

POTENTIAL PROJECT: Mechanical Engineering 4-Year Plan

Extension of existing project Mechanical Engineering Program sheets found here:
[http://worksheets.stanford.edu/homepage/view.php?sheet=mech_2018&folder=undergrad&dataset=genesereth\(mech_2018,1580756794317\)](http://worksheets.stanford.edu/homepage/view.php?sheet=mech_2018&folder=undergrad&dataset=genesereth(mech_2018,1580756794317))

This project involves building upon an already existing structure in place for a program sheet. The existing program sheet structure only takes into account which classes a student plans on taking and whether those in a vacuum will fulfill graduation requirements of the major. Here, you will develop a 4 year plan program sheet for the Mechanical Engineering department based on the requirements outlined in the attached documents (the program sheets above are outdated with requirements for the year 2018-2019). In addition to the graduation requirements, you will specify which classes can be taken which quarters, enforce that prerequisites be taken before other classes, and implement consequences for changes downstream when you move classes around. Finally, this project requires (for its written report) a detailed summary of how to go about changing the requirements in the Rules library and the Lambda dataset so that someone in the mechanical engineering department would be able to update the 4 year plan program to reflect new graduation requirements without having to ask for help from the CS department.

As a starter task, we'd like you to update the program sheet template above to reflect the current ME major requirements using the documents attached below. You'll carry these forward to inform how the rest of the project should function, but it will be a good way to get your feet wet with the logic rules contained in the program sheets and how you could build on them further for the functionality outlined below.

This project would then involve adding functionality and a UI to the above, pre-existing functionality. The dataset would consist of potential classes a student can take as well as quarters these classes are offered and restrictions on when specific classes can be taken in relation to others (for example, Math 19 must be taken before Math 20). The classes that fulfill requirements of the ME major will have already been implemented in the program sheet you updated for your starter task; the additional requirement would be the restriction on placement of classes within the four year plan, specifically with regard to the order classes are taken. In the new system, a student would have to specify that they would take Math 19 in the fall of their freshman year before Math 20 in the winter of their freshman year, as an example.

From there, the project would involve the implementation of a new UI like a spreadsheet reflecting a general four year plan, with rows corresponding to years and columns corresponding to quarters with cells filled by classes planned for that specific quarter. Ideally, this would be a drag and drop system from the total list of classes where a student could drop Math 19 into the fall of their freshman year, with the limitations of the previous section implemented by not allowing a student to drop a class into the plan until they'd fulfilled all the prerequisites of that class in their four year plan. We would also like for the system to highlight

possible places a class could be placed- if the prerequisites aren't fulfilled, there would be no highlighted slots; if a class is only offered winter quarter, only winter quarter slots would be highlighted, etc. Another potential UI would be the flowchart illustrated at the bottom of this proposal still utilizing the drag and drop implementation mentioned above but making prerequisites more visible to the student using the system.

Finally, the downstream effects of moving classes would be implemented as well- if a student moved a class to a later point than another class they had planned listing the first class as a prerequisite, the later class would be highlighted in the spreadsheet as the new ordering is not allowed under the prerequisite rules.

In addition, students could implement general WAYS/THINK/PWR classes as well, which would help achieve minimum/maximum unit counts for every quarter, without having to specify which exact class the student would be using to fulfill this requirement. This would be an extension and is less important to the completion of the project but would be a nice bonus at the end, time allowing.

As a final part of your project, you will be required to do a write-up as usual, but your write-up will focus more on how to change your system in the future. The goal is to provide this system to the Mechanical Engineering department such that someone there could look to the write-up and make necessary changes to the system without the help of anyone who designed it; if there are prerequisites that change, if there is a class that is offered in a different quarter, or if the requirements of the major change, the report should equip whoever is dealing with the system in the ME department to make those changes without assistance from the CS department.