

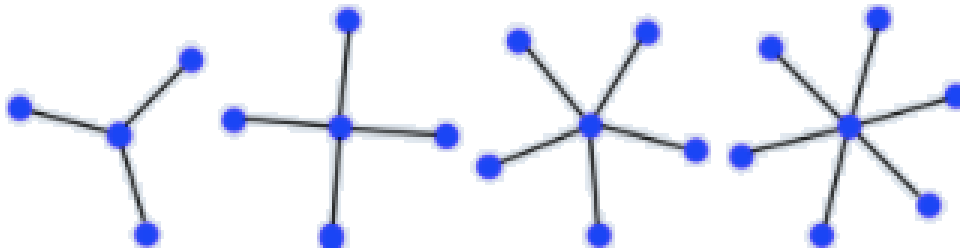
# CHALLENGE 03: COUNT STARS

## 1 Preliminaries

### 1.1 Problem

You want to teach your program to recognize star patterns in the image of the night sky, which means that you need to implement a function that, given the adjacency matrix representing a number of contours in the sky, will find the number of *stars* in it.

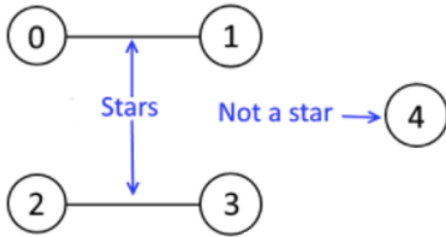
The graph representing some contour is considered to be a *star* if it is a tree of size **2** or if it is a tree of size **k - 2** with one internal node (which is a tree root at the same time) and **k - 1** leaves. Here is an example of some stars:



Star contours

Given the sky object's contours as an undirected graph represented by its adjacency matrix `adj`, calculate the number of stars in it by completing the `countStars` function given below.

- `int countStars(std::vector<std::vector<bool>> adj)`

**Example:**

Input	Output
adj = [[False, True, False, False, False], [True, False, False, False, False], [False, False, False, True, False], [False, False, True, False, False], [False, False, False, False, False]]	2

## 2 Regulations and Evaluations

### 2.1 Regulations

- This challenge requires a group of 4 students. Group registration and Group ID will be provided within the attached Google Drive [link](#).

*Note:* Group registration and file submission time should not be different more than 15mins.

- The submission file must be in the following format: **[Group\_ID.rar]** or **[Group\_ID.zip]**, is the compression of the **[Group\_ID]** folder. This folder contains:
  - The report file must be presented as a document **[Group\_ID.pdf]** or as a slideshow **[Group\_ID.pptx]**. This file presented research answers from **1.1** and the information of code fragment (data structures, algorithms, functions) from **1.2**.
    - \* If your submission is a slideshow, there must be explanation in the *Note* part of each slide.
    - \* Information (Name, Student's ID) must be declared clearly on the first page (or first slide) of your report.
    - \* The report file should be structured, logical, clear, coherent, and answer directly to the question. The length of the submission should not exceed 15 pages for the document file, and 30 pages for the presentation slide.

- The programming file must be a single file [**Group\_ID.cpp**]. The code fragment must be clear, logical and commented.

## 2.2 Evaluation

- File submission: 10 points max.
- Submission with wrong regulation will result in a "0" (zero).
- Plagiarism and Cheating will result in a "0" (zero) for the entire course and will be subject to appropriate referral to the Management Board of the CLC program for further action.