CSE341 – Programming Languages (Fall 2023)

Homework #4

Hand-in Policy: Source code and any documentation should be submitted online as a single .zip or .rar file with naming convention studentid_lastname_firstname_h4.zip via Teams by the submission deadline. No late submissions will be accepted.

Collaboration Policy: No collaboration is permitted. Any cheating (copying someone else's work in any form) will result in a grade of -100 for the first offense and -200 for the subsequent attempts.
Grading: Each homework will be graded on the scale 100. Unless otherwise noted, the questions/parts will be weighed equal.

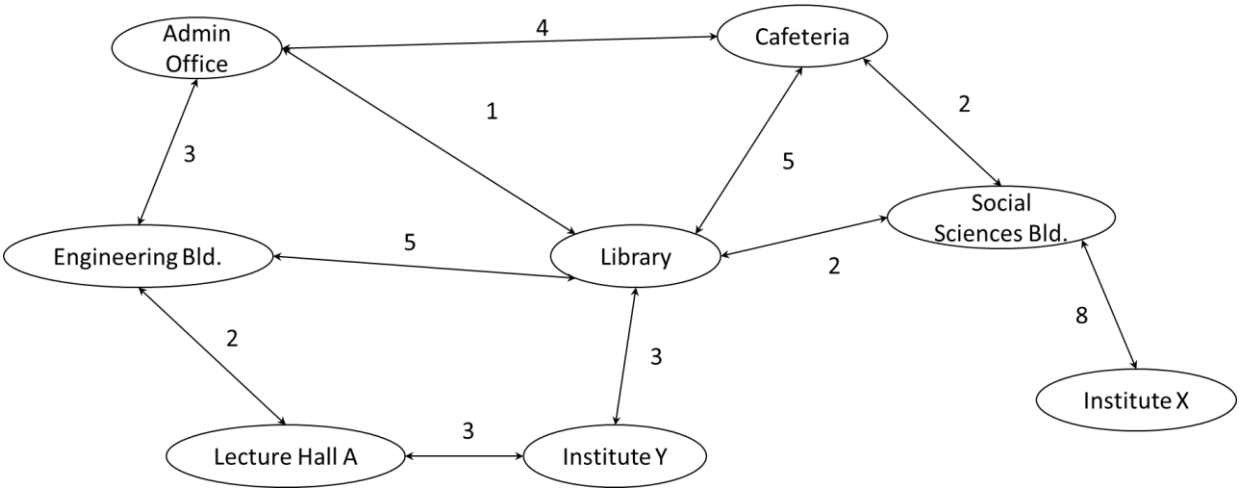
Part 1. [60pts] In this part of the homework, you are asked to write a simple expert system in Prolog for scheduling pickup and deliveries in a small college campus. In this campus you have the following:

- Several delivery personnel:
  - A unique ID.
  - Capacity to carry (in kg).
  - Work hours (in 4-hour increments including the entire day).
  - Current delivery job (if any).
  - Current location (one of the places as described below).
- Several places to pick up from and deliver objects to:
  - A unique ID.
- A set of objects to be delivered:
  - A unique ID.
  - Weight in kg.
  - Pick up place (as described above).
  - Drop of place (as described above).
  - Urgency of the delivery (low, medium, high).
  - ID of the delivery person if in transit.
- A map showing the routes between any two places:
  - Nodes including a place's unique ID.
  - An edge showing the connection between two places along with the time it would take to travel.

Your Prolog program will have the given map implemented. It should have three delivery personel and five objects (one of them should be in transit).

The resulting expert system should respond to queries such as:

- Given the current state, are there any delivery person available to pick and deliver a given object. If the object is already in delivery, return the person delivering it. Otherwise, print all the people that could make the delivery along with the total time to complete it.



Part 2. [40pts] Given the IRIS machine learning data set (https://archive.ics.uci.edu/dataset/53/iris), built a single decision tree to classify any given input. You can use your favorite tool to build your decision tree. Once built, you are asked to implement a Prolog program that will implement this tree. Your program should be able to respond to queries such that:

classify(4.9,2.4,3.3,1.0)

This should return yes with class label “Iris-versicolor”.