Sprint 1: Decompose a problem into computational steps

Practice Challenge - 1.1 – Eligibility Criteria for an Exam

At an engineering college, the minimum attendance required for a student to be eligible to appear for the year-end examination is 75%. A student who does not meet this criteria can take this examination only if there is a medical reason for the short attendance. The college administration needs to check the eligibility of each student for the year-end examination.

a. Write an algorithm that takes the total number of classes held in the year and the number of classes attended by the student as input and determines if the student is eligible to take the examination.

b. Draw a corresponding Raptor flowchart.

c. Create a Scratch program based on the flowchart drawn.

Practice Challenge - 1.2 – Armstrong Number

A 3-digit number is an Armstrong number if it is equal to the sum of the cubes of its digits. For example: 153 = 1×1×1 + 5×5×5 + 3×3×3 // 153 is an Armstrong number.

Perform the following steps to determine whether a given 3-digit number is an Armstrong number or not.

a. Write an algorithm.

b. Draw its corresponding flowchart using Raptor.

c. Write its corresponding pseudocode.

d. Create a Scratch program based on the flowchart drawn.

Practice Challenge - 1.3 – Age Categorization

At a multidisciplinary health clinic, different consultants are responsible for attending to patients of different age groups.

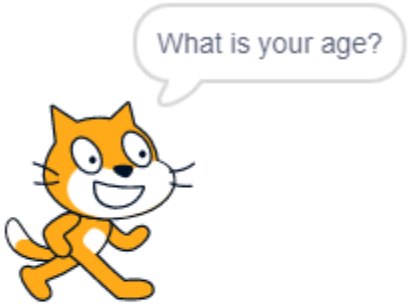
Write a program that accepts the age of a patient and categorizes the patient as a child (<13), a teenager (>=13 but <20), or an adult (>=20). The age should only include the number of completed years.

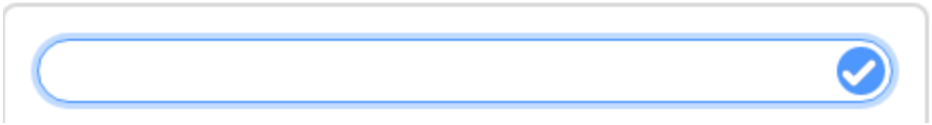
a. Write an algorithm to solve the problem.

b. Draw its corresponding flowchart using the Raptor tool.

c. Write its corresponding pseudocode.

d. Create a Scratch program using the flowchart drawn.





Practice Challenge - 1.4 – Traffic Lights

Traffic lights of most countries follow a universal color code to control the traffic at road intersections or at pedestrians' crossings. Red, yellow, and green are the three traffic lights where red means to stop, yellow means to slow down, and green means to go.

Write a program that takes the traffic signal color as input and displays what it indicates. If the input is a color different from red, yellow, or green, then display the message 'Not a valid signal.'

a. Write an algorithm to solve the problem.

b. Draw its corresponding flowchart using the Raptor tool.

c. Write its corresponding pseudocode.

d. Create a Scratch program using the flowchart drawn.

Practice Challenge - 1.5 – Leap years

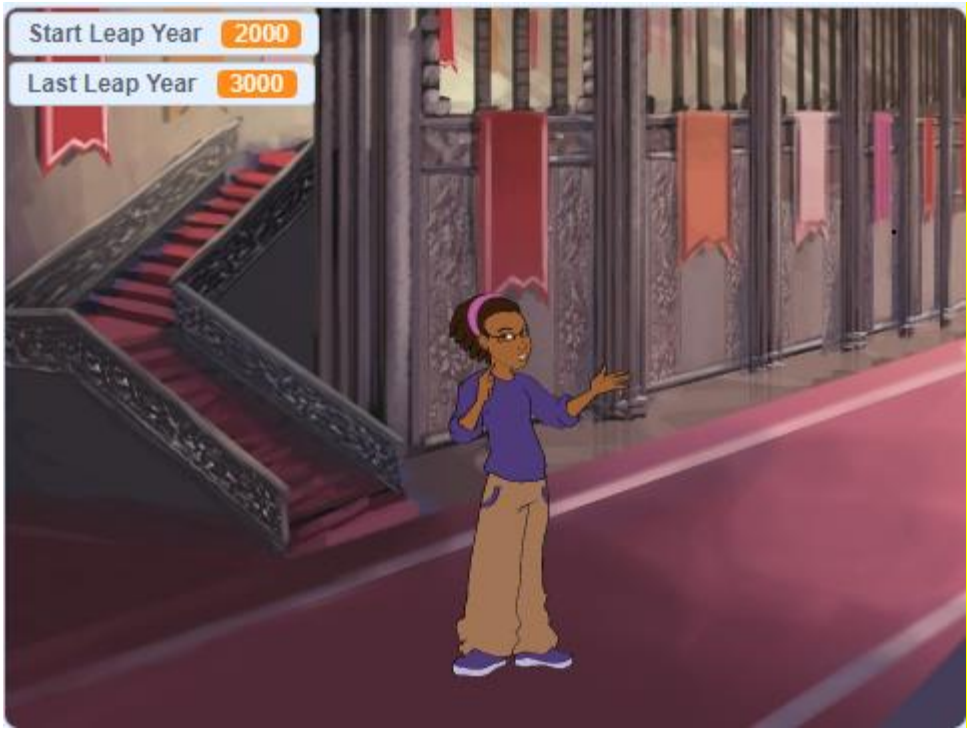
An astronomer needs to determine the number of leap years from 2000 to 3000 inclusive.

a. Write an algorithm that displays the leap years from 2000 to 3000.

b. Draw its corresponding flowchart using the Raptor tool.

c. Write its corresponding pseudocode.

d. Create a Scratch program using the flowchart drawn.



Practice Challenge - 1.6 – School Exhibition

An elementary school is conducting a Mathematics and Science exhibition. Sarah is developing a simple calculator for the exhibition. Help Sarah to write an algorithm to create the calculator that takes two numbers as input and performs addition, subtraction, multiplication, or division based on the operation chosen.

a. Write an algorithm to solve the problem.

b. Draw its corresponding flowchart using Raptor tool.

c. Write its corresponding pseudocode.

d. Create a Scratch program using the flowchart drawn.