

Exercise 2 – Decision Tree Classifier

-- Requirement

Implement the **Binary Decision Tree Classifier** with the Car Evaluation Data Set.

Download URL: <https://archive.ics.uci.edu/ml/datasets/Car+Evaluation>

Fill in the function of the attachment "DecisionTree.py"

--Coding(85%)

- implement `_entropy` (5%)
- implement `_feature_split` (10%)
- implement `_build_tree` (10%)
- implement `fit` (5%)
- implement `predict` (5%)
- implement `_find_leaves` (5%)
- implement `_error_before_cut` (5%)
- Implement `_compute_alpha` (10%)
- Implement `_find_min_alpha` (20%)
- Implement `_prune` (10%)

-- Report(15%)

1. Design `_feature_split`, `_build_tree`, `_find_min_alpha`, `_prune`, and then explain the goal of each function.
2. Decision tree before post-pruning accuracy
3. Decision tree after post-pruning accuracy
4. The effect of different parameters (Ex: `prune tree times`, `max_depth`)
5. A brief discussion of the results(Ex: After pruning the tree, will the testing accuracy be better, if yes, why would it be better? if not, why would it be worse?)

- Please upload the zip file, zip file should include

- `code_<your_id>.zip`

- your zip file should include

- `code_<your_id>.py`

- `car.data`

- `code_<your_id>.pdf` (your report)

- Ex: if your student id is 109522026, then you should upload

`code_109522026.zip` file (which must include `code_109522026.py`, `car.data`, `code_109522026.pdf`)