4.3 Proposed Design

4.3.1 Overview

Provide a high-level description of your current design. This description should be understandable to non-engineers (i.e., the general public). Describe key components or sub-systems and how they contribute to the overall design. You may wish to include a basic block diagram, infographic, or other visual to help communicate the overall design.

We are creating a class in the PrairieLearn Framework which the professor of the CPRE 288 class can create homeworks, quizzes, and exams that are automatically graded. This is broken down into the class instance, for example: CPRE288 Fall2022. Then into assignment types, which would be homeworks, quizzes and exams. Lastly broken into questions which would hold the content of the course and test the students on their knowledge. This application will be hosted on an ISU server and available for students in the class to access.

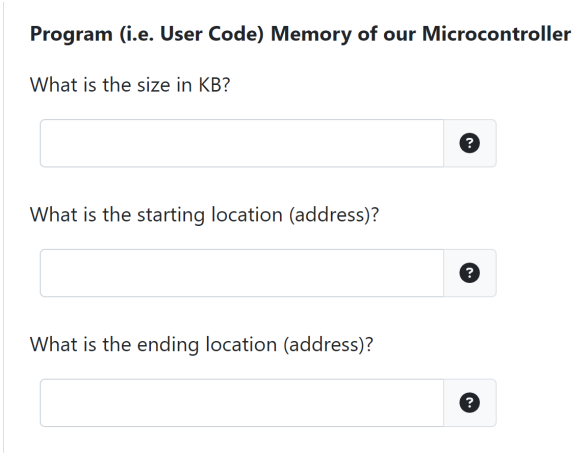
4.3.2 Detailed Design and Visual(s)

Provide a detailed, technical description of your design, aided by visualizations. This description should be understandable to peer engineers. In other words, it should be clearly written and sufficiently detail such that another senior design team can look through it and implement it. The description should include a high-level overview written for peer engineers. This should list all sub-systems or components, their role in the whole system, and how they will be integrated or interconnected. A visual should accompany this description. Typically, a detailed block diagram will suffice, but other visual forms can be acceptable.

The description should also include more specific descriptions of sub-systems and components (e.g., their internal operations). Once again, a good rule of thumb is: could another engineer with similar expertise build the component/sub-system based on your description? Use visualizations to support your descriptions. Different visual types may be relevant to different types of projects, components, or subsystems. You may include, but are not limited to: block diagrams, circuit diagrams, sketches/pictures of physical components and their operation, wireframes, etc.

We will be using Prairielearn which is a software that is made for creating and grading homework assignments. For each question there is a generated json, python, and html file. We modify those files to create questions relating to each homework assignment given to us by the professor. That is all that there is to the homework assignments then

we repeat for each question. It will look something like this.



Then we host it on an ISU server.

4.3.3 Functionality
Describe how your design is intended to operate in its user and/or real-world context. What would a user do? How would the device/system/etc. respond? This description can be supplemented by a visual, such as a timeline, storyboard, or sketch.

The user will be a CPRE 288 student. They will be able to access their homework assignments, exams, etc. As students submit their homework assignments, we will set up PrairieLearn to automatically grade and turn in their assignments to canvas. Students will be able to look at their grades for each assignment and be able to redo questions that were incorrect (if assignment is still available).

4.3.4 Areas of Concern and Development
How well does/will the current design satisfy requirements and meet user needs?
Based on your current design, what are your primary concerns for delivering a product/system that addresses requirements and meets user and client needs? What are your immediate plans for developing the solution to address those concerns? What questions do you have for clients, TAs, and faculty advisers?

Our current design fits well with its users needs and requirements. Our primary concerns right now are the user profiles and privileges as well as getting a hold of a server to host everything on. Our plans to solve these are researching PrairieLearn documentation on handling users and talking with our client about getting a hosting server set up. Some questions might include figuring out the necessary auto grading parts that will be used in each homework.

4.4 Technology Considerations

Describe the distinct technologies you are using in your design. Highlight the strengths, weakness, and trade-offs made in technology available. Discuss possible solutions and design alternatives.

The technologies used mainly consist of PrairieLearn and its internal tools, python and HTML for the auto grading and web page, and docker for running it inside of a portable container. An alternative to using PrairieLearn for automatic grading is using canvas quizzes instead. The strength of PrairieLearn and therefore weakness of canvas is that PrairieLearn can have students submit code to be compiled and have tests run for grading. Canvas doesn't have this function and it will be very useful in the later homeworks in the class.

4.5 Design Analysis

Discuss what you have done so far, i.e., what have you built, implemented, or tested? Did your proposed design from 4.3 work? Why or why not? Based on what has worked or not worked (e.g., what you have or haven't been able to build, what functioned as expected or not), what plans do you have for future design and implementation work? For example, are there implications for the overall feasibility of your design or have you just experienced build issues?

So far we have implemented the class instance and the homeworks set up in PrairieLearn. Next we are going to be setting up the server and putting the application onto the server before continuing the work. We are also developing the questions for the homework questions. Eventually when we are finished with the homeworks we will look into if our shareholder wants any additional features on the application like exams or quizzes. Lastly we will try to integrate our application into canvas so it will automatically update the student grades with their scores.