

Project 579 Individual Progress Report

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Problem statement

Students are tasked to incorporate the knowledge learned in CSE 579 to apply to a real world problem. They have to build a knowledge base system for either the automated warehouse scenario or the insurance referee assignment project. To help students to achieve the core competencies of the project, the course provides a guidance system via a series of intermittent milestones and mini-assignments to build up core competencies of the students. Upon completing the project, students will be equipped fully with the necessary tools and devices at disposal to tackle real world challenges in the knowledge representation domain.

A summary of the progress you've made so far, including the background work you completed

The project has achieved 50% progress of the total plan (Appendix A). It is expected to receive 89% \pm 5% standard deviation + error (Appendix A). The estimate is based on the Gaussian distribution of the grades having received so far in this course, applied the pessimistic penalty estimate relative to the projects from the other course, as well as the systemic error rate. The background work will be discussed in section 3.

Discussion of issues encountered and your plan for solving them

2 days behind the schedule

Due to the amount of time taken to prepare for the midterm examination was a lot greater than the initial estimate, all of the incomplete components of the project were pushed back by 10 man hours. To account for the delay of time, the following contingencies are developed.

Project crashing

Adding resources to the tasks: ASU tutoring center offers writing assistance. Instead of working alone on the writing project report, the report writing components will be assisted by a tutor for the following processes: proofreading,

grammar, structure formalization and coherency. This contingency hopes that adding the manpower, a.k.a the essay writing domain expert, to the task would significantly reduce the required time to pass the minimum acceptance tests for the written components.

Resource outsourcing: Going to the grocery often takes 1.5 hour per trip, two trips per week. By ordering on Uber grocery, the amount of available time for the next 2 weeks is approximately 6 hours. This would reduce the lost hours to 4.

Crunch time: The project is estimated to have 8 extra hours available for crunch time at disposal for weeks 6,7.

Risk prioritization

If all other plans fail, risk prioritization follows the order for one day loss: Week 7 Graded Quiz, Building an OWL Ontology, Course Project: Milestone 4 - Individual Project Report. The order has 2 reasons: Since week 8 contents don't appear on the exam, there is slack time available to finish these without incurring knowledge absorption delay. When the penalty of 25% per day late to each, the loss per day for the 3 aforementioned items follows: 0.53%, 1.65%, 3.75%. Note: These don't take into account the weights of the internal components of each assignment.

A summary of the specific tasks you've completed to date

To better track performance and optimize the quality of the project deliverables, the project is managed by a project management methodology; as a systemic approach has proven to increase efficiency by approximately 40%[1]. The project is sequentialized into 4 major components: project management methodology selection, project selection, planning and implementation.

Project management methodology: There are 2 methodologies in managing software projects: waterfall and agile. The agile is initially selected for the project because it's popular among the software development community. Its success rate is greater than its counterpart. However, preliminary analysis indicated that the learning core competencies component can't be done iteratively because understanding enough core concepts to work on the project is a binary classifier. In other words, students either pass the knowledge un-

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derstanding threshold to carry out the project or they don't. Therefore, all of the components except for the knowledge requirement use the agile approach.

Project selection: To see what the other students who have taken CSE 579 think about the 2 projects, a small survey conducted and going over the students' reviews indicated that 4/5 students favored the insurance project and 1 chose the automated warehouse project because it was challenging. Thus, the insurance referee assignment problem was selected as the main focus of this project.

Planning: The project has the following components:

- Acquire the knowledge requirements.
- Define a systemic approach.
- Define minimum acceptance criteria.
- Design the problem based on constraints
- Create test cases
- Implement the design and perform test cases

Implementation Knowledge requirements: To start on the project, students need to pass the minimum knowledge competencies of the following subjects in 579:

- Logic, reasoning and representation- Natural deduction, first order logic.
- Combinatorial search - Answer set programming (ASP).
- Knowledge representation: Frame problem, Soft constraints, Bayesian network, LPMLN.

Define a systemic approach: The solution used in this problem follows the generate-define-test approach[2]. Generate: to generate the world of the solution space, the following entities are designed from the requirements[3]:

- Objects
- Actions
- States - initial statuses, final statuses
- Common law of inertia
- Domain independent axioms

Define: at this stage, the entities in the generation are defined to have[3]:

- Preconditions, effects
- Constraints

Test: To be completed by the end of the project.

Tasks to complete: See appendix B.

References

- [1] M. Abrahams, "Think Fast, Talk Smart: Communication Techniques," in youtube, 2021.
- [2] J. Lee, "Methodology of ASP", Arizona State University, Tempe, 2022.
- [3] J. Lee, "Monkey and Bananas in ASP", Arizona State University, Tempe, 2022.

Appendix A

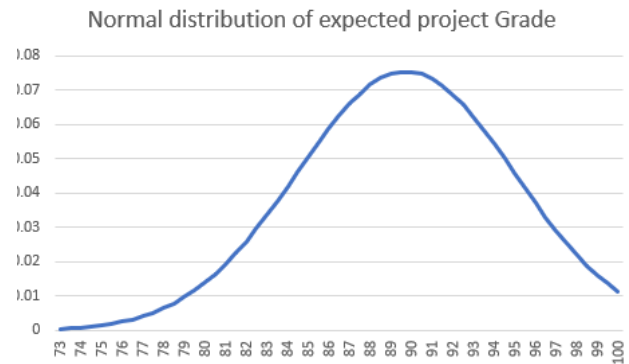


Figure 1: normal distribution of expected project grade

Appendix B

Task	Deadline	Status
Logic, reasoning and representation	Jan/19/2022	Done
Propositional Logic	Jan/25/2022	Done
Combinatorial search	Feb/01/2022	Done
Choice Rules and Constraints	Feb/05/2022	Done
Frame problem	Feb/13/2022	Done
Bayesian network	Feb/15/2022	Done
Soft constraints	Feb/15/2022	In progress
LPMLN	Feb/15/2022	In progress
design the problem based on constraints	Feb/14/2022	In progress
create test cases	Feb/18/2022	Pending
implement the design	Feb/18/2022	Pending
perform test cases	Feb/19/2022	Pending

Figure 2: Schedule