EE/CprE/SE 491 WEEKLY REPORT 6

10/17/2024 - 10/24/2024

Group number: sdmay25-33

Project title: Interactive Embedded Systems Learning using the Prairie Learn Framework

Client &/Advisor: Phillip Jones

Team Members/Role:

Rachel Druce-Hoffman — Notetaker Justin Cano — Technical Lead Joey Krejchi — Quality Assurance Caden Otis — Project Manager Devin Alamsya — Consultant

• Weekly Summary

Our objective for this week was to continue improving our skills with and understanding of PrairieLearn. We continued work on getting the server running, reading documentation, and re-learning 288 material. We spent time looking into some more complex questions, such as those dealing with autograding, different question formats, question elements (drawing), and more. We continue to gain a better understanding of PrairieLearn, past teams' successes and shortcomings, and our own vision for the project.

• Past week accomplishments

Caden: I worked on randomizing the problem that I started last week, which is HW 5, 2a. From watching a Youtube video made by the previous team, I learned how to draw and group elements to make the microcontroller diagram with port I/O pins. I then learned how the previous team randomized the ports and I/O pins to make variants of the question. I then updated how the c autograder worked on my problem to generate the correct answer for each problem variant instead of just hardcoding the answer. I also looked at another problem that had students submit c code (HW 2, 5) to learn a different approach on using the c autograder, which is to test the student's created function via multiple tests instead of just comparing the student's answer to the correct answer. I noticed on this problem that whenever a student failed a test, they didn't have any knowledge of what exactly caused the test

to fail, so I added some feedback to give students insight into what they missed if a test/s failed.

Rachel: My main focus this week was addressing the condition of HWs 9 and 12. I joined and looked through the official PrairieLearn Slack, and I looked through the PrairieLearn Github forum. I went back to the Canvas from when I took 288 and reviewed lecture slides. I looked into the Excalidraw and pl-drawing question elements (my thought is to use one of these for HW9 Q2c or other interactive questions). Watched the YouTube videos on next steps and the C autograder. Resolved my issue with the HW1 resources folder- the fix was to use clientFilesQuestion folders, and adjust the server.py to address the new structure. This can be applied at a course, HW, or question level.

Joey: I was able to get my c autograder to function properly. The issue lied in my Docker setup which did not properly map the docker socket and grading "jobs" folder. Once that was fixed, I worked on writing a problem based on HW4 Question 4, which is another basic C program. This is a good way to make sure I understand the c-autograder setup. I first had to review C programming as it has been a little while since I have written a C program from scratch. Then I started working on an assembly language question from HW12

Justin: I got docker and Prairielearn installed on the project server. Got last year's questions up and running the server so we can start getting our newly created questions hooked up. I sent you an email about how to get ISU integration working with our OAuth app. Created an admin prairielearn account to lock down permissions on our server. Started working on updating last year's teams documentation for setting up the server since some of it was inaccurate.

Devin: I looked into trying to randomize the answer pool for the question I was working on the week prior (HW1_Q5). I am able to go through and replace different words in a potential answer to give more variety and potential answers to choose from. With the input of the actual answers, more answer options are given based off of that answer just by switching out nouns, verbs, etc. I looked into old CPRE 2880 material to familiarize myself again with certain concepts.

NAME	Individual Contributions	<u>Hours this</u> <u>week</u>	HOURS cumulative
Caden Otis	I randomized the image for HW 5, 2a to allow for variants of the question to be created and updated the C autograder for that question. I also looked into problem HW 2, 5 to see a different use of the C autograder, which is to create tests of the student's created function. I then added additional feedback whenever a student failed a	6	22

o Individual contributions

	test to give them more insight into what they did wrong		
Rachel D-H	Slack and Forum reading, 288 lecture slides review, documentation video viewing, Excalidraw and pl-drawing and pl-figure research, clientFilesQuestion research and debugging	7	28.5
Justin Cano	Installed docker and Prairielearn on the project server. Got last year's questions up and running. Created an admin prairielearn account to lock down permissions on our server. Started updating last year's team documentation.	6	20
Joey Krejchi	Fixed PrairieLearn autograder, reviewed C programming, and worked on implementing another C programming question.	6	19.5
Devin Alamsya	Answer randomization for HW1_Q5 (changing out nouns or verbs inside of a potential answer) and reviewing CPRE 2880 material	6	18.5

• Plans for the upcoming week

- Joey: I will look into the assembly autograder and try to get an understanding of that. I will then finish writing an autograded assembly question and then see what I can make better from other homeworks that has been completed by the previous group. I will also continue to review CPRE 2880 topics.
- Caden: For the upcoming week, I plan on looking into how HW 5, 2a handles students inputting incorrect naming of GPIO registers. There are register variables defined outside of the function that student's create, but can't see since they are the same as the registers in the course datasheet. There is a possibility that if a student mistypes the name for a register, then they have effectively called an unknown variable, which will not let Prairie Learn compile and autograde the question. I also didn't have enough time this week to review more concepts from CPRE 2880, so I also plan on reviewing additional CPRE 2880 material for next week.
- Justin: Keep working on updating documentation. Hopefully get ISU SSO integration working. Link our projects git repository to our Prairielearn server so we can start pushing our work to the actual production server.
- Rachel: I plan to look into "adding the data sheet" to questions in HW9 and look into HW12. I also want to understand the ARM autograder for use in polishing HW12. Meanwhile, I will review course material and research interactive question types.
 - Devin: In the upcoming week, I plan on figuring out if there's a better format for HW1_Q5 to be delivered. I also plan on going through the homeworks and seeing if there are more short answer questions that can be changed to multiple choice or another format so that they don't rely on a TA or a professor to grade them. Hoping

to implement the randomization I've been able to use in HW1_Q5. Continuing to look into CPRE 2880 material for future question creation.

• Summary of weekly advisor meeting

During our weekly advisor meeting, we first discussed our findings with potentially having students draw as input for questions. The two possibilities that we found for making this possible was using excalidraw or pl-drawing. We then shared our progress with getting our team server setup for Prairie Learn, and our advisor noted that we should update the previous team's documentation that explains how to set up the server certificate. Our advisor also mentioned that we should make sure that only iowa state members can access our website, which is something that we'll need to fix in the near future. We also discussed the different approaches that the previous team designed for different code snippet questions.