

Algorithmic Thinking for Migrants Teachers Education

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Handout #4: Patterns & Generalization

EXERCISE #1

Update the drawing of the smiley face discussed earlier in the chapter so that the positioning of the features (eyes and mouth) are calculated automatically based on the positioning of the face.

EXERCISE #2

Further update the drawing of the smiley face so that:

- A. All features have colour (for example, skin colour, red lips, brown eyes, etc.).
- B. The cheek has a scar.
- C. A round, red nose that partially obscures the eyes is included.

EXERCISE #3

You can group animals by their shared characteristics into a hierarchical tree structure. Consider these animals: bat, crocodile, fox, human, octopus, ostrich, penguin, shark, snake, swan, turtle. Group them into three different tree structures by:

- A. number of legs;
- B. whether they can fly;
- C. their class (mammal, fish, etc.).



Imagine these animals were used in a ‘Twenty Questions’ style game where your opponent thinks of an animal and you may ask them a limited number of yes/no questions to work out which animal they’re thinking of. Use your tree structures to guide your questioning strategy. Which one of the three structures would minimise the number of questions you would have to ask? Try dividing groupings into sub-groupings to see if that helps to reduce the number of questions.