.

Context:

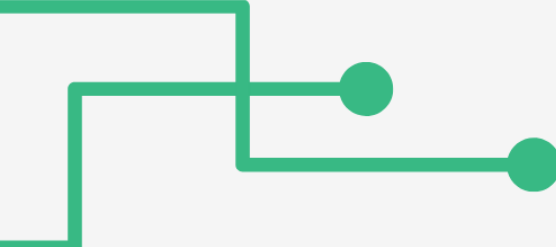
You are a high school student in the city of Torino, Italy and you are attending a technology workshop led by professor Massimo Banzi. The professor receives what it seems to be an important call and immediately leaves the classroom without saying a word. In the rush, he closes the door which is now locked. You, along with your colleagues try to open it but it seems impossible to go out. It's 9 o'clock and you're starting to worry because at 10 you have an important math test, the final one, you can't miss it if you want to pass the class. Since you know that professor Banzi is passionate about microcontrollers, you realize that the security system has been installed by him. After attending some workshops you've learned the basis of electronics and how to use a small microcontroller that he named "Arduino". You will do everything that is in your power to open the door by hacking that system.

Inspiration n°13: Dennis Ritchie – Father of the C programming language

Context:

The **A.M. Turing Award** is the highest honour a programmer can receive in computer science. It's 1983 and your professor, Dennis Ritchie will be co-awarded for his development of generic operating theory and specifically for the implementation of the UNIX operating system. When it's time to leave his laboratory at the Bell Labs at around 15:00, he realises that someone has locked him inside! The award! He has been waiting his whole life for this moment. Luckily, some have heard his voice and have called his team for help! You should hurry up! The awards ceremony starts in an hour!





Inspiration n°14: Carol Shaw – believed to be the first professional female video game designer

Context:

Carol Shaw is believed to be the first professional female video game designer. She first used a computer while in high school where she excelled at Maths and enjoyed playing text-based games.

After her graduation, she started working in the video gaming industry. Carol loved her job and was continuously working on developing new games. After hours of testing and working, she developed the first ever *Video Checkers* and *3-D Tic-Tac-Toe* in 1978 on her own. When the CEO of the company learned this news, he immediately launched them without giving her any credit!

But you, as one of her favorite colleagues should help her prove that all of the ideas and work were hers! Select proofs before the reporters and cameras arrive!

Inspiration n°15: Samuel Morse co-inventor of the Morse code - method of transmitting textual information as a series of on and off tones

Context:

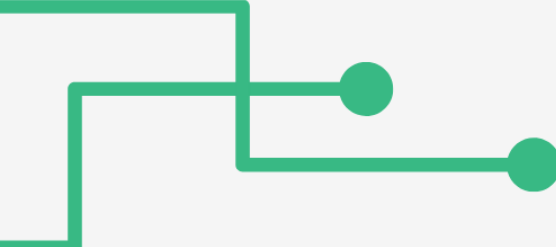
You're a high school student and today is the first day of your radio program! You have been dreaming about this day for a long time! You and your best friend have been preparing the playlists and songs for over a month, and suddenly, 10 minutes before your show, the signal gets lost and you can only hear random beeps and dissonant sounds. At that moment, you remember that during your last computer class, your teacher talked about a method, Morse Code, used in telecommunication to encode sound messages. Can you crack the code in time and make it on air? Hurry up, maybe the message broadcasting now has a secret meaning behind it!

Inspiration n°16: Margaret Hamilton – led the NASA software team that landed astronauts on the moon.

Context:

It's July 20th, 1969, the big day you and your team here at NASA have been waiting for! The leader of your team, Margaret Hamilton, has been working on writing Apollo 11 code that would land humans on the Moon forever! Everything is ready, the lunar module, Eagle, is approaching the moon's surface when suddenly a life-threatening error occurs, and Mission Control faces a "go/no-go" decision. You have 30 seconds to help Margaret decide on continuing the spacecraft or not. You cannot change the whole code, but small changes could work miracles! Remember that you only have a few seconds to help Margaret save the day and make sure that the astronauts get back home safely!





Inspiration n°17: Alan Turing – developed a universal computing machine (later called a Turing machine) that would be able to decode and perform any set of instructions

Context:

You work at the local Museum of Computing in your town, and this week is dedicated to Alan Turing. Your main exhibit is the Turing machine. On Friday, the Prime Minister will visit the museum, but as soon as you get there at 9:00, you realise that someone has locked it in a safety, especially locked with unique codes! Find the secret code before the Minister arrives, using a simulation of an analog computer.

Inspiration n°18: Donald D. Chamberlin - the principal designer of the original SQL language specification together with Raymond Boyce.

Context:

You are an accountant in one of the biggest banks in California. The CEO is out of the office for some hours, so you are in charge of the whole department. The most important task for today is to withdraw the 1 million dollars collected from last night's auction. As soon as you click on the "withdraw", you realise that you have removed a million dollars from the wrong customer, Donald Chamberlin! Mr. Chamberlin immediately calls the police and everyone in your bank might get fired. At this point, you are trying to retrieve all the correct data from the Bank's computer system. You and your team should hurry up! Search for the relevant transactions and retrieve the correct bank accounts before the CEO gets back!





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