ClassTech Student Scheduling System

Background:

The Classroom Technology department employs students to help run our three on campus offices. As you are certainly aware, student schedules are not as simple to plan around as typical full-time jobs, with class times and other commitments varying from day to day (As in Monday schedules aren't the same as Tuesdays') and semester to semester.

More broadly many departments on campus employ students and as such could all benefit from a streamlined way of generating work schedules. There is certainly software out in the world that can generate schedules, some maybe even with the granularity needed to understand a college student's schedule, but those all come at some cost to the departments.

The goal for this project is to be able to take in all student's schedules from a given department and produce multiple variations of coverage for a supervisor to choose from without having to manually check who has class Tuesday's at 11am etc. 😊

REQUIREMENTS/IDEAS FOR IMPLEMENTING:

- Broadly, generate (example) 20 possible work schedules for a given office, depending on those offices' days/hours of business.
    - Departments would likely need to be able to emphasize certain coverage requirements
        - i.e. 4pm-9pm requires 2 students on Mondays/Wednesdays

- How? This is merely a suggestion but:
    - Wiser allows students to download their class schedule as a .ical file.
    - My thinking was the students could either be sent an email by the application (or simply sent a link to the form by a supervisor)
        - They upload the. ical
            - The system then processes it, taking in the important information (Days/Times of class) and throws out/does not store the unimportant information (what class it is etc.)
        - Students then would also need to be able to indicate any other unavailable times
        - I would also prefer students to be able to state preferences, but whether this is accounted for in the actual scheduling or is just information for the supervisor to use when picking from the generated options we can decide as we go.
- The supervisor should have some type of dashboard to see that students have responded to the form and view the information provided as during semesters some weeks a supervisor may need to adjust manually the work hours temporarily.
    - This could also enable students to update their availability and generate new work schedules if needed
- On a related note, potentially this system could send out to students the "Draft Schedule" and allow the students to provide feedback in a way that the system could take into account should we need to go with a different schedule than what the supervisor initially elected.
- Some general guardrails/customizable elements needed for the software:
    - My department does the student budget in terms of hours, but this could vary so the schedule is generated either using a total $$$ amount or hour amount. (200 student hour/week or $3000/week etc.)
    - Specify minimum shift times – this can vary by department. For example, I am okay having a student work 1 hour as a shift because it fits their class schedule, but I wouldn't give a 45-minute shift. Some may find an hour too short etc.
    - I try to avoid scheduling students on days where they have no other reason to be on campus, could be a toggle per student depending on the student.
    - Some students and/or departments may have limits for hours that vary student to student.
        - As an extension of this, we would need to discuss how work-study may impact this even more granularly in terms of $/hr vs awarded money.

    - Students should also be able to be given a weighted likelihood of having more hours. Says student A has worked in the office for 3 semesters and is a very good employee. Student B is brand new. I want to give Student A more hours, but obviously only if Student A's schedule allows it.
- Given that I am unsure of the difficulty of the general task, these are some stretch goals/ideas:
    - Potentially students could also utilize this system to track their hours worked.
    - Students could utilize this to requests time off/indicate temporary shift conflicts (finals week etc.)

I am sure I am forgetting things but that is a general sense of what is needed.

TECHNOLOGY REQUIREMENTS:

The number 1 requirement is keeping cost to a minimum. Beyond that the project is open to the group's ideas of how to implement it. I do have access to a server on campus that can potentially host the final version, but it is unlikely I will be able to share it with the group for development purposes. We can discuss options in that regard if needed.

Past projects completed for the department utilize mainly JavaScript and/or React. Though not requirements, in terms of maintainability moving forward, having less pieces of technology someone has to understand would be ideal.

I am open to exploring how LLMs may be able to take on the task of generating schedules but with the caveat that this would have to be run locally and likely on modest by LLM standard's hardware.