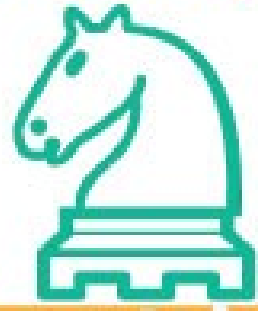


Trainers Support



Algorithmic
Thinking

Algorithmic Thinking for Migrants Teachers Education

2021-1-EL01-KA210-ADU-000035033

LESSON #8

TITLE: CASE STUDY “LOCKED IN SYNDROME – LIS”



LESSON #8 – CASE STUDY “LOCKED IN SYNDROME – LIS”

LESSON REQUIREMENTS



GROUP: 15 TRAINEES



DURATION: 60 MIN



PROJECTOR, PCS, QUESTIONS SHEET



OBJECTIVES

- REALIZE HOW ALGORITHMIC THINKING CAN BE USED IN A REAL LIFE CASE

WHAT IS THE “LOCKED IN SYNDROME – LIS” ?

Locked-in syndrome (LiS) is a rare and serious neurological disorder that happens when a part of your brainstem is damaged, usually from a stroke. People with LiS have total paralysis but still have consciousness and their normal cognitive abilities. Most people with LiS can communicate with eye movements and lead meaningful lives.



LESSON #8 – CASE STUDY “LOCKED IN SYNDROME – LIS”

AS SIMPLE AS THE “ALPHABET”.

A simple communication protocol is our **Algorithm**

What is needed is a way to turn blinks into letters. One blink can mean "A", two can "B", etc.

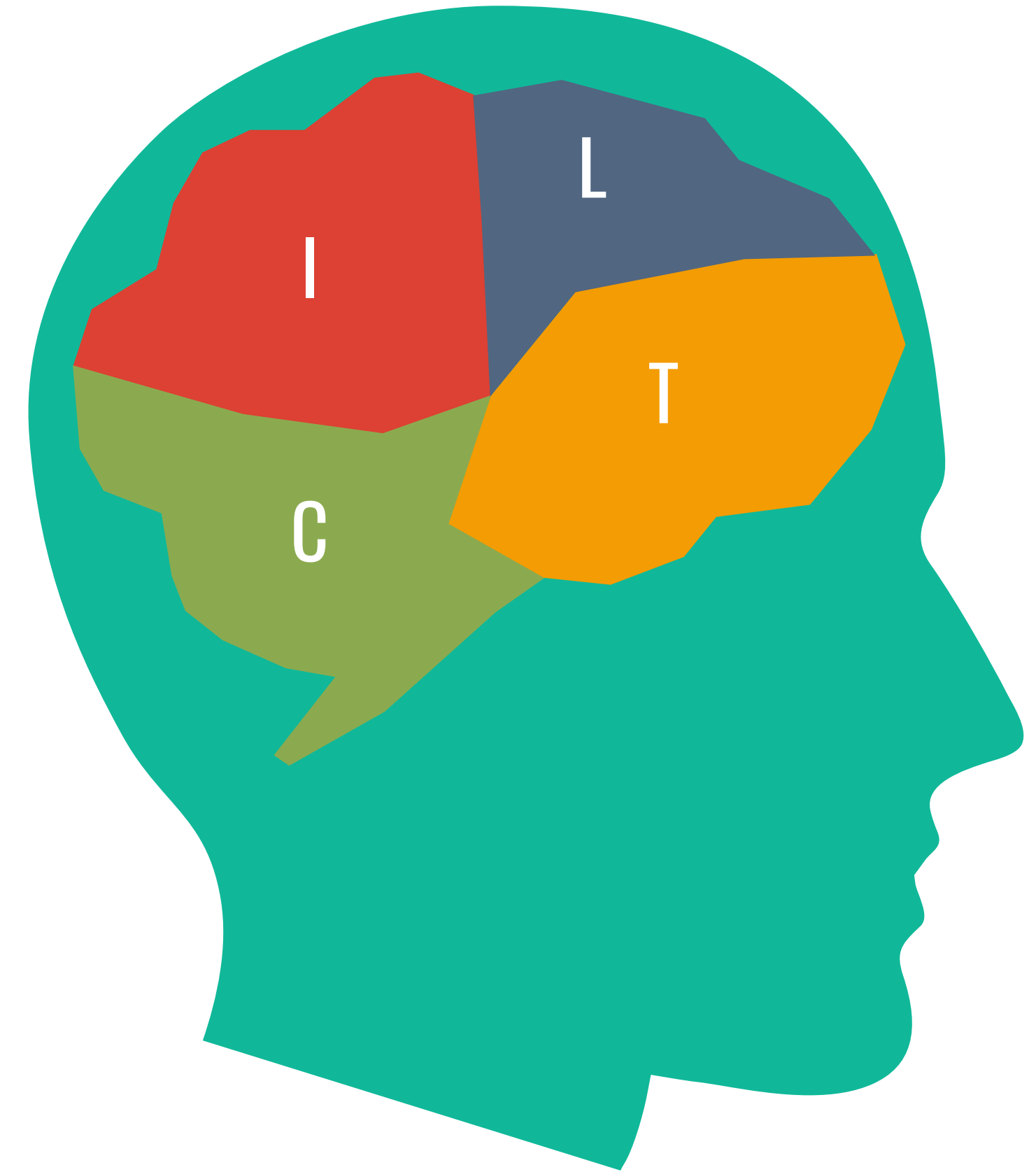
1 blink -> “A”

2 blinks -> “B”

3 blinks -> “C”

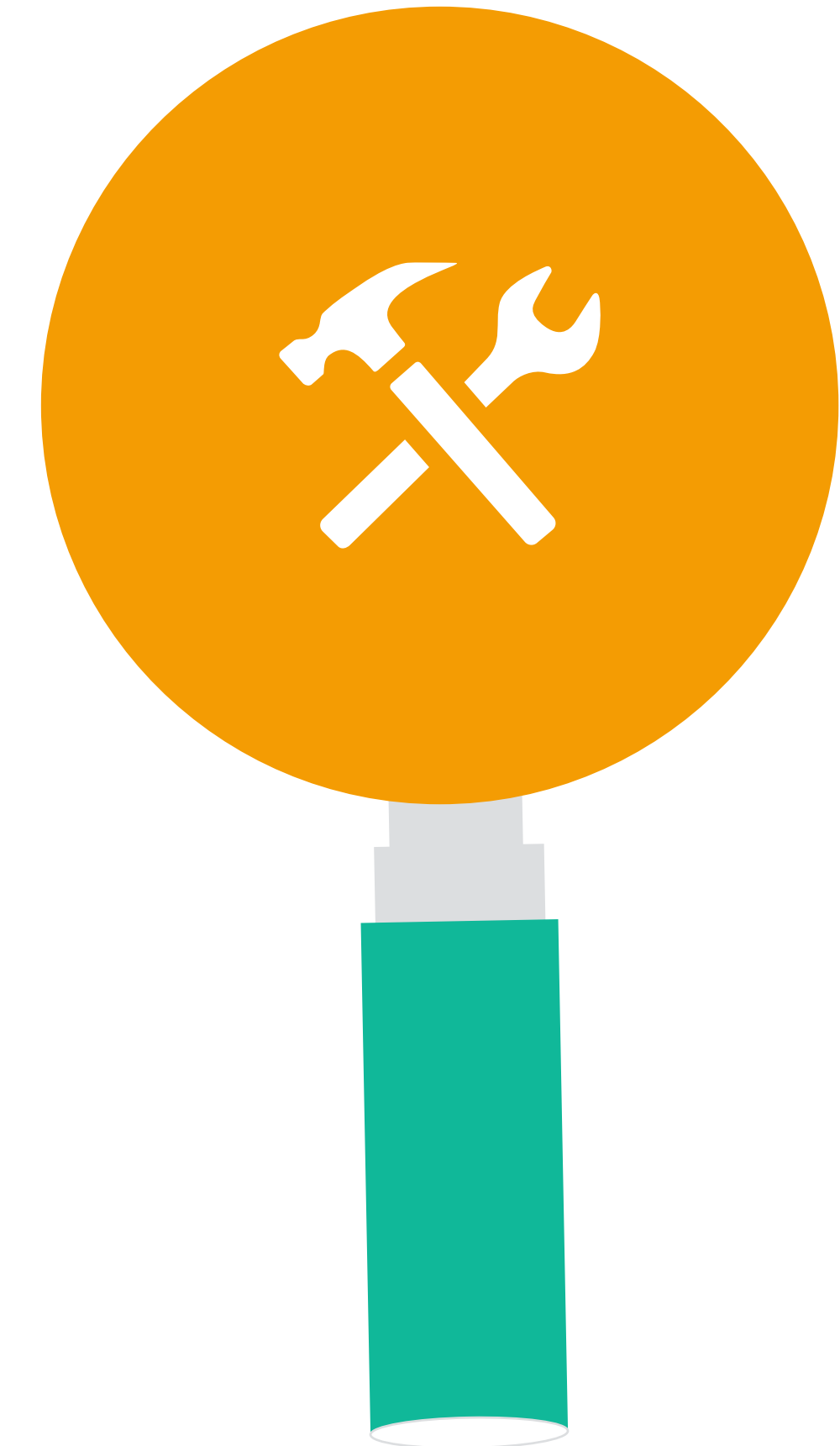
....

“My name is: **Willy**”



EXTRA CONSIDERATIONS - RULES

- **Symbols:** apart the alphabet, we need more symbols like ,?#\$% etc.
- **Wrong character:** we need a way to cancel the last character or last word and start all over again.
- **Guess:** the solutions should provide the ability to guess the word, for example “e-n-v-e-l..” gives “envelope”
- **Frequency:** some characters are being used more often that others, for example “A-O-T-E..”



LESSON #8 – CASE STUDY “LOCKED IN SYNDROME – LIS”

ABSTRACTION

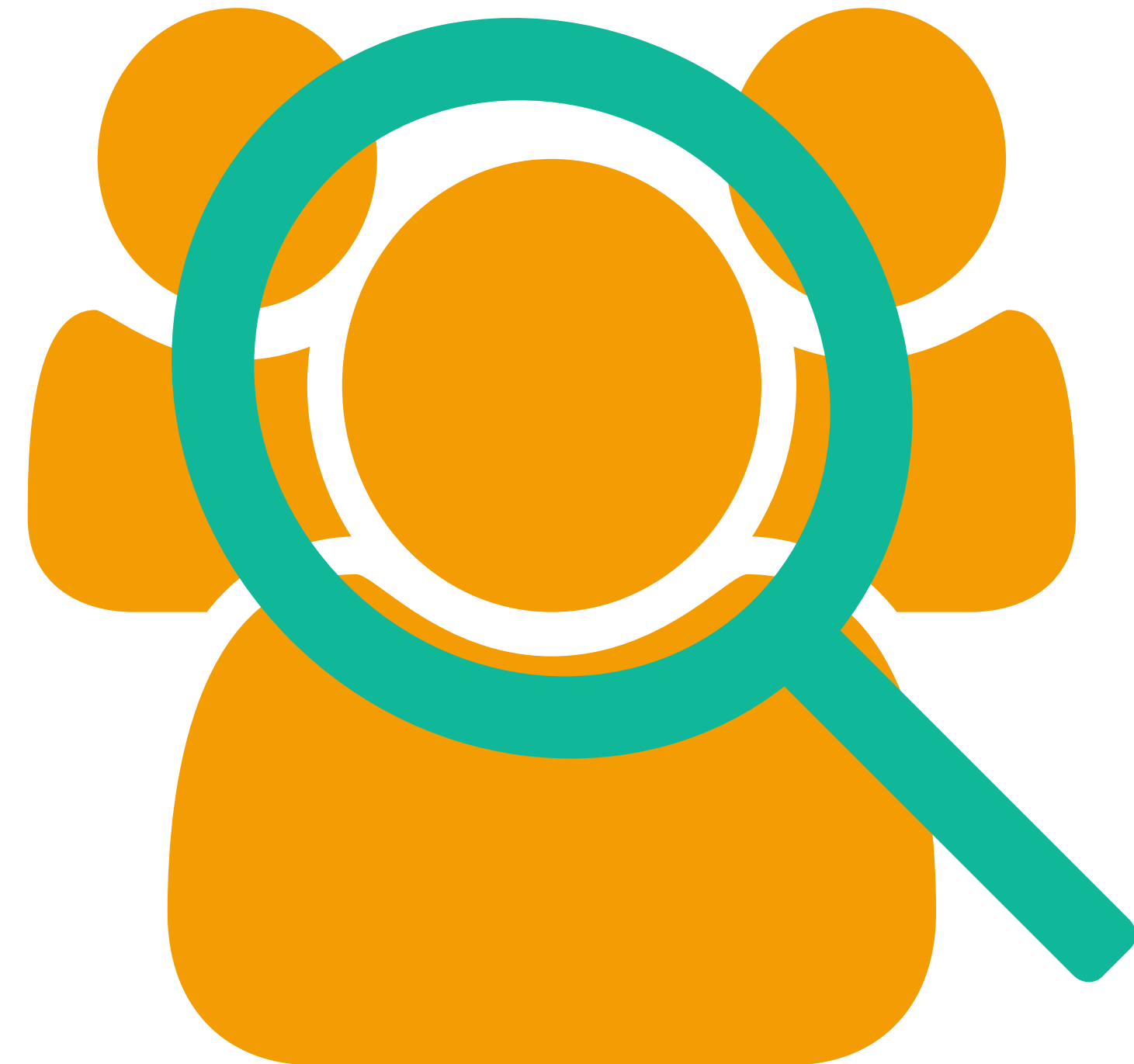
- How fast is our algorithm?
- Is this algorithm efficient ?

BEST & WORST CASE SCENARIO

- For “A” -> 1 question
- For “Z” -> 24 questions
- Average -> **12** questions

...to guess a letter.

If we add the “Guess” rule, the average could reduce to **9 or 10**



LESSON #8 – CASE STUDY “LOCKED IN SYNDROME – LIS”

THE 20 QUESTIONS GAME

Guess a famous person and let others to find out who is the person. Answers could be either “Yes” or “No”.

- | | |
|---------------------------------|-----------------------------------|
| 1. “Is she a woman?” - No. | 6. “Is she from Asia?” - Yes. |
| 2. “Has died;” - Yes. | 7. “Is she from India?” - Yes. |
| 3. “Is he a movie star?” - No. | 8. “Is he a politician?” - Yes. |
| 4. “Is she from England?” - No. | 9. “Is it Gandhi?” - Yes.. |
| 5. “Is she from America?” - No. | |



ACTIVITY #8.1

Trainer shares a sheet with two exercises.

Trainees, write down the answers for the next 25 minutes and at the end they all together discuss the results.

The discussion follows last 5 minutes.



CORE SKILLS DEVELOPED

- Realize how algorithmic thinking can be used in a real life case

TIMING

30 min

REQUIRED TOOLS

PC, projector, sheet

REFERENCES

PANE, J. F. ET AL. (2001) STUDYING THE LANGUAGE AND STRUCTURE IN NON-PROGRAMMER’S SOLUTIONS TO PROGRAMMING PROBLEMS. *INTERNATIONAL JOURNAL OF HUMAN-COMPUTER STUDIES*, 54 (2). 237.

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HAYNES, B. (2006) GAUSS’S DAY OF RECKONING. *AMERICAN SCIENTIST*, 94 (3). 200.