A New Home: Phase 2

INSO 4101: Introduction to Software Engineering

Informative part

1. Name, Place, Date

A New Home by team Codewalkers, UPR Mayagüez Puerto Rico, Spring Semester 2021

2. Roles

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Pablo G. Sepulveda Cosme - Frontend

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Fernando Mendez - Backend

3. Situation

Twice a year, students at the University of Puerto Rico Mayagüez (UPRM) go through the often-frustrating process of enrolling into their classes. In the UPRM system, the enrollment process favors students with good grades, athletes and others by letting them start the enrollment process sooner than all the other students, which leads to many students being left out of the classes they want to take the next semester. Many of these classes are core requirements without which students may not be able to access certain other classes. This problem has been occurring in the UPR for a long time and many students have had their graduations delayed by one or two semesters because of it. We know that something has to be done about this because most private colleges in Puerto Rico don’t suffer from this problem, while all UPR campuses do.

4. Needs

For enrollment decision making, students need easy ways to access their major information, no matter the academic department that he/she comes from, this to help them make decisions way easier. UPRM students often struggle when it comes to deciding which courses to take, given that there are courses given only once a year, others that are rarer to find since they aren’t offered that often which leads to students not being able to find them when enrollment comes around and as a result students can be affected by being held back. Students are eager to graduate as soon as possible in order to get started with their careers. So

they need guidance or suggestions on which courses they should/can take based on their curriculum. Students also need information so they can decide what they will take, and which courses will be available for the next term. This includes either courses within the curriculum or elective courses. Students DO NOT know how many elective courses the university gives each term and is a need for the enrollment process, for them to choose which courses to take.

5. Idea

To successfully eradicate the problem, we are developing a software that UPRM students can log into with official credentials and, tell the departments' faculties how many students want to take a given course during the next semester before beginning the enrollment process, so they can open as many sections as possible allowing for most if not all of the students to successfully enroll in the course of their choosing. This will let students and faculty work together in order to help each other for the upcoming semester and determine how many sections of each class they should open. During the first parts of the implementation we (the developers) will be creating mock accounts containing data about the students and faculty, hoping that in the future faculty and students may use the web application as it is meant to be used. This software design will be implemented on the Flask(Python) framework with HTML and CSS and the web application will be using SQLite to manage the databases in the backend of the program.

For phase 2 we started working on the frontend part of the web application. Since we wanted to work with Python and HTML/CSS, we decided to use Python's Flask framework which is very good for web development. For this phase we got to build the home page of the web application and other necessary pages like the about page, the contact page and the login/register pages. For the next and final phase, we are going to use SQLAlchemy to implement the database that we are going to be using for the backend part of our project. With this database we look to store user data to have a fully functional user feature and bring our idea of A New Home to life.

For the moment it is a template, with different buttons at the top such as: Home; it lets the user go to the homepage, About; it will let the users see what the application is about, Contact; this button will redirect the user to the github repository for any issue or bug found by a user, Login button will let a user login into his account and the Register button will let a new user create an account. There is a description of the application beneath the title A New

Home. Also, there is a getting started for the register/sign up button and if you are already a user you will be able to login in the other button.

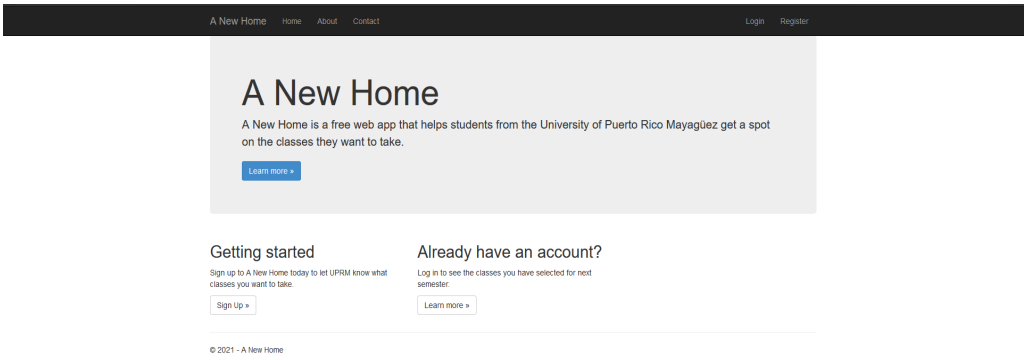

Figure 1: A New Home, Home Page

6. Scope, span

The scope of this project is for students to tell the faculty which classes they intend to take during the upcoming semester according to their curriculum. The span is that the faculty will be able to estimate how many sections of any course need to be opened for the enrollment process.

7. Project Organization

For the organization of this project we started by meeting up through the Matrix chat room via voice calls. Since then we have moved on to using our WhatsApp group since it is the easiest way to contact each other at any time and for our meetings, we decided to move to Google Meets because everyone felt it was more convenient since we could share our screens if needed. For phase 1 we had a lot to fix within our project as we felt we had missed the mark on our team proposal. In this phase we thought about what programming languages we wanted to use and came to the conclusion that Python coupled with HTML and CSS would be our best bet given that almost all of the team members are familiar with them due to previous classes. We also made some advancements in the front-end portion of the

application by creating a rough sketch of the user interface which was made via Figma, a graphics editor created with team development in mind.

Other meetings are happening via Discord, easier to communicate via voice chat and compatible with every platform. Whatsapp is the one that we use the more to communicate via text messages and to send more files, and access them via cellphone.

Descriptive part

1. Rough Domain Sketches

The enrollment process in the UPR is a very stressful moment for many students. The reason as to why most students do not enjoy this process is because it prioritizes students with better grades, athletes, and certain other categories of students by allowing them to start their enrollment process days before the rest of the students have their chance. This leads to courses being full before a majority of students even gain access to the enrollment system. There have been many ideas and suggestions to make the enrollment process a better one but, as many people know, the UPR is underfunded, the enrollment system that is being used at the moment is vastly outdated, and there appears to be no intent to change it in the near future.

The enrollment process in UPRM has been the cause of a crisis in the academic life of students for many years. Due to this, many students prefer to enroll in a private university with the hopes of finishing their degrees in a timely fashion. At that point students who are far into their degrees just want it, no matter how they get it. You go to any UPRM department and say “I couldn’t enroll in X course due to lack of space.” or “The system does not let me enroll in X course due to prerequisites.”. So that brings lots of questions, what are they doing wrong? What can they do to improve their system? Is the university prepared each semester for the enrollment process when the date comes? Most of the time the answers to these questions are not what the student wants to hear, and so the university needs feedback from students in order to make sure that they are comfortable with the enrollment process in UPRM.

2. Requirements

Students should be able to see and interact with their curriculum so they can see how to plan for their next academic terms. It should also provide feedback to the departments

as to how many students will take said courses in the next semester so that they can see the demand and adjust the offer accordingly. The user interface should be able to compete with today's standards with the user interface by keeping it simple and straightforward but yet versatil. The system should be able to catalog departments differently and provide useful information to said departments.

3. Domain Phenomenon

Domain Terminology:

- **UPR** - abbreviation for University of Puerto Rico, a public university system consisting of 11 campuses around the island.
- **UPRM** - abbreviation for the University of Puerto Rico, Mayagüez. A campus of the University of Puerto Rico.
- **Semester** - a half-year term in a school or university, typically lasting between fifteen and eighteen weeks.
- **Student** - a person who is studying at a university or other place of higher education.
- **University faculty** - a division within a university or college comprising one subject area or a group of related subject areas, possibly also delimited by level.
- **Enrollment** - the action of enrolling or being enrolled into a course.
- **Department** - a division of a university or school faculty devoted to a particular academic discipline.
- **Campus** - the grounds and buildings of a university, college, or school.
- **Curriculum** - the classes a student has to take to get their degree.
- **Course** - class that the student enrolls in to take during a specific semester.

Domain Entities:

Atomic:

- **Student** - UPRM student looking to let his department know he/she wants to take a specific course next semester.
- **Department** - a specific department of UPRM who wants to know the exact number of students who want to take a given course.
- **Curriculum** - the classes a student has to take to finish their degree.

Composed:

- **Curriculums** - List of curriculum, each item in the list will be the curriculum of a specified degree.

Domain Events:

A. From a student's perspective:

- The curriculum has been displayed to the student.
- Courses suggestions for the next academic term are shown.
- The student is communicating with the university.

B. From a faculty member's perspective:

- The faculty has been shown how many students want to take a specific course.
- The faculty is communicating better with the student indirectly.
- The faculty is showing the classes that will be given next term.

Domain Behavior:

A. Student's behavior:

- Pre-select courses that the student wants to take for the next academic term by selecting from their curriculum suggestions shown to him/her.
- Have a tentative class schedule do to the selections of courses suggested for the student to take.
- The student will know which courses he/she might be able to take to the preselection of courses done before.

B. Faculty member's behavior:

- Each department faculty members now are able to open as many sections as they see and think they need, due to students soliciting a specific course.
- The faculty will let the students know beforehand the courses that they are going to give according to the quantity of sections for each course they estimate that should be open according to the students pre-selection.

4. Domain Requirements

A. For students:

- Easily find the curriculum pertaining to the student's degree
- Quickly be able to notify his department that the student wants to take a specific course
- The system will hide the courses already taken or unnecessary from the enrollment feature.

- Cannot take a course the student has already taken and passed.
- Cannot take a course the student doesn't have the prerequisites for.

B. For faculty members:

- Have a quick way to know how many students want to take a course in the upcoming semester.

5. Interface requirements

A. Shared Phenomena and Concept Identification

- Student
- Department
- Curriculum

These three phenomena and concepts are the most important part of our domain and will be included in our machine. In our web application the students and department will be our users. Students will use their college emails to create an account in order to be able to let their department know what courses they want to enroll in. Student users will have different privileges when compared to the faculty users.

B. Rough Sketch of the Interface

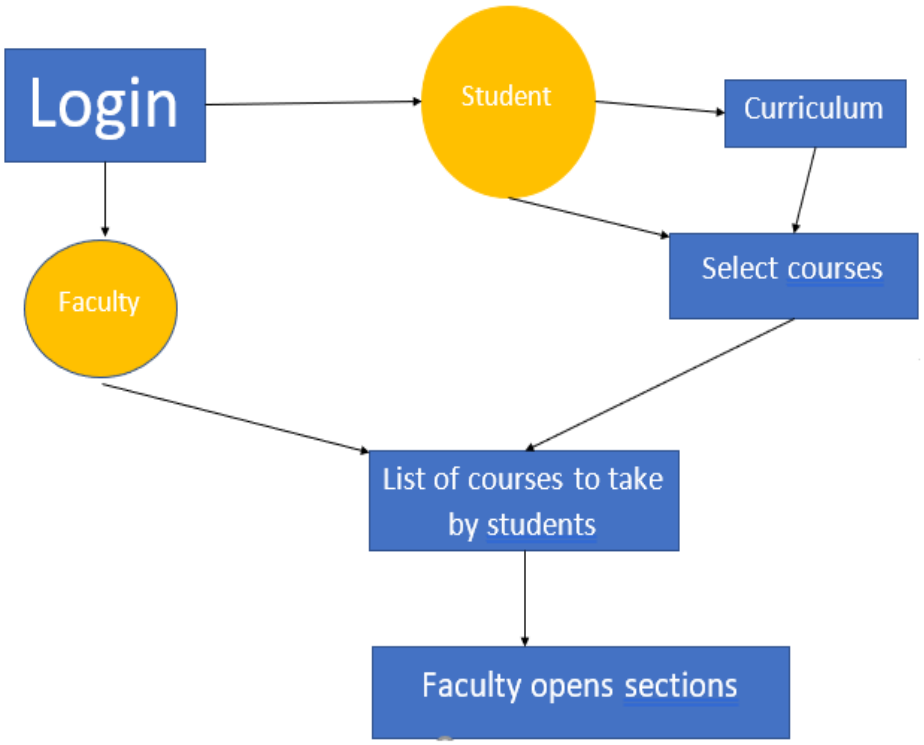

Figure 2: Rough sketch of the interface for the web application

- The login page will receive institutional credentials and detect if the user is a faculty member or a student.
- If a student, it will have access to their curriculum and also allow them to select the courses they want to take next semester.
- If faculty, the user will have access to the list of courses and how many students want to take it, in order to open as many sections as they can for the students to enroll.

6. Rough Sketch for the User Interface

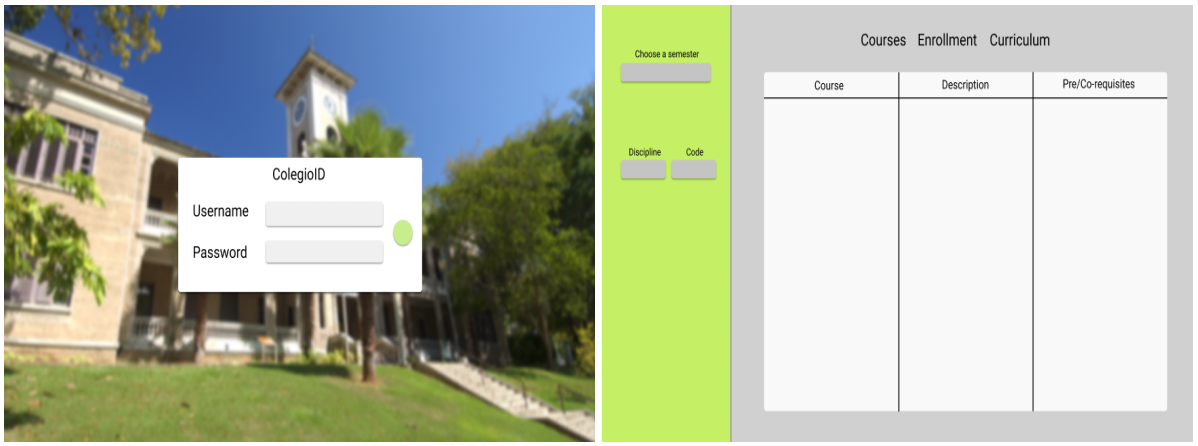

Figure 3: Rough Sketch for the UI of the web application

Analytical part

1. Concept analysis:

- The web application will provide the user with information crucial for the upcoming semester.
    - For the student, it will give them as users the best way to plan their class schedule regardless of their date of enrollment.
    - On the faculty side, it would give each department less problems with how many students will have issues enrolling classes.
- The web application will provide options for students at the moment to choose courses for next semester.
    - The student will be able to choose beforehand courses that they need to take according to their curriculum.

- The faculty will have the authorization to see how many students want to take a specific course.
    - This will help the faculty decide how many sections of an established course they are going to open for students to enroll into their classes without problem.
- The web application will work with institutional credentials
    - Using institutional credentials will make the use of the software safer because only people that have access to the institutional services will be able to use it.

2. Validation

The validation process for this project will be carried out by the stakeholders which consist of the following:

- Marko Schutz(Professor) - The professor will be reviewing each phase of the project and will be giving feedback for us to improve the project.
- Developers - Each member of the team will give feedback throughout the development process on what they think must be improved.
- Users - We will have a link to our github repository in our “Contact Us” page so users can give us feedback on any issues or recommendations that they have.

For validation purposes, the first is to have the evaluator(professor) see the work the developers have done, for his approval for release. As we(developers) receive the approval, our task is to double check that the web application can do everything that is supposed to, for it to be released, if a bug or an error is found, the work will be re-evaluated by the professor. When developers see that the web application is ready they will release it. The users are the most important part of our validation process, there will be a link to our github repository in the “Contact us” page, letting the users give us feedback on any issues regarding the web application or suggestions that they may have about the web application. Issues may be errors selecting a specific course, account does not exist after created already, the curriculum is not what it is supposed to be, any bug or error made by the developers. When it comes to resolve the issues, if the web application was already released, the developers will shut it down until they can fix all the errors that it may have, and then the validation process will start again.

3. Verification

Checking/Testing

- Before commiting a newly implemented task, the code will be put through various debugging techniques to make sure the program runs as expected. Also, each member

of the team will review the newly implemented code to check if there are parts of the code that can be optimized.

- We will also make use of the feedback given by the users to ensure that the web application runs smoothly.
- The documentation of the web application will be essential for the web application to not lose its purpose.
- For verification, constantly developers can go in as users and try different stuff in the application to try and find bugs and fix them.
- See experts if we as developers get stuck while fixing bugs or making updates to the application.
- Constantly testing the main functions of the application to make sure that it works as perfectly as we as developers want. If not, then proceed to the fixing errors/bugs part.