

Christina Porter

Drake Hovsepian

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Software Engineering Project

Valor's Schedule Planner

Introduction

Valor's Schedule Planner is an application for Bellarmine students who want to easily plan a class schedule catered to their personal needs. Valor's Schedule Planner allows students to plan multiple possible courses and compare them while giving students the ability to filter courses by their preferences, add their own schedule as potential schedule blocks, view other students' schedules, and view professor ratings. Unlike Self-Service where students have to manually create their schedule, Valor's Schedule Planner automatically creates recommended schedules for each semester based off user input, allows students to filter courses based off preferences, and gives the functionality to share and compare classes with other students.

This document outlines the possible features included in Valor's Schedule Planner and user stories and scenarios that are generated by several student interviews that took place from a diverse array of universities to get their experience scheduling and see how Bellarmine can improve their schedule planning process. To demonstrate this, we use feature diagrams, a feature table, personas, scenarios, and user stories.

Part 1 – User Stories and Scenarios

Persona 1

Nikki, age 18, is a freshman living at home who plans to commute to school. Her mother has a bachelor's degree in Business Management and her father is an electrician. She is uncertain about what career she wants to pursue and feels daunted by the wide variety of majors available. Nikki has never chosen her own class schedule before, as her high school simply assigned her classes each semester.

Nikki wants to explore her options and weigh the possibilities of available majors and their associated fields. She would like to delay committing to a major, if possible, because she knows there are a number of general education credits that can be completed before she has to decide. She has used a laptop regularly for her schoolwork but has never had to deal with administrative applications.

Scenario 1: Comparing multiple Majors

Nikki has narrowed her search to a small number of potential degrees. By browsing the Schedule Planner, she picks degrees by descriptions that stand out to her as aligning with her interests and past experiences in high school. When she selects a Major, she has the option to view details on what the requirements

to complete this degree are, which include required classes, groups of optional classes she must earn a certain number of credits from, and general education credits she must earn in any degree. Nikki clicks the "semester forecast" option and sees a sectioned view of what classes are recommended by semester of her college career. This view indicates what classes are only available during certain years and in spring or fall, and what classes are interchangeable. Each major Nikki is interested in can be saved to her personal profile, so she can review them later from her homepage.

Scenario 1's Stories:

- As a user, I want to quickly access relevant information about my schedule from my personal profile.
- As a user, I want to bookmark subjects, classes, or views so I can return to viewing them later.
- As an inexperienced user, I need an interface that clearly shows me where relevant information is.
- As a user, I want to be able to print available graphical views of majors.
- As a student, I want to see all of the requirements for a major summed up in neat categories.
- As a student, I want to know when I should be taking certain classes, and what classes I have to take each semester.
- As a student, I want to know what credits in one Major could count towards earning another degree.
- As a student, I want to filter degrees and classes to find what I am interested in learning.

Scenario 2: Looking in-depth at a single Major

Nikki is seriously considering a particular major. She's interested in seeing just how much she can change the recommended plan while still finishing her degree in 4 years. She's curious about possibly delaying her decision until after the first semester, and she wants to know how she would be able to make up for that time. Nikki accesses a detail view of the classes that comprise this degree. She sees classes divided according to whether they are necessary or in the 'pick x of these' category. She views prerequisites for advanced courses as 'chains' of succeeding classes, with each link being required a semester before the next. Nikki experiments with a potential schedule and sees how adding prerequisite classes to a semester unlocks more advanced classes in the next semester.

Scenario 2's Stories:

- As a student, I want to generate recommendations for what classes I should take every semester to graduate on time.
- As a student, I want to see my advanced classes and its prerequisites at the same time, instead of one or the other.

- As a student, I want to see at a measure of how advanced a class is for its associated major.
- As a user, I want to see at a glance which parts of my schedule as more easily manipulatable.
- As a user, I want to construct different potential schedules.
- As a user, I want to construct a schedule with guidelines according to my degree.
- As a user, I want to see how changes to my schedule in one semester will affect future semesters.
- As a user, I want to retrieve saved schedules I am considering, modify them, and save them again.

Scenario 3: Planning for the upcoming semester.

Nikki's parents are helping her prepare for her upcoming semester. Her decisions are finalized for what classes she will be taking this semester. An option on her semester schedule allows them to see a summation view of the materials like books and tools that will be required for each class, as well as which of these are available for sale in the campus store. Nikki is also adding custom time blocks to her schedule for activities and groups she plans to participate in.

Scenario 3's Stories:

- As a parent, I want to see a summary of the extra books and supplies my child will need for their classes.
- As a parent, I want to see if I can purchase school supplies on-campus or if I need a third-party seller.
- As a user, I want to add more events than classes to my schedule to make it complete.
- As a student, I want a readable schedule that tells me where my classes are, as well as what time they are.
- As a user, I want to see my current semester's locked-in schedule displayed on my homepage.
- As a parent/student, I want to print a concise graphic of my schedule.

Persona 2

Laura, age 20, is a transfer student who completed three semesters at another college before moving back home for family reasons. She wants to continue her education at a local university, and most of the credits she completed can be transferred over. Laura was originally pursuing a career in writing with an English major but has decided she would rather write as a hobby and make a career in Business or Finance.

Laura is weighing her options as to which major she should take. Whatever she chooses, she wants to construct a plan for each semester that will guide her class choices for the rest of her school career. Laura is also hoping to make the best

use of her existing credits, so she can repeat as few classes as possible, and avoid taking extra gen-ed or elective courses.

Scenario 1: Loading applicable credits from previous school

Laura is preparing the Schedule Planner to begin looking for a new degree to pursue. She has received feedback from her new university on what credits from her previous transcript are applicable in their system. After setting up her profile, she accesses the 'credit history' section to add her approved credits. She matches the classes in the scheduler to those on the document provided by the university and can now see them appear in relevant categories when she selects potential Majors and Minors.

Scenario 1's Stories:

- As a user, I want to construct a profile that reflects my academic progress
- As a user, I want to be able to add credits I already have to my profile
- As a user, I want to see a summary of all of my earned credits
- As a user, I want to see credits from other institutions apply to degrees I am pursuing at my current university

Scenario 2: Viewing a potential degree

Laura is researching a degree she is interested in. Part of her research is determining how many semesters it would take for her to graduate; she doesn't want to spend extra time wrapping up a few classes. Laura loads up the recommended by-semester schedule for this degree, then begins modifying it by moving available classes from later semesters to earlier ones. The classes in her schedule are marked to show which can be taken anytime, and which are bound by certain semesters or have prerequisites which prevent them from being taken earlier. Laura wants to get more credits taken care of now than later, when she might not have as much time.

Scenario 2's Stories:

- As a student, I want to see what credits I earned in one program are applicable to another
- As a user, I want to see how dense of a schedule I can make, according to university rules
- As a user, I want to see which classes I move earlier or later, and which have to be taken in a particular semester
- As a user, I want to see a condensed schedule that takes up as few semesters as possible

Persona 3

Joshua, age 22, is an oncoming senior completing his Exercise Science major in pursuit of a doctorate in Physical Therapy. Both of Joshua's parents have graduate degrees in professional fields. Joshua's interests in both sports and medicine during high school made this Major stand out to him when he entered college. Joshua is an out of state student renting a shared house with a few of his classmates. Joshua works a full-time job in an assistant role at a local Physical Therapy office, which treats patients recovering from debilitating injuries and those learning to use prosthetics.

Joshua is used to putting together schedules semester by semester but wants to make sure he can find a schedule that agrees with his busy life outside of school. His manager can offer some flexibility in what hours Joshua can work, if he is consistently available the same times each week.

Scenario 1: Constructing a Schedule around time restrictions

Joshua's boss and he are cooperating to see if they can find a time arrangement which works well for both of him. Joshua's boss forwards him a document which contains a 'wishlist' of shifts and times he'd like Joshua to work. Joshua accesses his recommended semester schedule and opens a view for each class to see what other times the class is available. He also applies filters to his schedule, to see if there is a version of it that can be generated with no classes at certain times of certain days.

Scenario 1's Stories:

- As a student/employee, I want my scheduler to help me balance time conflicts
- As a user, I want to view all available sections for my classes on my schedule
- As a user, I want to set restrictions on when I don't want to have a class, if its possible to schedule around that

Persona 4

Matthew, age 26, is a system administrator maintaining the Valor Schedule Planner. He graduated from a four-year program in Computer Science and shortly after earned certifications in Systems Administration. He is responsible for ensuring accurate information for degrees, classes, and sections is displayed for each semester. He manages relationships between classes such as pre-requisites and multi-semester courses, and he keeps degree requirements up to date. He handles maintenance of the system's servers and ensuring high-load times like the period just before registration move smoothly. He also handles emergency changes to class details or offerings, such as canceled sections, closed classes, additional seats in classes, and class details changes.

Scenario 1 Updating the Schedule Planner

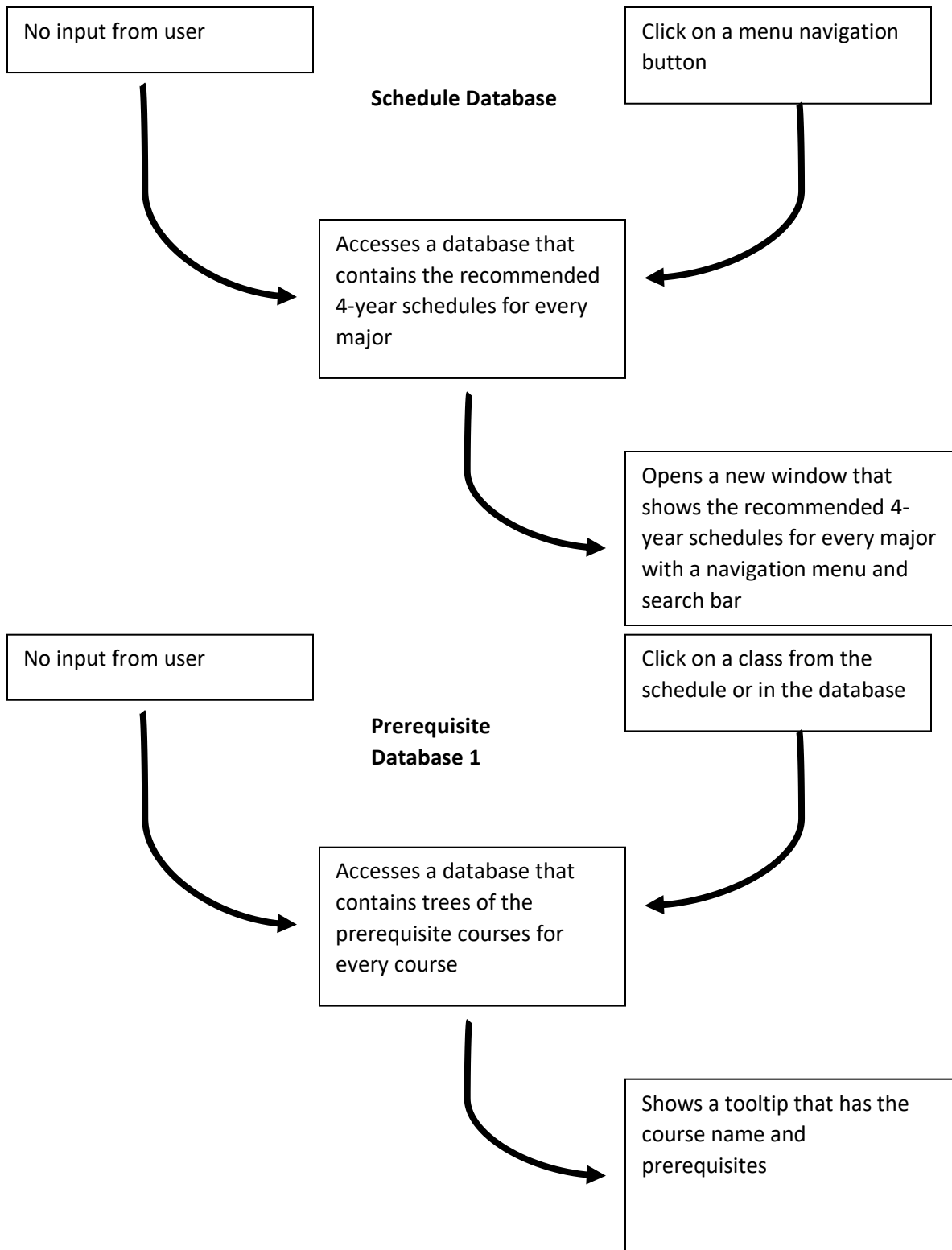
Bellarmino is changing some of the classes that will be offered in future semesters, which will affect degree requirements, prerequisites, and class groupings like individually required classes and 'complete x number of this group' courses. Matthew needs to update the scheduler's class and degree databases so that the right information is shown for the right semesters. Student who started their degrees before a certain time will not be affected, but students in earlier years may need to change their plans for what courses they will take in future semesters.

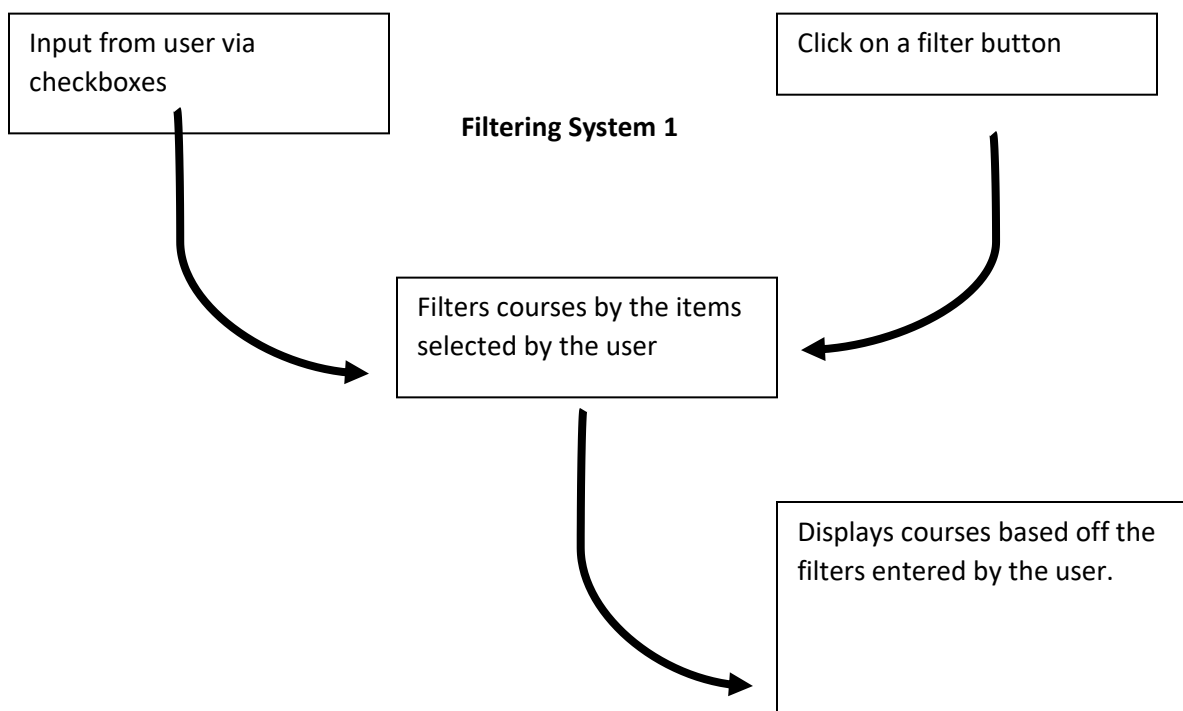
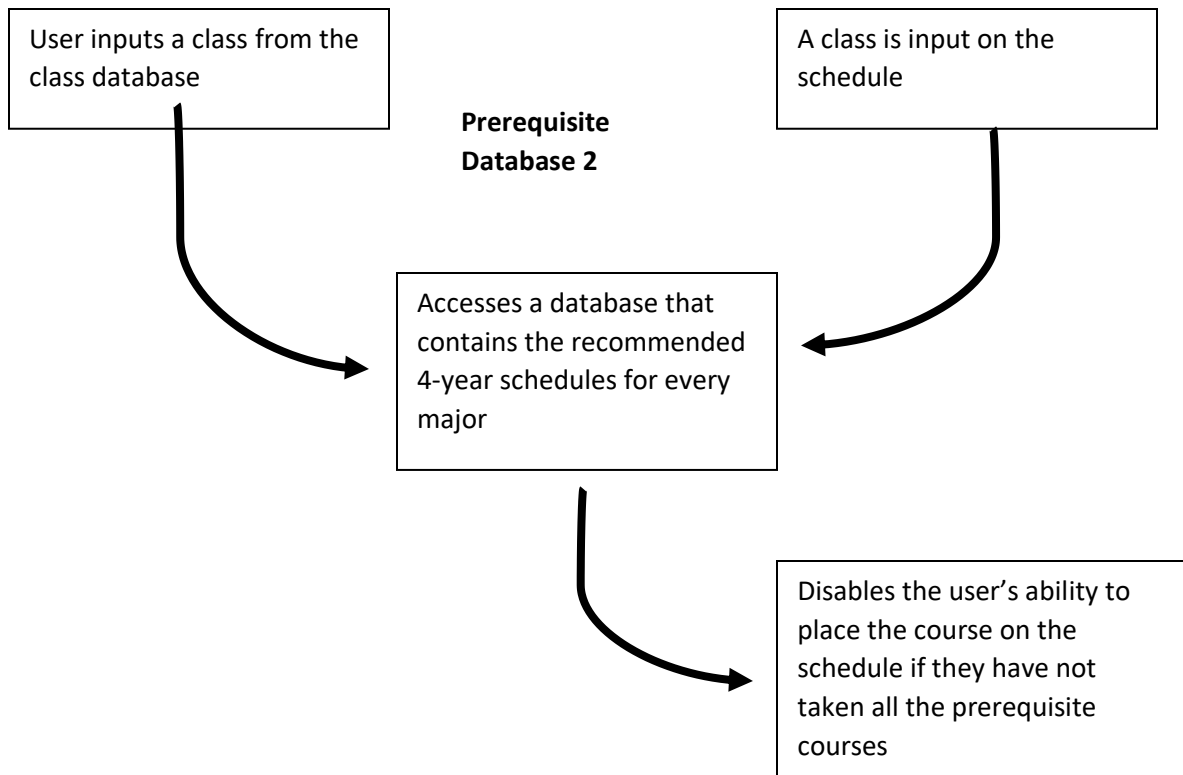
Scenario 1's Stories:

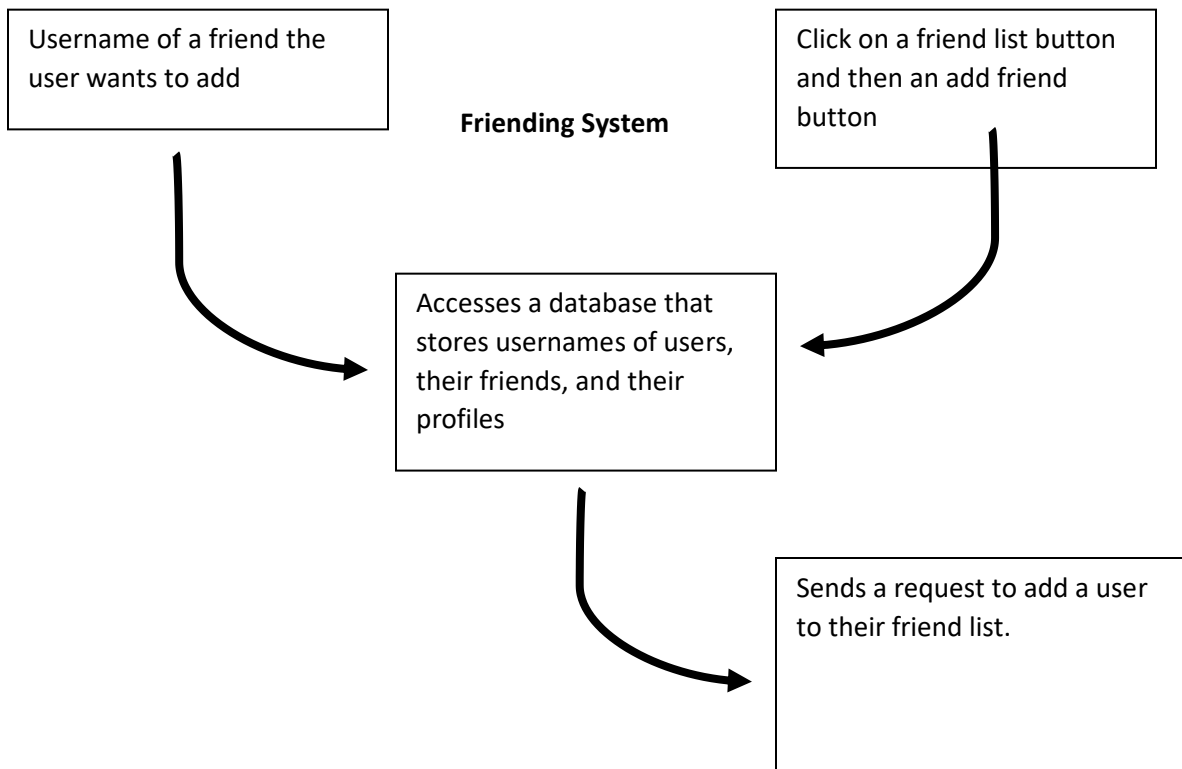
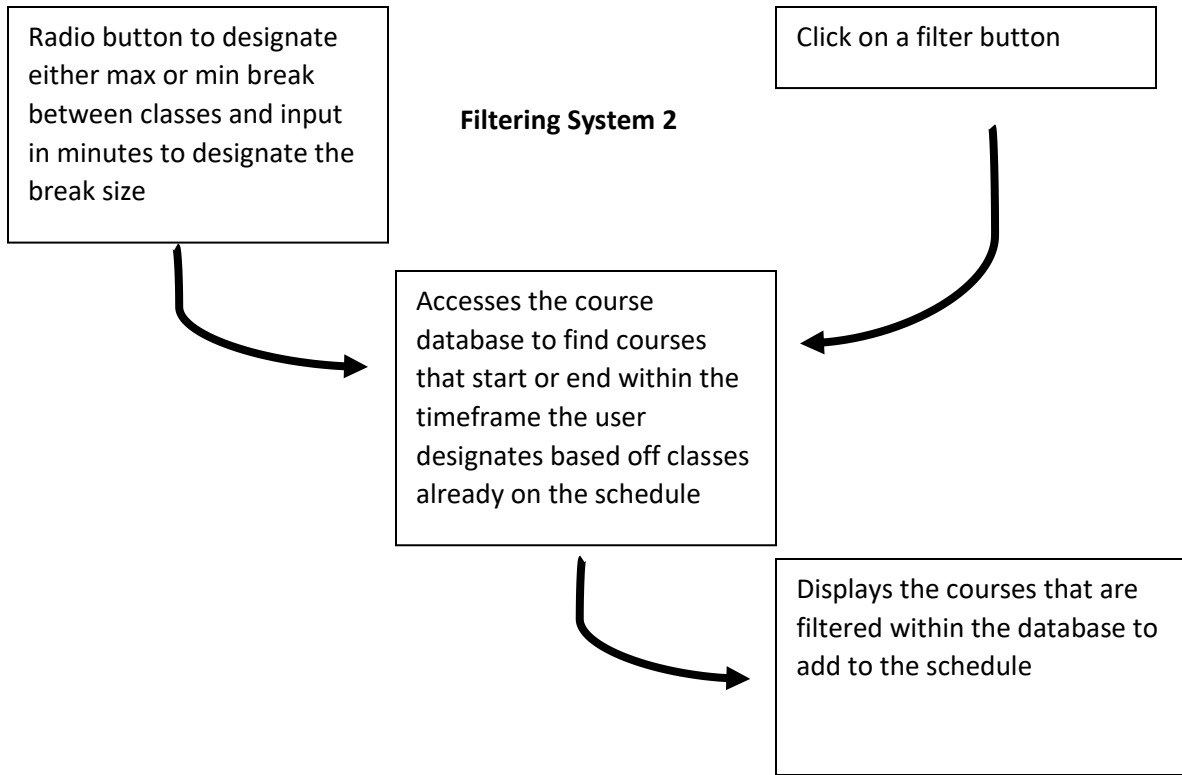
- As an administrator, I need to access and edit the database containing class information
- As an administrator, I need to establish planned updates to course and degree details
- As an administrator, I need to manually adjust degree requirements to prepare for future changes
- As an administrator, I need to update course details dynamically, so that they are accurate for present and future semesters
- As an administrator, I need to manage relationships between courses
- As an administrator, I need to make courses details relevant to the year of the student viewing it
- As an administrator, I need to troubleshoot the Scheduler's recommendation system

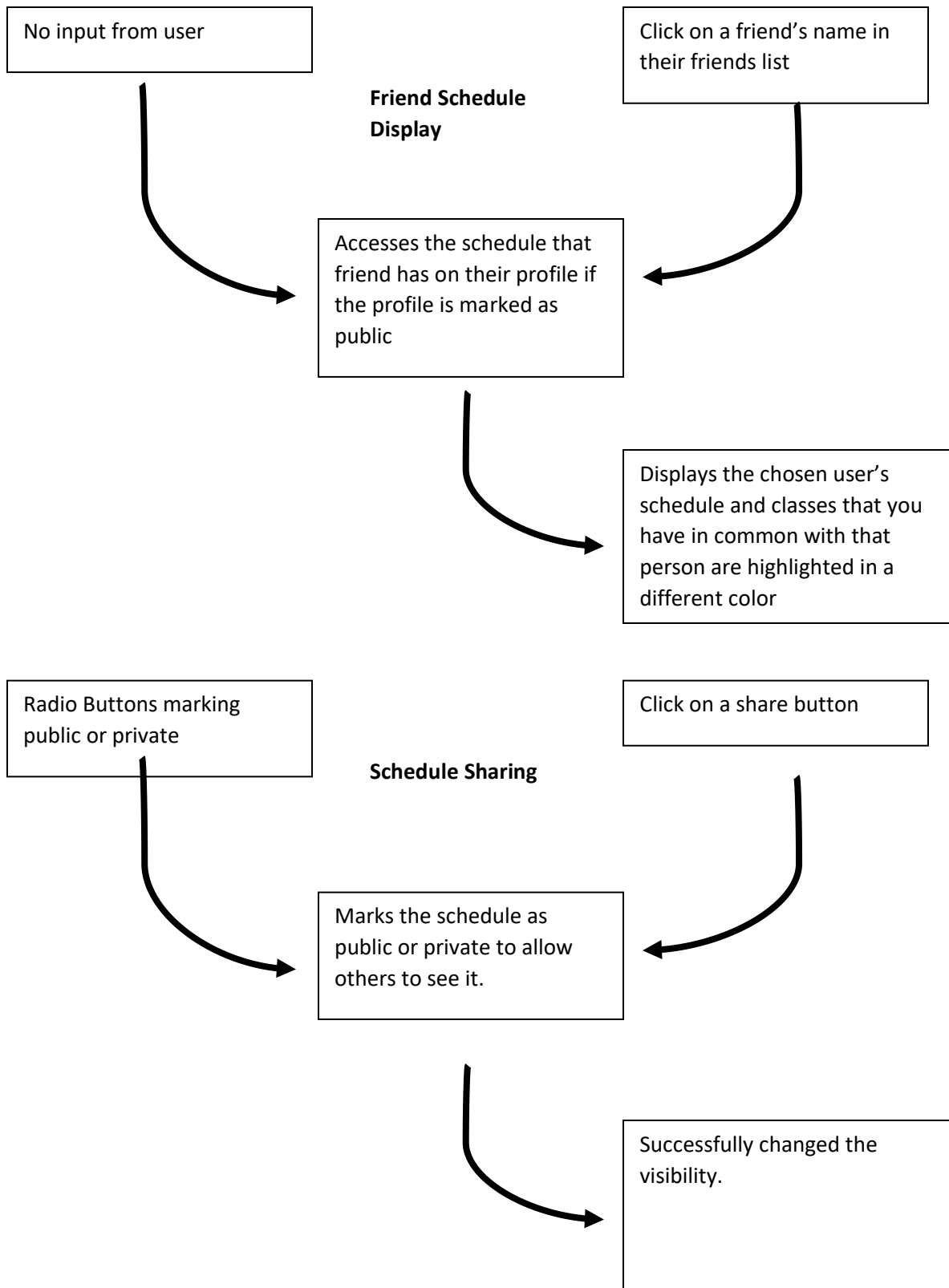
As an administrator, I need to adjust the details such as teacher names, section times, and required materials for individual courses.

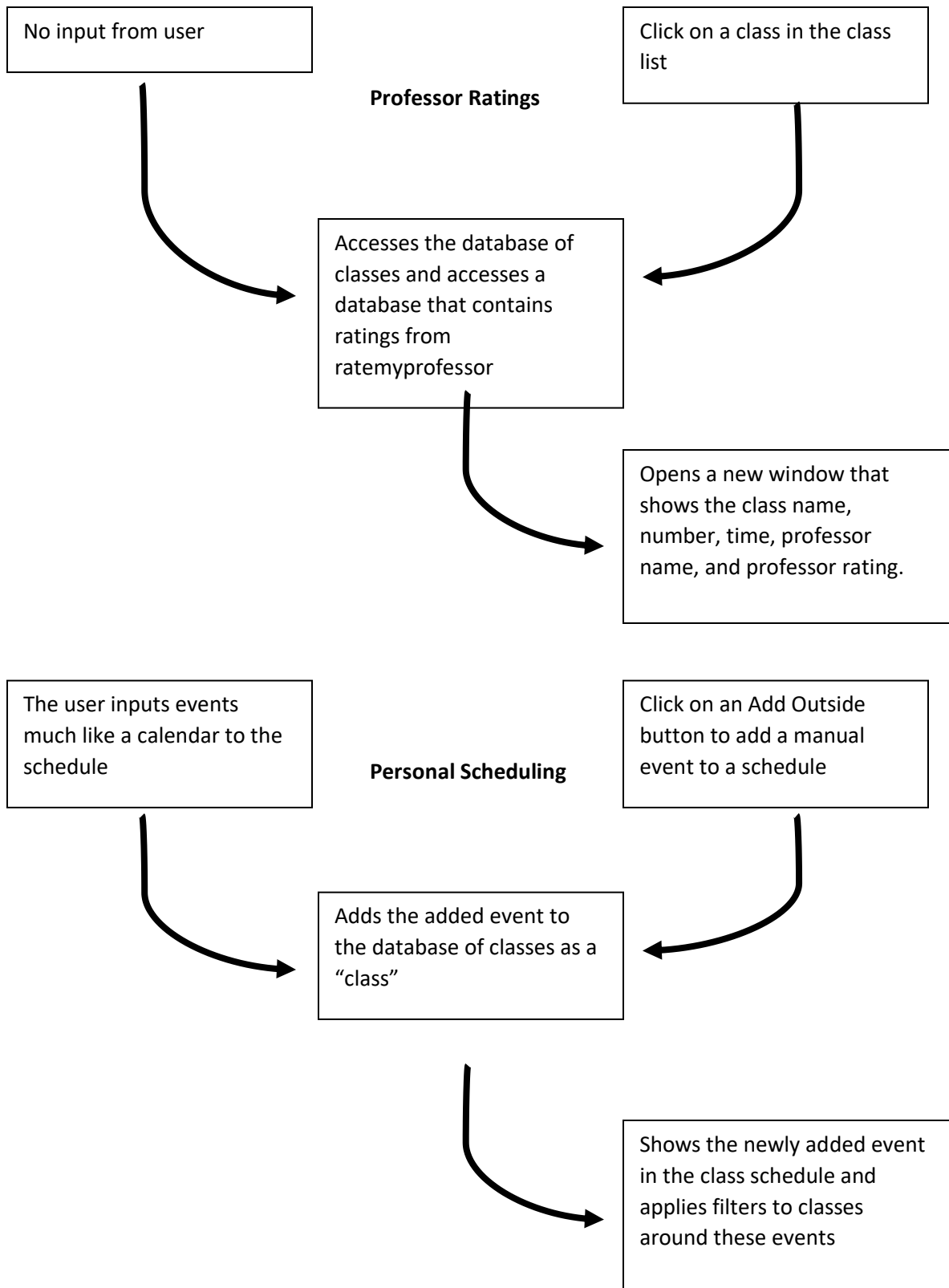
Part 2: Feature Diagrams and Table

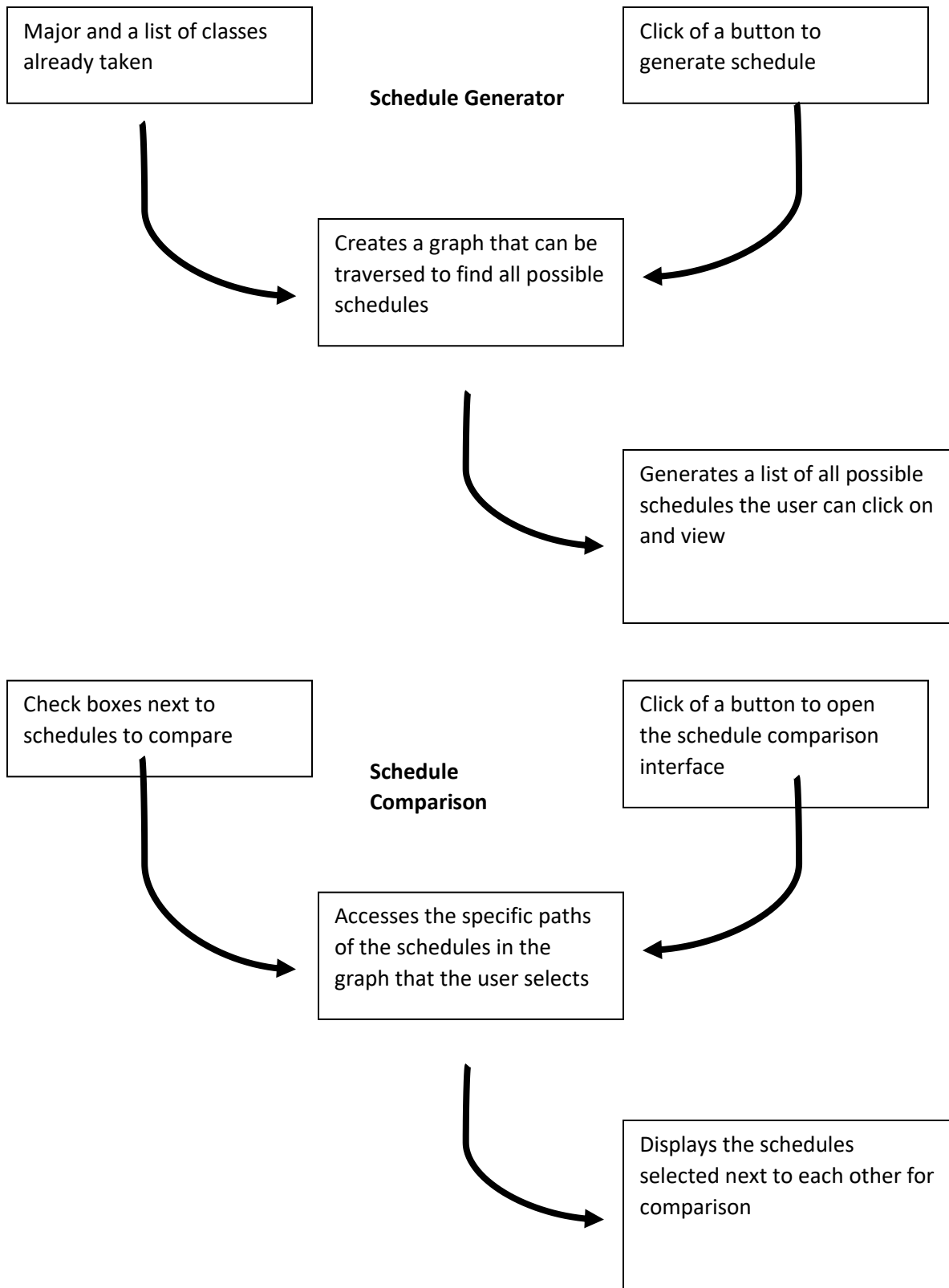












Schedule Database

User Stories

- As a user, I want to quickly access relevant information about my schedule from my personal profile.
- As a student, I want to know when I should be taking certain classes, and what classes I have to take each semester.
- As a user, I want to be able to print available graphical views of majors.
- As a student, I want to see all of the requirements for a major summed up in neat categories.
- As a student, I want to know when I should be taking certain classes, and what classes I have to take each semester.
- As a student, I want to know what credits in one Major could count towards earning another degree.
- As a student, I want a readable schedule that tells me where my classes are, as well as what time they are.
- As an administrator, I need to access and edit the database containing class information
- As an administrator, I need to establish planned updates to course and degree details
- As an administrator, I need to manually adjust degree requirements to prepare for future changes
- As an administrator, I need to update course details dynamically, so that they are accurate for present and future semesters
- As an administrator, I need to adjust the details such as teacher names, section times, and required materials for individual course

Constraints

In order to access the database, there needs to be a configuration set up that allows the program to query the database.

Prerequisite Database 1

User Stories

- As a student, I want to see my advanced classes and its prerequisites at the same time, instead of one or the other.
- As a user, I want to see a summary of all of my earned credits
- As an administrator, I need to manage relationships between courses

Constraints

- In order to access the database, there needs to be a configuration set up that allows the program to query the database.

Prerequisite Database 2

User Stories

- As a user, I want to construct different potential schedules.
- As a user, I want to construct a schedule with guidelines according to my degree.
- As a user, I want to retrieve saved schedules I am considering, modify them, and save them again.

Constraints

- In order to access the database, there needs to be a configuration set up that allows the program to query the database.
- We need to be able to represent a flow of how prerequisites will be represented in the system and how the program will access requirements.

Schedule Generator

User Stories

- As a student, I want to generate recommendations for what classes I should take every semester to graduate on time.
- As a user, I want to construct different potential schedules.
- As a user, I want to construct a schedule with guidelines according to my degree.
- As a user, I want to see how changes to my schedule in one semester will affect future semesters.
- As a student, I want a readable schedule that tells me where my classes are, as well as what time they are.
- As a student/employee, I want my scheduler to help me balance time conflicts

Constraints

- We need to be able to access the database that classes are stored in.
- We need to utilize a data structure that will allow us to come up with all the different possible combinations of courses.
- We need to rely on prerequisite information and use that information when determining courses and possible paths to take to generate schedules.
- We need to utilize class filters when coming up with possible paths to generate schedules with so classes that aren't on a student's preferred combination don't appear in possible schedules.
- We need to utilize Bellarmine's recommended course schedules in addition to credits the student has already earned to generate possible schedules.

Filtering System 1

User Stories

- As a student, I want to filter degrees and classes to find what I am interested in learning.
- As a user, I want to construct different potential schedules.

Constraints

- We need to be able to access and query the database the classes are stored in.

Filtering System 2

User Stories

- As a user, I want to set restrictions on when I don't want to have a class, if its possible to schedule around that
- As a user, I want to construct different potential schedules.

Constraints

- We need to be able to calculate the time that the first class ends and the next class should start or vice versa and only display classes that show up during or after/before that timeframe.
- We have to utilize times of events that aren't considered classes that the user adds in on their own.
- We need to be able to access and query the database that classes are stored in.

Schedule Comparison

User Stories

- As a user, I want to construct different potential schedules.
- As a user, I want to see how dense of a schedule I can make, according to university rules
- As a student, I want to generate recommendations for what classes I should take every semester to graduate on time.

Constraints

- We need to be able to access and query the database that classes are stored in.
- We need to be able to display two or more schedules next to each other so the user can see them.

Personal Scheduling

- As a user, I want to add more events than classes to my schedule to make it complete.
- As a student/employee, I want my scheduler to help me balance time conflicts
- As a user, I want to set restrictions on when I don't want to have a class, if its possible to schedule around that

Constraints

- We need to be able to access and modify the class database that classes are stored in.
- We need to create a framework that allows users to add their own events to the database without accessing the data directly.

Friending System

User Stories

- As a user, I want to be able to add friends to my profile do designate the people whom I want to share my schedule with.
- As a user, I want to be able to click on a button that allows me to see all my available friends.

Constraints

- We need to find a way to connect with other accounts and send requests into the database.
- We need to find a way to allow users to view other users profiles or gain access to search for other users' usernames.

Friend Schedule Display

User Stories

- As a user, I want to be able to see the schedules that my friends have created.
- As a user, I want to be able to mark schedules as public or private to designate whether my friends can see my schedule.

Constraints

- We need to find a way to allow users to view other users profiles or gain access to search for other users' usernames.

- We need to find a way to display the schedules that other users have set in real time.
- We need to find a way to display the classes that two users have in common differently than the rest of the classes.

Schedule Sharing

User Stories

- As a user, I want to be able to share a link to another user that allows them to view my schedule.
- As a user, I want to be able to share my schedule with other users so we can compare schedules.

Constraints

- We need to be able to generate a unique link to allow others to view a user's schedule if shown.

Professor Ratings

User Stories

- As a user, I want to be able to view ratings for professors that are on my schedule.
- As a user, I want to be able to view professor ratings in the same screen as the classes I'm taking.

Constraints

- We need to be able to connect to RateMyProfessor and store ratings for each professor
- We need to be able to display the professor's ratings to the user.

Appendix: Interviews

Interview 1: *Student who changed their major halfway through college*

(Asking what they might need from a class scheduling program)

The main pain is trying to put a schedule together with classes that are only offered every other year, especially considering classes have to be taken in a certain order.

(Describing idea for scheduler software that displays importance of courses and can generate semester plan based on completed classes)

Say with the student planning, I'd like to see my potential classes in a light blue outline. I'd like it to automatically create a structure based on what I need to do that semester, so I know what's optional and what I can swap between.

A lot of times advisors have to be consulted to know what's mandatory for any given semester.

You can see a lot of what I mean in the 'progress' menu, where it tells you what classes you have to take and what you can choose between, but I'd like to see that on one screen alongside my next schedule.

Being able to filter potential classes based on time would be helpful.

I'm not used to choosing exactly what I do each semester, I usually just take whatever my advisor tells me I need.

(Describing possible feature to adjust schedule according to time needs, filter for certain sections or ask to not have any classes at a particular time.)

It would be nice if there were enough classes to be able to choose around certain times, I don't think that's usually the case

I'd like to see if it was smart enough to set up my schedule for all four years, just based on the major/minor I'm taking, then I could make adjustments to the schedule from there.

(Asking about additional wish list features.)

It would definitely need to keep track of credits; in case I need to achieve a certain number of credit hours over a period of time

I'd like to see a 'shortest time possible' mode, where I can do as many classes every semester and during the summer if they're available, to graduate as soon as possible.

Could there be a difficulty rating for classes? I have some semesters that are a lot harder than others because I have a bunch of really involved classes going on at the same time.

Interview 2: *Graduate Student at UofL*

How was the process for scheduling classes in your undergraduate career?

I had to wake up before class selection and had to have my schedule planned already.

How was the process for planning classes?

I mainly planned by myself. My advisors gave me a flowchart of the classes I needed to take each year.

The most annoying part about scheduling classes was finding times to schedule classes because we had to coordinate schedules.

What would you do to make that process better?

The entire process of planning classes was annoying because of the outdated website that was frustrating to use.

If you had an app described as this, would that make it better?

I think it would be equally as annoying to use.

What features would you like to see?

1. Sharing class schedules using links
2. Maximizing the number of shared classes with friends
3. Modern and easy-to-use UI

Interview 3: *Alumna of Bellarmine University*

How was planning classes when you were at Bellarmine? How would you describe your planning process?

I had no issues unless two required classes were scheduled for the same time like CS and Physics. Then we would have to wait on the two departments to work something out.

What would you do to make the process easier?

It was easy, nothing would have made it easier.

What if you had an app with these features?

Yeah I guess that would help. In my day though all the classes you needed were only offered at one time so there was nothing to compare.

What other features would you look for?

Filter by major or subject, like setting just all physics classes or math classes, etc.

Interview 4: *Undergraduate at UofL*

How is coming up with a class schedule at UofL? How would you describe your planning process?

Coming up with a class schedule definitely sucks. Trying to fit in all the requirements is a struggle.

What if you had an app with these features?

I'd use an app like that.

What features would you like to see?

Customization. Include professors names and suggestions for your schedule.

Interview 5: *Junior at Bellarmine*

How is coming up with a schedule for Bellarmine? How would you describe your planning process?

Coming up with a schedule sometimes requires a lot of energy. I always have ten thousand tabs open to see what classes I need and what's available and blah blah blah. I usually try to schedule an appointment with my advisor to make sure I cover all the right bases.

Would you describe it as frustrating?

Yeah sometimes. It's either VERY frustrating or very smooth.

What would you do to make the process easier?

I would provide a tutorial for new students.

What if you had an app with these features?

That app sounds awesome asf. 10/10 would use.

What features would you like to see?

Maybe like a help feature to chat with a real person?

Interview 6: *Sophomore at Bellarmine*

How is coming up with a schedule for Bellarmine? How would you describe your planning process?

My advisor created a plan for my classes so that I could achieve my double major in 4 years. Therefore, all that's up to me is to schedule what days/hours for each class.

I start out by looking at each classes professors on Rate My Professor. Then I write down all their available time slots (unless there's one with like 5+). After that, I just start trying out combinations on the website.

This semester I planned around workstudy, so I left a 2 hour gap in the morning for it. I also dislike having two lab blocks one after another, so I schedule them for different days.

What if you had an app with these features?

I think an app would be really helpful for creating schedules as that's the most chaotic part of my process. Being able to filter professors and add work schedules are great ideas. A feature where it takes into account the time you want to wake up would be helpful. Perhaps you could even click a schedule it made and modify it.

What features would you like to see?

I would like to see how many people chose/liked a particular schedule. Also I would like to see if any of my friends classes lined up with mine.

Interview 7: *Senior at Bellarmine*

How is coming up with a schedule at Bellarmine? How would you describe your planning process?

I look at key classes I want and plan gen eds around them. It is very quick and haphazard.

What would you do to make the planning process easier?

I would love the ability to sign up for classes I wouldn't be able to take at BU but would be great for my major.

What if you had an app with these features?

I'd fucking love that, please make it, I would pay \$1.99 in the App Store for one.

Interview 8: *Alumna of Florida International University*

How was planning schedules for school? How would you describe that process?

Well for me, planning schedules tended to vary... alot

Some semesters, I had a good plan set up

Other semesters, the plans went flying away

Usually, what plans usually managed to stay intact involved other people

Like a Carpool agreement

Would you say the process was annoying?

In some semesters, yes

In others, the planning was more organic

As in I didn't have much prior planning

And things just developed

In the ones that I liked the most was when I was able to plan a lot more

By my own nature, I tend to be a planner

Until reality intervenes and irl stomps all over my plans

Why do plans fall apart?

Life, Family matters

What was one of the most difficult parts of planning your school schedule?

Having to wait for when the classes can be picked and hoping that you get one at the good spot but then it fills up too quickly and you're left with dogshit at noon when parking is paddling up a shit creek without a paddle

I've been late several times because I couldn't find parking

And I wasn't the type to parking on the other side of campus where car is now oven

What if you had an app with these features?

That could work, I like the idea. Of course, one of the main issues is getting into said class in the first place

I remember having to wake up early, hoping to get into the class while the platform is struggling to accommodate all of the students trying to get their classes at the same time

There was many freezes and stalls

The website crashing and all that

What features would you like to see in said application?

Hm, I like the features that you've put up in the prior question

What needs would you have besides those?

Better infrastructure

Probably a way to handle some kind of budgeting too

I got lucky in my scholarships and family

But not everyone can afford to feed themselves that easily

So with the planning thing, it might have to involve whether a person works

And what they can afford

Hence the budgeting

Probably an optional thing