Workshop

Unlocking A.I.

esplora®

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A WORKSHOP DEVELOPED AS PART OF EMPOWERING YOUTHS IN STEM THROUGH THE ARTS KA2 ERASMUS+ PROJECT
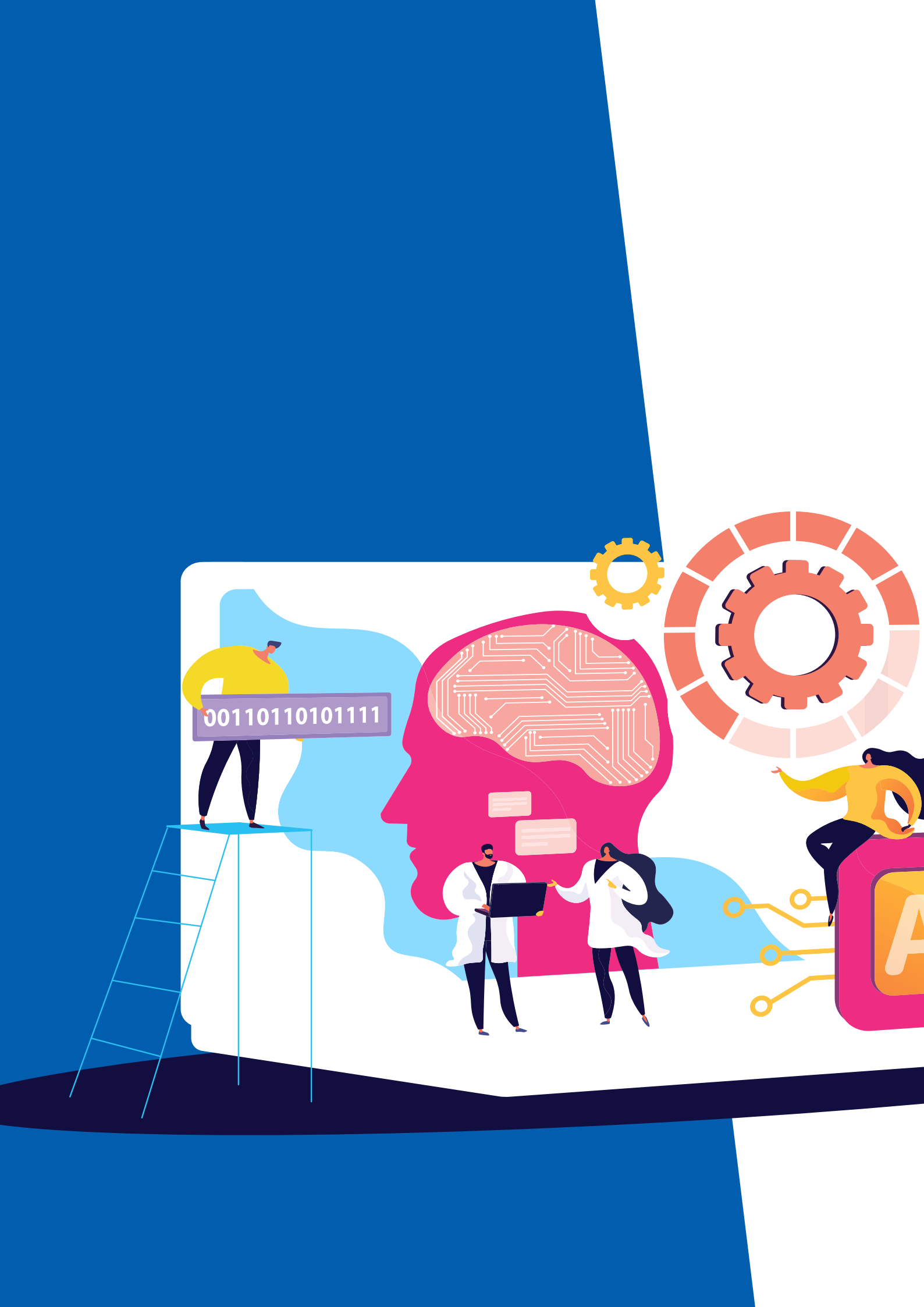
This Erasmus+ project forms part of the Strategic Partnerships for youth with a duration of 20 months, that commenced in October 2020 till May 2022. This project was led by Esplora Interactive Science Centre, in collaboration with Inizjamed, Aġenzija Żagħżagħ, NEMO Science Centre and, Cosmo Caica Barcelona. The main objective of this project was that all partners will collaborate both with the youths, together with the support of youth workers to engage them in informal education in relation to STEAM and science communication.

Furthermore, sharing the knowledge and experiences have enhanced the projects' outputs; three interactive workshops, targeted for youths between 16 to 24 years, all developed in collaboration with the three Science Centres forming part of this project. The bases of these intellectual outputs, being Technology extending to Artificial Intelligence and Robotics were decided through research in collaboration with youth and youth workers from Aġenzija Żagħżagħ, as well throughout training events organised by Inizjamed.
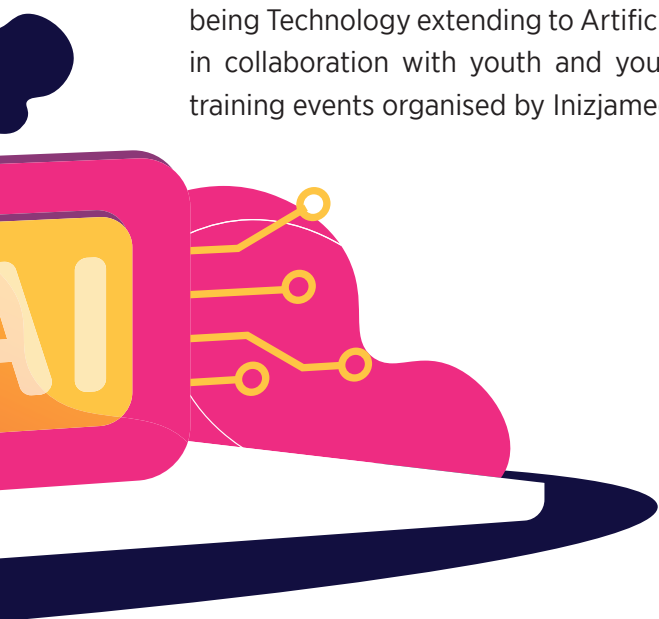
UNLOCKING A.I. – WORKSHOP BRIEF

PREMISE OF THE WORKSHOP

The workshop will start with a 30 minute codebreaker activity in groups themed around Artificial Intelligence. The below is a short synopsis of the plot which we will be explaining to the participants before the start of the workshop. The storyline was chosen to shed light on the fact that A.I. is not science-fiction or technology which will be developed in the future, but it is something which we already use on a daily basis in many every day circumstances.

"It's 1941 Germany, at the height of WW2. Arnold Shulte, a German researcher, has spent the last years of his life building and testing out a time machine, and one day it finally worked! He wanted to go to the future to find new technology that can help his research. He chose to travel to 2022 and discovered Artificial Intelligence! Fascinated by the progress that it has brought to society, he wants to take A.I. back to the 20th century but we can't let him mess up the timeline! Help us take back all of the files in his safe before its too late!"

Briefcase

We managed to grab his briefcase while he was away...that might give us some clues to find the combination for the safe. He wants to communicate with his coworkers back in Germany but he is still not sure how to do that. In the first letter we find in the briefcase, he explains his timetravel success but lets them know that he is afraid that others will steal his research. He expresses that he will try to find an enigma machine like the Germans used in WW2 to encode his messages and protect them from others. He managed to find a digital version in 2022 which is found in the locked tablet.

CODEBREAKER PUZZLES

Each team of participants will then be given a number of physical resources such as a locked briefcase. They must solve the puzzle presented to them to unlock items and find clues which will lead them to the combination of the digital safe in the room.

Enigma Machine

Keeping with the WW2 theme, a (digital) Enigma machine will be used by the teams to decode a number of clues. This was included in the workshop as a nod to Alan Turing and his efforts to decrypt German enigma machines. Some of the earliest work in the field of artificial intelligence was in fact credited to him and his ideas would lead to pioneering work in the field of computer science and A.I. eg. The Turing Test

Self-Driving Car Puzzle

This puzzle has a simple maze format that will encourage the participants to get a self-driving car from point A to point B. However, there are obstacles they must avoid. These are objects or instances which are known to be issues which still need to be solved in the development of automated vehicles. Examples include: pedestrians, cyclists, construction work and other situations which are unknown to the A.I. unless it was trained to respond to that particular scenario.

SIRENS 🚒 🚑 🚓
PEDESTRIANS 🚶 🚶 🚶
CYCLISTS 🚲
UNSEEN OBJECTS 🛸
CONSTRUCTION 🚧
TRAFFIC LIGHTS 🚦

This will expose the participants to the issues which are faced by A.I. researchers in the field as they work to find appropriate solutions.

HR & Recruitment Puzzle

A.I. is often used in HR departments to help screen candidates and choose the best applications to be seen by staff members. However, machine learning needs previous data to recognize patterns and make choices based on those patterns. If the data given to the A.I has any biases present, the machine will recreate those same biases in the choices it makes. This has led to real life issues such as the sexist algorithm that was being tested by Amazon (**https://www.bbc.com/news/technology-45809919**). Since many employees were males, this led the A.I. to believe that successful candidates had to be male. This puzzle recreates this scenario in order to shed light on the biases which may present themselves in artificial intelligence research.

Translation Puzzle

Speech recognition, voice to text functions, and natural language processing are all capabilities of artificial intelligence. One is able to program a machine in such a way that it is able to understand our speech, translate it and elicit emotions and understanding from that information. This is represented in the translation puzzle as the participants must first understand what they are hearing and then translate it using the limited word bank which was presented to them. They will also be made aware of how much data an A.I. needs to learn something which to them, might be very simple to conceptualize.

Emotions Puzzle

Many of us use Face ID multiple times a day to unlock our mobile phones. This is possible due to A.I. which was trained in a particular way to recognize faces by comparing unseen data with previously seen data. In the same way, an A.I. may also be trained to recognize emotions in those faces by recognizing what traits occur in faces which are showing a particular emotion and searching for those same traits in unseen data.

Resources Needed

1 Digital Safe with 5-digit code
Per Team
- 1x Laptop Case with handles
- 1x 4-digit bike lock
- 1x Pair of Scissors
- 2x 3-digit padlocks
- 1x Diary with 3-digit Lock
- 3x Paper Letter Envelopes
- 1x Flat File
- 1x pair of 3D glasses (paper)
- 1x Clear A5 envelope button file
- 1x Tablet with Enigma Machine app installed
- 1x Cashbox (with key)
- 1x Pencil Case
- 1x UV Light Pen (Invisible Ink Pen)
- 1x Wood Wine Box with drilled holes
- 1x Small Cable Tie
- 1x Talking Tile
- 1x Cryptex with 6 letter code

Preparation

1. Print, cut and laminate the following
    *   CV Cards
    *   Emotion Cards
    *   Number Wordle Puzzle
    *   Wordle Puzzle Instructions
    *   Self Driving Car Note

2. Prepare the letters
    *   Print 3 letters + fold them and place them each in an envelope
    *   Print and cut out map and place it alongside letter 1
    *   Add the rest of the items inside each envelope as outline in diagram on the next page

3. Prepare the safe clues
    *   Print safe clues on sturdy cardboard in a different colour (not white) eg. brown and cut out each one individually
    *   Prepare Day 12 clue by covering up the clues with red/orange ink. Follow this tutorial **https://www.youtube.com/watch?v=fSX3P5Pc2Uc&t=220s**
    *   Prepare the red filter by cutting out the red lens of a pair of paper 3D glasses
    *   Prepare Day 15 Clue by writing the encrypted text in the blank space with the UV pen

4. Setting Up
    *   Record talking tile sound (audio file should be attached) -   Print out papers for flat file:
        *   Enigma Machine Instructions
        *   Rotor Settings Sheet
        *   Self Driving Car Map
        *   Translation Sheets x2
    *   Print decorative cover for Talking Tile + Emoji Label for diary. Tie the label to diary by punching a hole where marked and using string to attach it.
    *   Set up the safe, tablet and all locks with the right combination as seen in diagram below
    *   Place all items, papers and clues in the right locations by following the diagram below
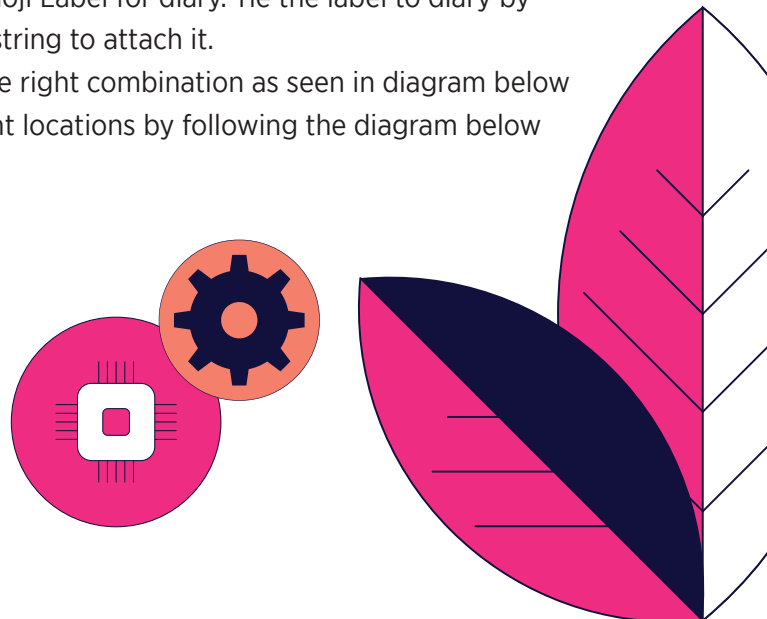
Laptop Case 2718
(4-digit bike lock)

Front Pockets

Scissors 642
(3 digit lock)

Secret Diary 582
(3 digit lock)

A5 File (marked with 3x3 grid)
- Number Wordle Puzzle
- Wordle Puzzle Instructions
- Self Driving Car Note
- Emotion Cards x4

Inside
- Letter #3
- Safe Clue (Day 15)
- Red Filter

Main Compartment

Tablet
With Enigma Machine
app installed

Letter #1
- Folded Map
- Emotion Cards x4
- Safe Clue (Day 1)

Flat File
- Enigma Machine Instructions
- Rotor Settings Sheet
- Self Driving Car Street Maze
- Translation Sheets x2

Pencil Case 888
(3 digit lock)
- UV Pen

Cashbox (Locked with a key)
- Emotion Cards x3
- Safe Clue (Day 12)

Wood Box
(Cable tie to cut open)

CV Cards
(x12)
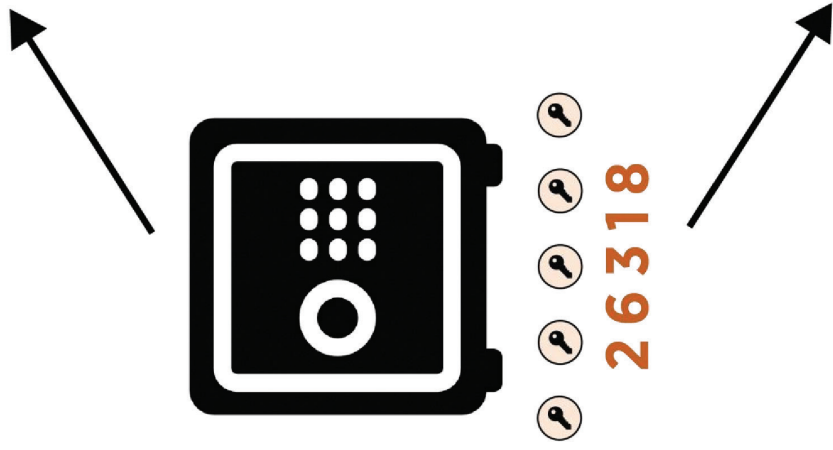
Talking Tile

Letter #2
Emotion Cards x4
Safe Clue (Day 6)

Cryptex LUDWIG

Cashbox Key
Safe Clue (Day 6)

26318

Day 1

A QLBWQ F RA GBQZP OWKGJLCY EK XHD UKBYTH

Day 6

ZBSS JFWD ZRDJWVO SQD YSRFF SP VWJ UFCY EBTMNPV

Day 10

NCAP JXU CEV BTTAM VHFB C ZSE BRWX

Day 12

Day 15

_____

_____

DECODED CLUES

I think I am being followed by two people	DAY 1: A QLBWQ F RA GBQZP OWKGJLCY EK XHD UKBYTH
They were outside the house at six this morning	DAY 6: ZBSS JFWD ZRDJWVO SQD YSRFF SP VWJ UFCY EBTMNPV
This was the third time I saw them	DAY 10: NCAP JXU CEV BTTAM VHFB C ZSE BRWX
I hope that at least one of you is looking for me	DAY 12: O JFAO UQQY BL HZKDU PVI HE QLT JG SNAEBWE LUW SB
Find me on the eighth floor	DAY 15: ERQG TG MO QRF TMZEKN ORF-GA

These are not to be given to participants

To my associates,

I did it! I cannot believe I did it! I am now in the year 2022. The world is so different now! They have something called artificial intelligence that helps them with so many tasks. It will definitely be of help for us in 1941, so I am trying my best to collect as much information as possible while I try to find my way back to you. I travelled far and wide to try and find a solution, from Munich to Warsaw to Sofia, Trieste, Paris and even Nice! I will do my best to find a way to speak with you soon, but these letters will do for now. Maybe I can find an enigma machine like the ones we have back home so I can make sure no one else finds out about this! I trust that you will keep these secrets safe.

Best regards,

Arnold Schulte

To my associates,

It seems like I will be spending quite some more time here. I think I might need some help to figure out how to get back to 1941 ... so I looked for some resumes from local engineers to see who the best candidate will be. Their skills and expertise will definitely be of help! In 2022, they have artificial intelligence that chooses new recruits for you! Isn't that great? I don't have access to it yet however, so I'll just have to do it myself it seems. 7 people will make a great team, I think. Only one more person left to choose ... who will it be?

Best regards,

Arnold Schulte

To my associates,

In the time I've been here, I've learnt so much about artificial intelligence. They use it for everything here; from navigation, to writing, advertising and even in the health sector. As I already promised you, I am compiling all this information to bring it back to you once I find a way to come home. All the documents will be locked inside the safe in my office. If you manage to find me here, you'll only be able to unlock it by reading between the lines. Best of luck.

Best regards,

Arnold Schulte

Remember: Red goes with red to reveal blue

ENIGMA MACHINE
Instructions for use

ROTORS

hel Batterie dkl · aus · Sammler

A   A   N

INPUT KEYBOARD

Q W E R T Z U I O
A S D F G H J K
P Y X C V B N M L

Q W E R T Z U I O
A S D F G H J K
P Y X C V B N M L
DEL

INPUT JLEURR OYKOKPL

OUTPUT SECRET MESSAGE
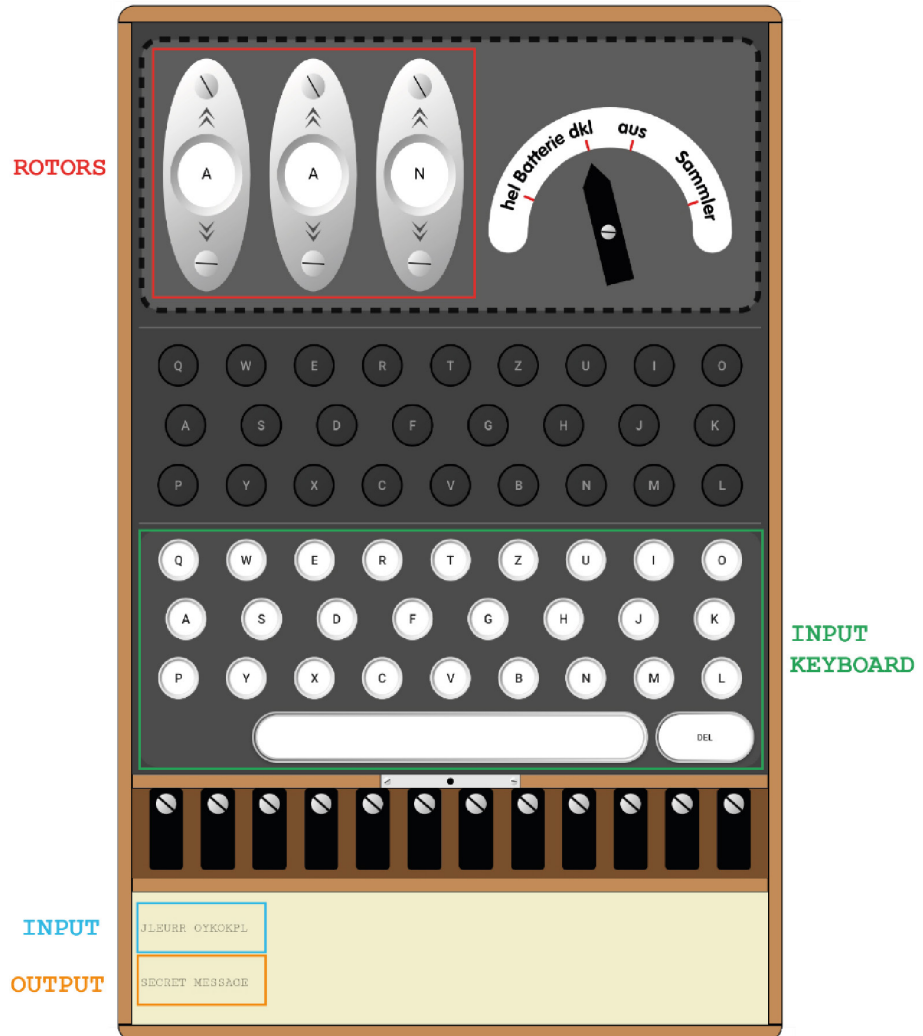
1. Set each of the rotors positions to the desired position from A to Z.
2. Use the input keyboard to type the message you wish to decode.
3. Your message should appear on the output line.

Day 1	**A-J-K**	**Day 11**	**E-S-P**
Day 2	**F-P-B**	**Day 12**	**M-R-T**
Day 3	**H-D-E**	**Day 13**	**J-E-A**
Day 4	**O-P-L**	**Day 14**	**I-L-R**
Day 5	**K-U-A**	**Day 15**	**O-R-T**
Day 6	**L-R-T**	**Day 16**	**A-R-B**
Day 7	**B-S-C**	**Day 17**	**G-D-S**
Day 8	**S-R-B**	**Day 18**	**V-C-O**
Day 9	**P-R-A**	**Day 19**	**E-T-G**
Day 10	**H-G-O**	**Day 20**	**S-B-M**

START

END

1
2
3
4
6
8
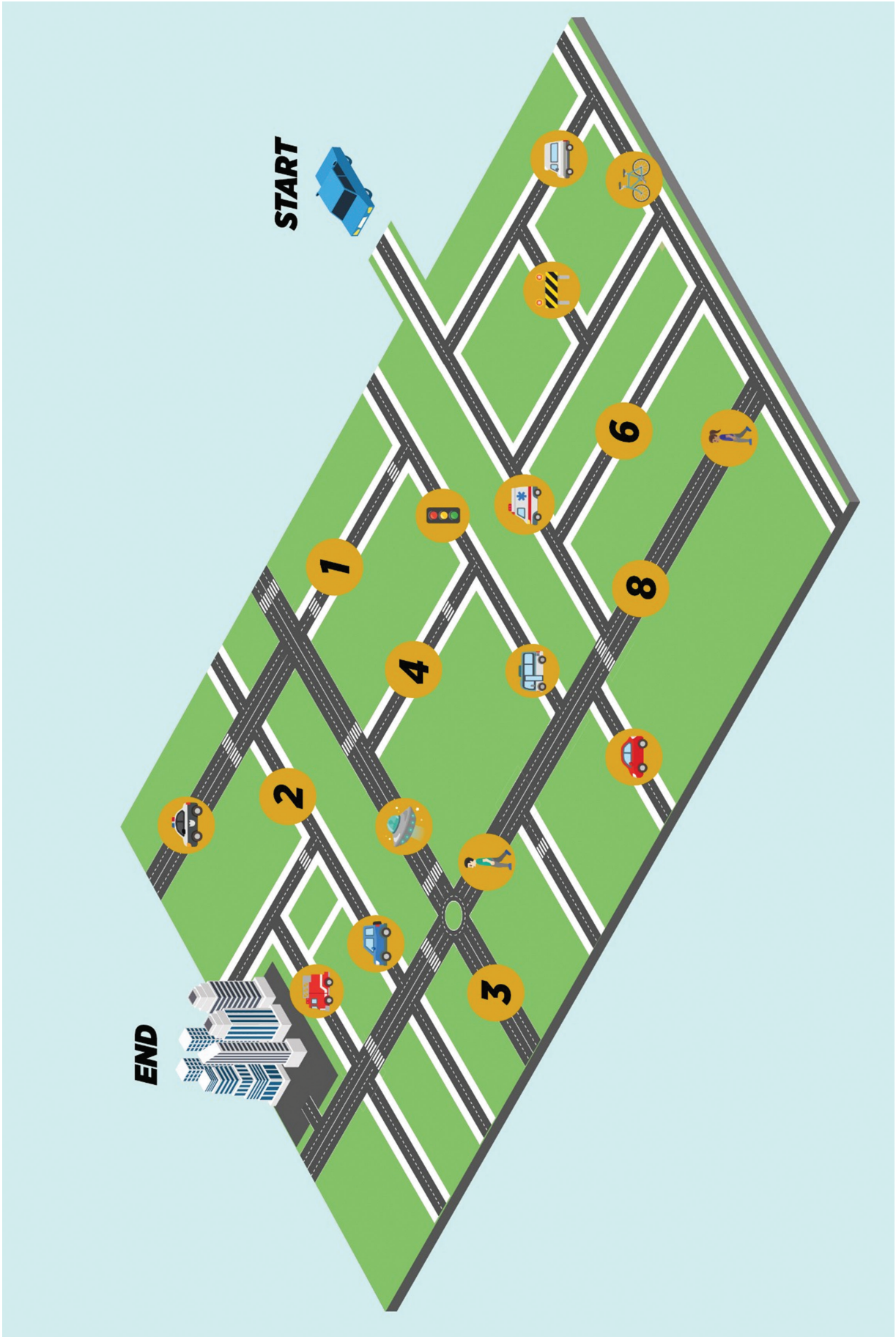
🇩🇪	🇬🇧
hinter	behind
erreichen	reach
bleistift	pencil
schreiben	write
gehen	go
baum	tree
lesen	read
mit	with
schneiden	cut
benutzen	use
obendrauf	on top

🇷🇴	🇬🇧
din	from
cheie	key
ușoară	light
alabastru	blue
după	after
încerca	try
galben	yellow
carte	book
între	between
patru	four
deschis	open

🇵🇹	🇬🇧
debaixo	under
vermelho	red
oito	eight
fechar	close
de	of
treze	thirteen
perto	near
fora	out
entre	between
olhar	look
preto	black

🇭🇺	🇬🇧
körul	around
hely	place
felett	above
a	the
üveg	glass
holnap	tomorrow
mozog	move
három	three
közel	near
kek	blue
hallgat	listen

0	5	4	8	1
5	2	8	0	2
3	5	9	4	✕
9	1	2	7	3
3	8	9	6	1
0	6	4	7	1

Self driving cars seem to get confused by ...

SIRENS

PEDESTRIANS

CYCLISTS
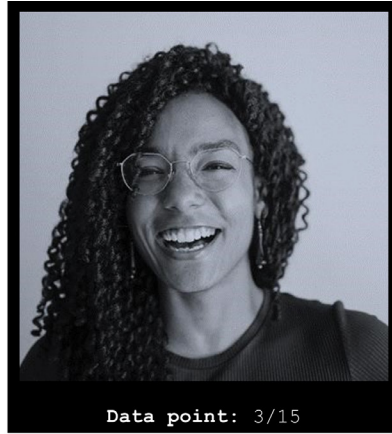
UNSEEN OBJECTS
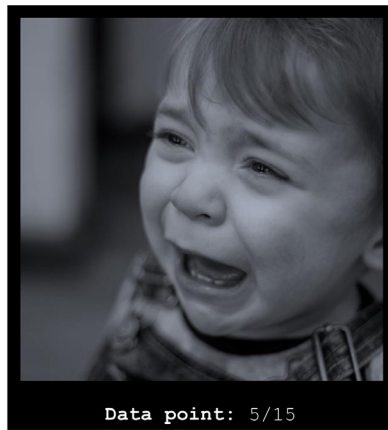
CONSTRUCTION
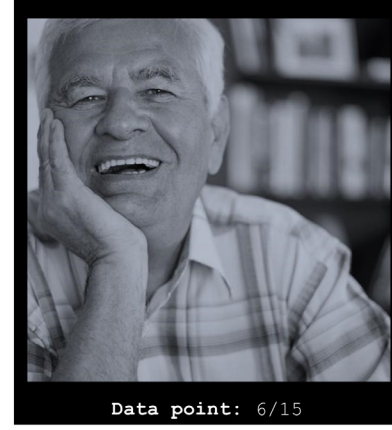
TRAFFIC LIGHTS
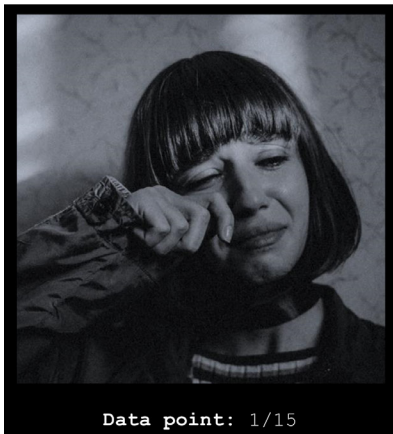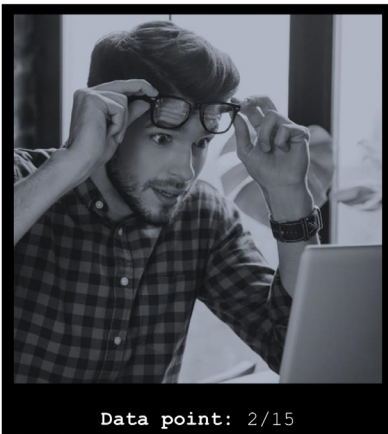
Data point: 1/15
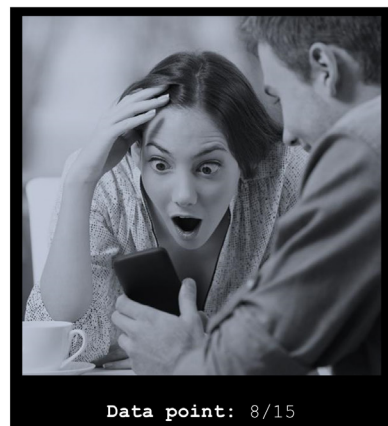

Data point: 2/15

Data point: 3/15
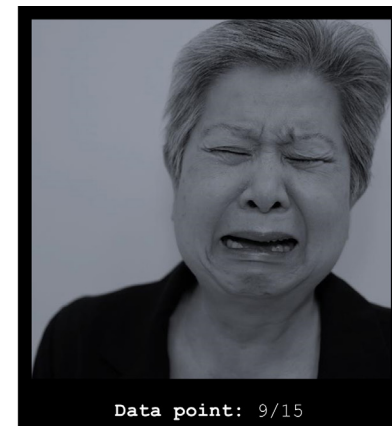

Data point: 4/15

Data point: 5/15

Data point: 6/15
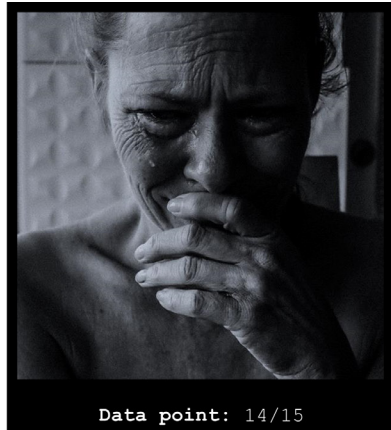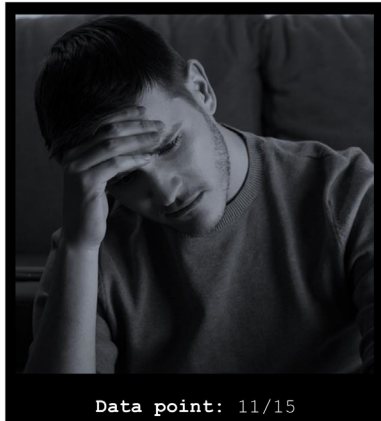

Data point: 7/15

Data point: 8/15

Data point: 9/15

Data point: 10/15

Data point: 11/15

Data point: 12/15

Data point: 13/15

Data point: 14/15

Data point: 15/15

ALBERN KÖHLER

SKILLS

DETAIL ORIENTED	94%
MANUAL DEXTERITY	93%
PROBLEM SOLVING	91%
CREATIVITY	95%
TEAMWORK	82%

EDUCATION

BSc Mechanical Engineering
2005-2009

EXPERIENCE

Mechanical Engineer
13 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●
CATIA ● ● ● ●

APPROVED

GUNTER ZIEGLER

SKILLS

DETAIL ORIENTED	90%
MANUAL DEXTERITY	93%
PROBLEM SOLVING	95%
CREATIVITY	98%
TEAMWORK	89%

EDUCATION

BSc Mechanical Engineering
2011-2015

EXPERIENCE

Mechanical Engineer
5 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●
CATIA ● ● ● ● ●

APPROVED

ADRIAN WEISS

SKILLS

DETAIL ORIENTED	77%
MANUAL DEXTERITY	83%
PROBLEM SOLVING	91%
CREATIVITY	100%
TEAMWORK	87%

EDUCATION

BSc Mechanical Engineering
2011-2015

EXPERIENCE

Mechanical Engineer
5 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●
CATIA ● ● ● ● ●

APPROVED

THOMAS MÜLLER

SKILLS

DETAIL ORIENTED	88%
MANUAL DEXTERITY	73%
PROBLEM SOLVING	97%
CREATIVITY	91%
TEAMWORK	93%

EDUCATION

BSc Mechanical Engineering
2008-2012

EXPERIENCE

Mechanical Engineer
8 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●
CATIA ● ● ● ● ●

APPROVED

ARNOLD SCHNEIDER

APPROVED

SKILLS

DETAIL ORIENTED	94%
MANUAL DEXTERITY	82%
PROBLEM SOLVING	97%
CREATIVITY	92%
TEAMWORK	80%

EDUCATION

BSc Mechanical Engineering
2006-2010

EXPERIENCE

Mechanical Engineer
12 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●

CATIA ● ● ● ● ●

GÜNTHER MEYER

APPROVED

SKILLS

DETAIL ORIENTED	87%
MANUAL DEXTERITY	100%
PROBLEM SOLVING	90%
CREATIVITY	90%
TEAMWORK	93%

EDUCATION

BSc Mechanical Engineering
2015-2019

EXPERIENCE

Mechanical Engineer
3 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●

CATIA ● ● ● ● ●

LOUISA NEUMANN

SKILLS

DETAIL ORIENTED	100%
MANUAL DEXTERITY	91%
PROBLEM SOLVING	89%
CREATIVITY	87%
TEAMWORK	77%

EDUCATION

BSc Manufacturing Engineering
2009-2013

EXPERIENCE

Manufacturing Engineer
9 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●

CATIA ● ● ●

SOPHIA WAGNER

SKILLS

DETAIL ORIENTED	100%
MANUAL DEXTERITY	73%
PROBLEM SOLVING	81%
CREATIVITY	84%
TEAMWORK	93%

EDUCATION

BSc Mechanical Engineering
2006-2010

EXPERIENCE

Mechanical Engineer
11 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●

CATIA ● ● ● ● ●

LUDWIG ZIMMERMANN

SKILLS

DETAIL ORIENTED **100%**

MANUAL DEXTERITY **73%**

PROBLEM SOLVING **97%**

CREATIVITY **95%**

TEAMWORK **93%**

EDUCATION

BSc Mechanical Engineering
2009-2013

EXPERIENCE

Mechanical Engineer
8 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●

CATIA ● ● ● ● ●

JÜRGEN HAAS

SKILLS

DETAIL ORIENTED **84%**

MANUAL DEXTERITY **94%**

PROBLEM SOLVING **89%**

CREATIVITY **82%**

TEAMWORK **100%**

EDUCATION

BSc Electrical Engineering
1985-1989

EXPERIENCE

Electrical Engineer
33 years

COMPUTER SKILLS

AUTOCAD ● ● ● ● ●

CATIA ● ● ● ● ●

JOHANN SCHMIDT

SKILLS

DETAIL ORIENTED **85%**

MANUAL DEXTERITY **61%**

PROBLEM SOLVING **86%**

CREATIVITY **80%**

TEAMWORK **100%**

EDUCATION

BSc Mechanical Engineering
1983-1987

EXPERIENCE

Mechanical Engineer
35 years

COMPUTER SKILLS

AUTOCAD ● ● ●

CATIA ● ● ●

ISABEL HUBER

SKILLS

DETAIL ORIENTED **94%**

MANUAL DEXTERITY **66%**

PROBLEM SOLVING **85%**

CREATIVITY **84%**

TEAMWORK **88%**

EDUCATION

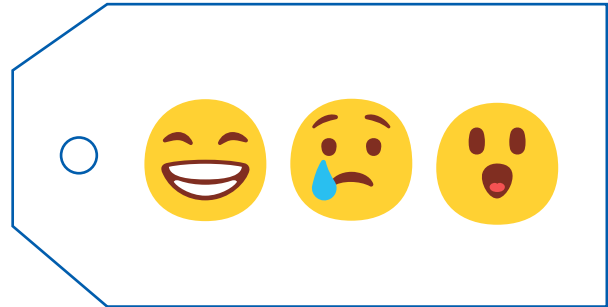BSc Built Environment
1983-1987

EXPERIENCE

Architect
35 years

COMPUTER SKILLS

AUTOCAD ● ● ●

CATIA ● ● ●

GAME RULES

 None of the numbers in this row are correct

 One (or more) of the numbers in this row is correct but not in the right place

 One (or more) of the numbers in this row is correct and in the right place