

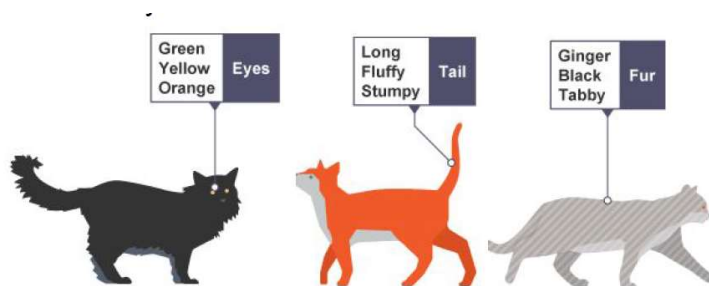
**Pattern Recognition:**

*"Pattern recognition is about spotting if any steps in a solution can be repeated. It can also help to think about whether we have solved similar problems before".*

Example:

Consider drawing three cats. Cat has common features like 4 legs, a body, head and a tail, 2 ears, eyes, mouth, fur. To solve this problem we could use what we know;

- by recognising this pattern for all cats we can draw the first cat and then draw two more that look similar.
- The only bits that will change in the drawings will be the specific details -
  - They could have different colour eyes
  - They could have different colour or style of fur
  - They could have different types of tails
  - They could be different sizes



Why Pattern Recognition?

- Patterns make our task simpler.
- Problems are easier to solve when they share patterns, because we can use the same problem-solving solution wherever the pattern exists.
- The more patterns we can find, the easier and quicker our overall task of problem solving will be.

Qn1. Decompose the given tasks into smaller tasks.

Note : Use a bullet point for each smaller steps.

- a) Making a family meal
- b) Decorating your room

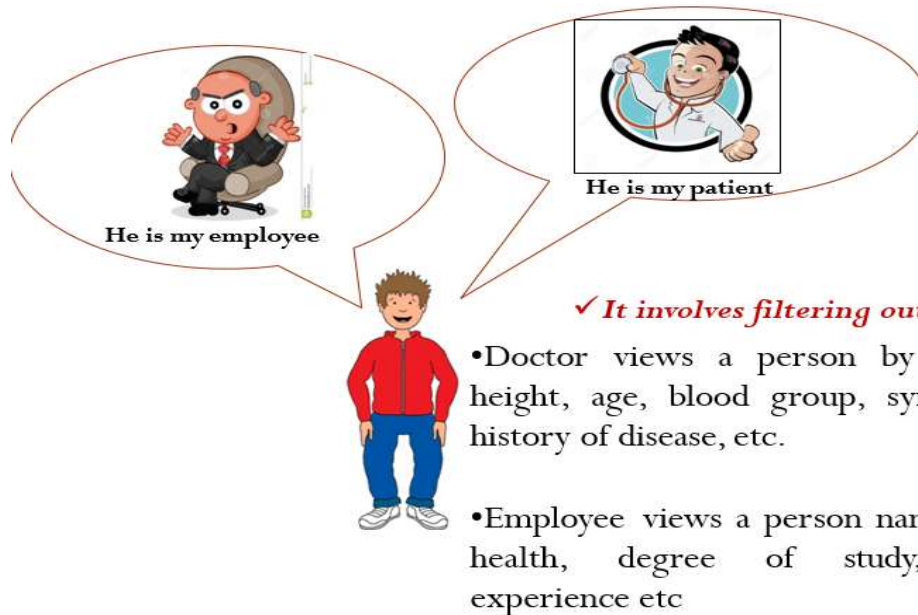
From the decomposed smaller tasks, identify the patterns/similarities

Qn 2. Identify 5 common features and different features for drawing three bicycles.

## Abstraction:

Abstraction is one of the four cornerstones of Computer Science.

- Once patterns are recognised, abstraction is used to gather the general characteristics and to filter out of the details we do not need in order to solve our problem.
- It involves filtering out - essentially, ignoring - the characteristics that we don't need in order to concentrate on those that we do.
- It filters the specific details.



Example :

- Consider the activity of drawing a series of cats.
- We noted that all cats have general characteristics, which are common to all cats, eg eyes, a tail, fur, a liking for fish and the ability to make meowing sounds.
- In addition, each cat has **specific characteristics**, such as **black** fur, a **long** tail, **green** eyes, a love of **salmon**, and a **loud** meow.
- **These details are known as specifics.**
- We **don't** need to know what sound a cat makes or that it likes fish. These characteristics are irrelevant and can be filtered out.
- We **do** need to know that a cat has a tail, fur and eyes, but we **don't** need to know what size and colour
- **Abstraction is gathering of general characteristics we need and filtering out of details and characteristics that we do not need.**

Qn 3: Decompose the steps involved for baking a cake. Identify the common patterns. Also list down the general and specific details pertaining to it.

### Nonograms

Nonograms is a logic puzzle with simple rules and challenging solutions.

The rules are

- ✓ You have a grid of squares, which must be either filled in black or marked with X.
- ✓ Beside each row of the grid are listed the lengths of the runs of black squares on that row.
- ✓ Above each column are listed the lengths of the runs of black squares in that column.
- ✓ Your aim is to find all black squares.

Qn 4:

			2	1		3		2		1	1	1
			2	1	1	2	9	4	5	5	5	5
1	4	3										
	2	3										
		2										
		1										
		2										
	2	7										
	1	7										
		6										
	1	4										
		4										

Qn 5:

				3								
			2	3	4			2	2			
			2	5	1	4	4	2	1	1	7	7
7												
	9											
3	2											
	2	2										
		2										
3	2											
	4	4										
	3	2										
	1	1										
		3										

Qn 6:

	<b>3</b>	<b>2</b>	<b>1,5</b>	<b>2, 2, 1</b>	<b>4</b>	<b>2, 2, 1</b>	<b>1,5</b>	<b>2</b>	<b>3</b>
<b>1,1</b>									
<b>1,1</b>									
<b>4</b>									
<b>2,1,2</b>									
<b>9</b>									
<b>1,5,1</b>									
<b>1,1,1,1</b>									
<b>1,1</b>									