Final Project Eagles

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CS473 Adv. Algorithms

Project Proposal

Our project idea is to create a generic departmental class scheduling algorithm. The goal is to have something to help generally schedule classes without requiring super specific constraints – such as needing to be in a computer lab.

Our goal is to create an algorithm that will consider number of professors, number of courses (with a possibility of more than 1 section), number of classrooms, and number of time slots, and generate a schedule. This project can easily be expanded to consider many other variables and preferences to make it harder including professor timing preferences, walking distance between classes, classroom type, two courses historically taken at the same time cannot be scheduled at the same time, what courses professors can/prefer teach, etc. If time allows, we will attempt to incorporate more of these variables to make our algorithm more practical. We believe our algorithm could be used to analyze various limiting factors of a department that could answer questions such as:

* If we increase the number of courses to be taught, what will need more of next: Professors, Classes, Rooms, or Time Slots?

Assumptions: prioritize higher credit count classes when scheduling (a 3 credit class should have more priority to be at 9am MWF than a 1 credit class should on Monday at 9am), not all classrooms have to be used at the same time, every professor can teach every class, professors don’t have time slot preferences, professors have a limit to the number of classes they can teach (TODO).

Hard Constraints:

* No professor can teach two classes at the same time.
* Professors will teach a similar number of courses (+/- 1 course).
* Two classes can’t be in the same classroom at the same time.

Future Constraints:

* Two sections of the same class cannot be at the same time
* Some classes are prerequisites of other classes
* Professor preferences
  + Courses a professor teaches
  + Time of day (professor prefers Time Slot 1 vs Time Slot 5 )

Algorithm Inputs:

* Number of professors
* Number of Classes
* Number of rooms
* Available time slots

Algorithm Outputs:

* A departmental schedule of classes assigned to room numbers, time slots, professors, with no overlap between any of the assigned variables.
* The schedule is in a 5-day format, from Monday through Friday, including all classes as specified in the schedule.
* Three possible outcomes: Every class is taught, there aren’t enough professors to teach every class, or there aren’t enough rooms to teach every class