# Lab Assignment 2 - Decision Tree Part 1 - ID3

Build an **ID3 decision tree** for the following problem of finding whether a student is single or committed 😊

**Reference:** You can refer a similar problem in this page https://sefiks.com/2017/11/20/a-step-by-step-id3-decision-tree-example/

**To Do**

- Compute the Information Gains (using difference in weighted entropy) of the first features that better discriminates the single vs committed. Then split the tree based on the first feature.
- Choose the further features based on the information gains. Don't the split the tree if the information gain is not optimal.
- Print the information gains for each feature and every split. Finally print the tree.

| S.No | Branch | CGPA | Gamer | Movie Fanatic | Committed? |
|---|---|---|---|---|---|
| 1 | CSE | High | Yes | No | No |
| 2 | CSE | Low | Yes | No | No |
| 3 | CSE | High | Yes | Yes | No |
| 4 | CSE | High | No | No | Yes |
| 5 | CSE | Low | No | Yes | Yes |
| 6 | ECE | Low | Yes | No | No |
| 7 | ECE | High | Yes | Yes | Yes |
| 8 | ECE | Low | Yes | Yes | No |
| 9 | ECE | High | Yes | Yes | Yes |
| 10 | ECE | High | No | Yes | Yes |
| 11 | MECH | High | Yes | Yes | No |
| 12 | MECH | High | No | No | No |
| 13 | MECH | High | No | No | Yes |
| 14 | MECH | Low | No | No | Yes |
| 15 | MECH | Low | No | No | Yes |

- Test the model with the below samples and calculate the accuracy.

| | | | | | |
|---|---|---|---|---|---|
| 1 | CSE | High | No | Yes | Yes |
| 2 | ECE | Low | Yes | No | No |
| 3 | MECH | Low | No | Yes | No |

**Suggested Platform:** Python: Azure Notebook/Google Colab Notebook, packages such as Numpy, Pandas

**Submission:** Submit your files in **Single ipython Notebook** in LMS before **Sunday 5th Aug, 11.59 pm.**

**Marking:** Marking is based on both **performance during the lab hours** as well as **complete submission in LMS**.