

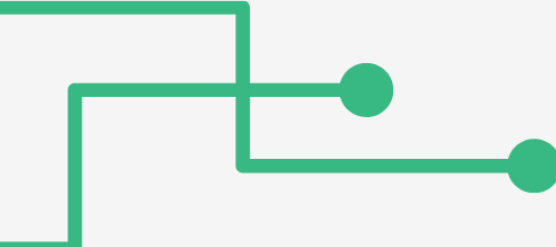


The CodER Physical Scenarios Handbook

Instruction for youth workers

Title: Boom in the Bank





Boom in the bank!

Instruction guide for youth workers/ teachers

1. Introduction

a. Context

The CodER project seeks to enable youth workers to gain basic knowledge in programming and microcontrollers so they can transfer this knowledge to young people through non-formal education and using innovative methods like escape room creation. CodER also aims to address youth unemployment by giving them access to training relevant to the labor market's needs. Basic programming knowledge is a skill needed in every field discipline nowadays, from social sciences to business and entrepreneurship. The objective is to use escape rooms appropriately to positively impact young people's engagement and learning in programming and microcontrollers. The aim is for ERs to be converted into effective and efficient educational tools, which take into consideration the validated results of the already existing research and simultaneously employ various synchronous digital tools, such as online courses and interactive platforms, digital gamified processes, digital media, VR Elements, apps, QR codes, etc.

b. Partners

DigiJeunes → www.digijeunes.com/

CIP (website) → www.citizensinpower.org

RITE (website) → <https://ritecy.org/>

ChalEdu (website) → <https://challedu.com/>

Kalimera (website) → www.kalimera.hr

AKMI (website) → <https://iek-akmi.edu.gr/>

To know more about the project: <https://coderproject.eu/>

c. Learning goals of the ER

- To introduce some basic concepts of programming through solving challenges
- To learn about the RFID system
- To learn how to use the Arduino board, how to write the code and upload it
- To learn about light sensors



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Cofinancé par
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a. Targeted audience

- i. Age: 9+
- ii. Level: Beginner- intermediate
- iii. Group size: 2-6 people
- iv. Type of target group: Young people interested in learning some basics about coding and microcontrollers, school students and families

2. The ER scenario

a. Storyline

The CLC is an important Belgium bank situated in the center of Brussels. You, as one of the security team members, 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 plans to replace it with a new one following the guidelines of Grace Murray, the inventor of the COBOL language. In the effort to replace 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 evacuate the place with the help of the authorities. You and your team want to fix this mistake and deactivate the bomb as quickly as possible. The guidelines of this system are ancient and you can barely read the text. Nonetheless, some information in the manual will help you find some answers. Don't forget that every minute counts and every step can be crucial to fix the situation.

b. The objective of the game

Once you find out the correct way of deactivating the bomb you will carefully proceed until the timer stops. If the timer stops, that means that the situation is under control and you have won.

1. Creating the setting

a. Needed materials/ equipment for each table

- A bomb to defuse
 - Download the instructions [here](#) ~15€
- A box that opens with RFID tags
 - Download the instructions [here](#) ~25€
- A bucket with a dozen of RFID tags ~10€
- An RFID ID Reader with screen ~20€
 - Download the instructions [here](#) (under construction)
- A printed manual that explains how to fix the RFID Reader



- Download the manual [here](#)
- Alt Table Printed [here](#)
 - You mark draw, on each tag, two symbols from this table (for this you can either use permanent mark, a sticker, a post it with some tape, etc)
- A computer with Arduino IDE pre-installed (You can download it [here](#))
- A box that opens with light sensor ~25€
 - Download the instructions [here](#)
- The final hint printed and shredded in two
 - Download blank riddle [here](#)
 - See a riddle example [here](#)
- Two invisible ink pens with UV Led ~10€
- A textbook with highlighted areas with invisible ink
- A white paper and a normal pen to take notes
- A multi-socket with USB port is recommended to plug the components easily (You can buy them [here](#))

Total cost should be at a maximum of 150€ if you only take the best quality materials. However, this price can highly vary depending on the quality of the tools taken or if you have a 3D printer at home or even if you take it from Aliexpress instead of Amazon.

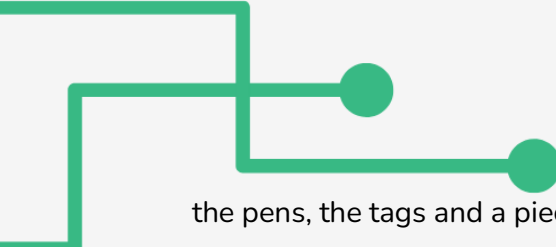
b. Setup of the table

- Plug in the multi-socket and place it on the table.
- Put the bomb at the back of the table, but keep it disconnected.
- Place the RFID box on the table and put half of the clue to defuse the bomb inside. Place the light sensor box on the table and put the other half of the clue inside.
- Put a bucket with the RFID tags
- Turn on the electricity to activate the mechanisms. Make sure the boxes are fully closed.
- Place the RFID reader on the table, with the Arduino cable unplugged. If necessary, flash the default code on it.
- Place the computer, the Arduino manual, white paper, pen, and UV pen on the table.
- You can add any ornament for immersion (drawings, pictures, items, etc)

c. Installation and reset

Take care that nothing has been forgotten or lost and then proceed to the cleaning. The table should come back to its initial shape. Put back the two clues inside the boxes and close them again and leave them plugged. Put back to their original place the papers clues,





the pens, the tags and a piece of paper. Unplug the bomb. Flash the default code onto the RFID Reader and everything is ready to be played again.

d. To have in mind

Any missing or weak element can break the smooth running of the game. You should have a spare kit in case something breaks so you can replace it.

2. The game

a. The game master

The game master will introduce the story to the players and have them take their seats at the table. He/she will explain the guidelines for the game, emphasizing the importance of not forcing the boxes open and being careful with the elements on the table. When the players are ready and understand the concept of the game, the game master will start the game by activating the bomb. He will remain present during the game, but should not interact too much with the players and allow them to search for the answers on their own. If the players are struggling with a particular mystery, the game master can provide clues at his/her discretion. He/she may also add pressure or relieve stress through his dialogue with the players. Last but not least, he/she needs to check if the mechanisms of the boxes are working properly when the participants try to open the boxes.

b. Introduction & instructions

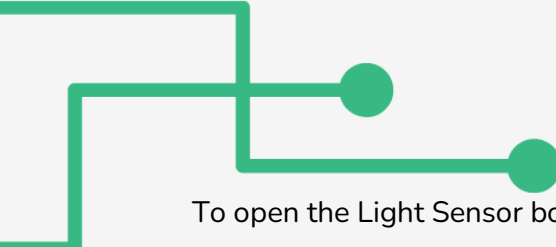
First, introduce the concept of an escape room to the participants if they are not familiar with it. Then, explain the guidelines for the game. Next, introduce the storyline. The old security system, which includes a self-detonating bomb as a precautionary measure, has been activated and will explode in 45 minutes to seal the money room. However, Grace Murray, the inventor of COBOL, left instructions in the room on how to deactivate the bomb if necessary. These instructions may be old and difficult to understand, but they are the key to escaping the room before the bomb explodes.

c. Hints

The hints for opening the boxes can be found on the table.

To open the RFID box, there will be a bucket of RFID tags. The participants can use the RFID reader, which has an Arduino code printed and shredded on a piece of paper. The participants should transcribe the code onto the computer and upload it to Arduino. This will allow them to read the IDs of the RFID tags and determine which ones are needed to open the box. The correct IDs should be written on the box itself.





To open the Light Sensor box, there will be a book or text document with a hidden message that provides instructions for opening the box. For example, the message may say "Light on 1 & 2 and Night on 3 & 4," which means the participants should expose sensors 1 & 2 to light and keep sensors 3 & 4 in the dark.

The answer to defusing the bomb will be written on a piece of paper, which will be cut in half and placed in each box.

d. Game stages

i. The beginning

Participants should start searching blindly and get some understanding of the game by looking at the boxes and the hints. They will discover the two different challenges, they can choose to split into groups or to stay together to solve them.

ii. The course of the game & solutions

1. Challenge #1

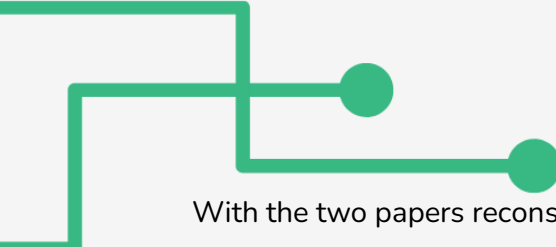
The RFID Reader task requires the participants to use an Arduino board to read the IDs of RFID tags. A manual with simple instructions on how to upload the code to the Arduino board and read the IDs will be provided. Once the participants are able to read the IDs, they will need to use the Alt Table. On each tag should be drawn two symbols from the Alt Table and on the box should be written: "Bigger to Smaller". Participants need to make an addition between the two values of each tag and determine their order. They can then use the IDs to try and open the RFID box, which should have the correct IDs and their order written on it. The first half of the riddle should be inside the box.

2. Challenge #2

The participants are given a textbook with some letters highlighted in invisible ink. They can use a UV pen, which has been placed on the table, to reveal the highlighted areas. By reconstituting the message letter by letter, they will receive a message such as "Light on 1 & 2, Night on 3 & 4." On the box, the sensors are labeled with the numbers 1, 2, 3, and 4. The participants need to understand that the box will open when they expose sensors 1 & 2 to light and cover sensors 3 & 4. When the box is opened, it should deliver half of the paper of the next riddle..

3. Challenge #3





With the two papers reconstituted, participants have to understand a programming riddle. The bomb can be defused by disconnecting the cables from the bomb in the proper order.

iii. Ending

1. In case of success

The timer on the bomb stops, the participants win and the bank has been saved.

2. In case of failure

The first wrong cable removes 5 minutes, the second 10 and the last one brings it to 0. The bomb makes a small noise to announce defeat.

e. Debriefing phase and feedback

After the game, the participants can stay, share their feelings about the game and debrief about the concepts they had to use. If they want they can also ask questions and the game master can show them the mechanisms hidden and explain the Arduino code used previously.





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