



# Graduation Requirements **Simplifier**

ICS370

Fall 2020

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**Elaboration Phase III**

Table of Contents & Status Report	
Project Component	% Done
1. Introduction	<u>100</u>
<b>System Concept</b>	
2. Business Case and Project Vision	<u>100</u>
3. Stakeholders	<u>100</u>
<b>Business Process Requirements</b>	
4. Business Process Analysis	<u>100</u>
<b>System Requirements</b>	
5. System Actors	<u>100</u>
6. Functional Requirements	<u>100</u>
7. Non-Functional Requirements	<u>100</u>
8. Mandated Constraints	<u>100</u>
9. Relevant Facts and Assumptions	<u>100</u>
<b>Design Diagrams</b>	
10. Updated Use Case Diagram	<u>100</u>
11. Updated Domain Model	<u>100</u>
12. Updated Class Diagram	<u>100</u>
13. Updated System Sequence Diagrams	<u>100</u>
14. Updated Sequence Diagrams	<u>100</u>
15. Updated Activity Diagrams	<u>100</u>
16. Updated State Machine Diagram	<u>100</u>
<b>Appendices</b>	

Communication Log					
Date	Communication Topic	Comm Type	Participants		
			Team Members	Client Reps	Other
Deliverable 1					
9/10/20	Phase 1 Preliminary Mtg	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
9/12/20	Demo Prep	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
9/16/20	Demo	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
Deliverable 2					
10/9/20	Phase 2 Preliminary Mtg	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
10/13/20	Demo Prep	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
10/15/20	Phase 2 Demo	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
Deliverable 3					
11/8/20	Phase 3 Preliminary Mtg	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
11/10/20	Demo Prep	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
11/11/20	Phase 3 Demo	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
Deliverable 4					
11/30	Phase 4 Preliminary Mtg	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
12/5	Demo Prep	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
12/9	Final Demo	<u>Zoom</u>	<u>Bradley, Rene, David</u>		
Final Project Deliverable, Visual Simulation and Presentation					

# Table of Contents

Introduction .....	5
Business Case and Project Vision .....	6
Stakeholders and Requirements .....	7
Introduction .....	7
Section 1 Technical Factors and Requirements .....	7
Section 2 Financial Factors .....	8
Section 3 Economic Factors .....	8
Section 4 Political Factors .....	9
Section 5 Market Factors .....	9
Gang of Four Design Patterns .....	10-11
Composite Pattern .....	10
High Cohesion Grasp Pattern .....	11
Appendix A	
Use Cases .....	12-13
Use Case Diagram .....	14
Appendix B	
Domain Model .....	15
Appendix C	
Software Archetecture Document .....	16
Appendix D	
Data Model.....	17
Appendix E	
System Sequence Diagram .....	18
Activity Diagram 1 .....	19
Activity Diagram 2 .....	20
Activity Diagram 3 .....	21
Appendix F	
Class Diagram .....	22
Appendix G	
Prototype .....	23-25

# Introduction

In this document we describe the requirements for the Graduation Simplifier System. We first describe the system concept and vision, followed by a description of actors, system boundary and scope of the system. We then provide more detailed requirements with use cases, followed by a description of non-functional requirements for the system. Finally, we provide a data model and other information management specifications. Please refer to Appendix A for a glossary of terms and acronyms used in this document.

## Business Case and Project Vision

The average bachelor's degree requires 120 college credits. However, the average recipient completes 134 credits before graduating. There are several factors that contribute to this phenomenon. We decided to explore those factors and determine what can be done to help with the problem.

One reason that students take extra classes is because they fail to take advantage of advising. Most, if not all universities, offer extensive academic advising services. However, advisors can be overloaded on cases and utilizing their services can take a great deal of time and effort. Thus, many students fail to follow through.

Other factors involve changing majors and/or transferring to different schools. Requirements can change from school to school and from program to program. This can cause great confusion and ultimately contributes to students taking unnecessary classes.

Degree audits can be very difficult to read. There are categories laid out in the audits, but often there are conditions listed that become very complicated. The wording of these conditions can almost resemble legalese, making them hard to interpret.

In addition to the factors mentioned above, I recently sat through student introductions for a college course. While giving their introductions, four separate students stated that they did not know when they would complete their major. It was apparent that they did not grasp the requirements to graduate with a degree.

Our desire is to create a simple application that will allow a student to better understand the requirements to graduate a given course of study. This system will have a simple user interface that can be accessed over the internet. There will be no appointments to make with advisors and no complicated degree audit to read. The scope will be programs at Metropolitan State University.

# Stakeholders and Requirements

## Introduction

This requirements report has been prepared to support our development of a software solution intended to be used by students that attend Metropolitan State University. We intend to show that this project will be beneficial across a variety of spectrums. These spectrums include, technical, financial, economic, and political. We will also explore the potential market value of this project.

## Section 1 – Technical Factors and Requirements

We considered the technical feasibility of the project from two different viewpoints. This allowed for us to get a full picture of whether the project could be completely funded from start to finish.

The first was project development and infrastructure. After researching several tools and integrated development environments, we found that we could utilize freeware in some instances and low-cost subscription SaaS products in others.

The second viewpoint required us to consider the technology of all potential end users. We determined that all of the students that attend Metropolitan State have access to laptop or desktop computers. Many have their own devices, in other circumstances, the University has computer workstations available for student use.

In summary, each of the products that will be needed by developers are supported by the current technical resources that we have on hand, no additional hardware will need to be purchased. Also, there will be no costs associated with end users, which is ideal. This will allow us to stay within our allotted budget for development and infrastructure, a topic that will be discussed in more detail in the following section.

## **Section 2 – Financial Factors**

Software development projects often involve numerous technical and operational expenses, particularly in the early phases. For this undertaking, we have gone to great lengths to avoid that potential pitfall.

Our project staffing consists of three individuals working together as a team. As mentioned in the previous section, all of the needed hardware for the project is in hand.

We do expect to incur minimal expenses related to software, this may come in the form of licensing or subscription fees related to development and hosting of the solution.

## **Section 3 – Economic Factors**

The previous section explored the costs associated with developing this solution, this section will focus on the ability of the solution to break even or become profitable in the future.

We do anticipate a considerable incubation period for this software feature before it becomes widely used and appreciated. This is largely due to factors beyond our control. The University follows yearly cycles of enrollment, registration, and course completion and evaluation. These cycles repeat throughout Fall, Spring, and Summer semesters. Graduation requirements are not always considered daily but tend to coincide with the aforementioned semester cycles. This phenomenon will contribute to the incubation period.

The next section of this report will explore additional factors that may contribute to a potentially lengthy break-even period. We understand that this is not always ideal for a software project. However, the nature of our project will afford us the ability to allow several semesters to elapse as students and advisors grow in their appreciation of this powerful tool.



## **Section 4 – Political Factors**

In a previous section, we mentioned that there could be a considerable period of time that elapses before this system becomes widely used. Our study on political feasibility helped us to form that belief. We have, however, concluded that none of the factors considered were harmfully significant or insurmountable.

Our project will be designed with the intention of helping students and also advisors. We expect the latter to involve political implications. The reason being that any outside attempt to improve processes or procedures often implies that a weakness or deficiency currently exists.

Previous experience shows that attempts to improve processes or procedures within any group or department, often incurs initial backlash from stakeholders or actors. We anticipate that, in this case, the benefits will be significant enough that the any pushback will be short lived.

## **Section 5 – Market Factors**

Our completed offering will have great potential within the Metropolitan State University system. We envision that students will find the solution to be intuitive and easy to use. It will negate the need to schedule countless appointments with their advisor and will provide peace of mind.

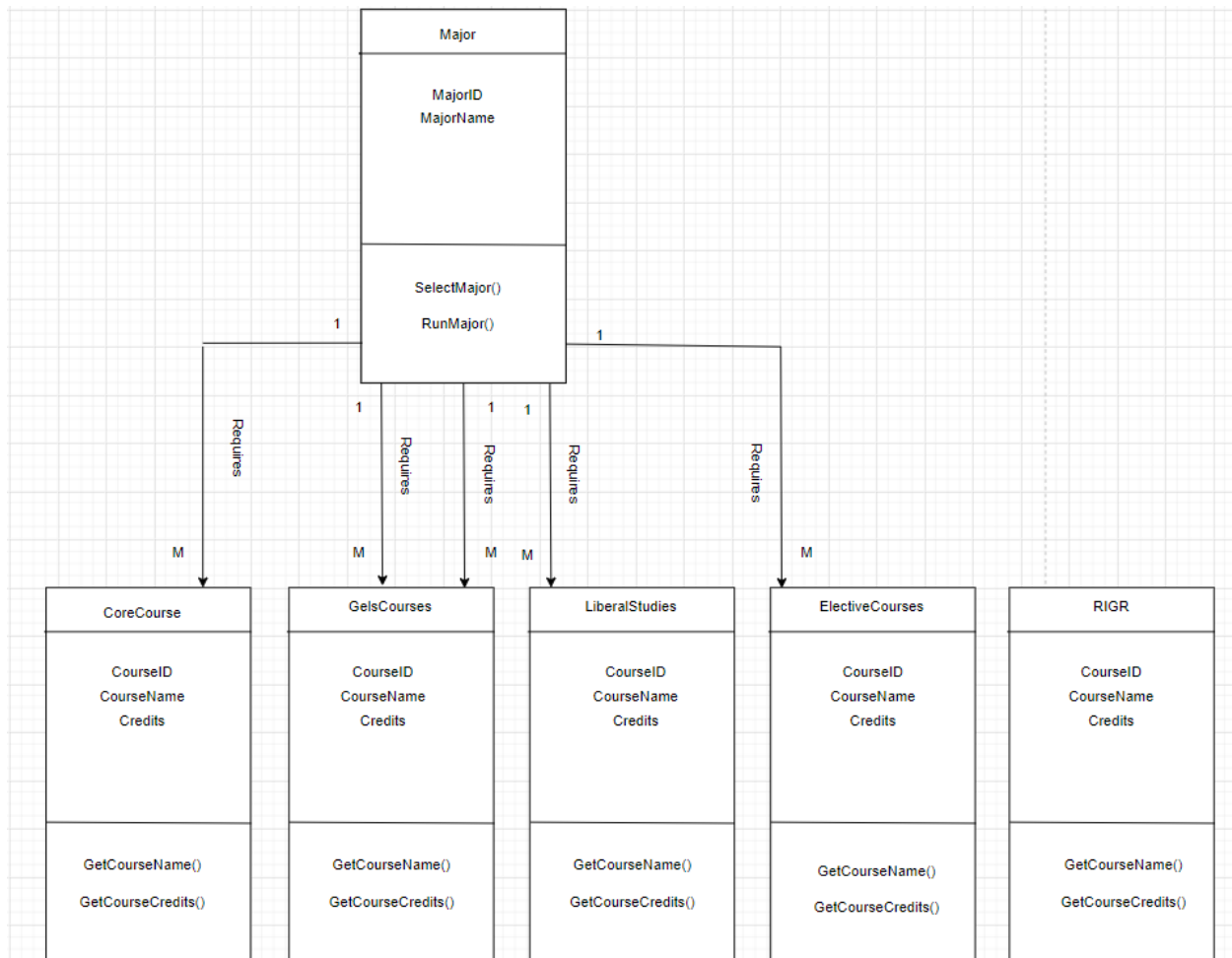
Advisors will also greatly benefit from this solution. Informed students will free up advisors to perform their essential duties and help them to manage their caseloads more efficiently.

Finally, we expect this solution to encounter demand from other colleges and universities. This simple application will improve student experience and advisor efficiency and thus will be coveted throughout the industry. This factor greatly mitigates the lengthy break-even period previously discussed.

# GoF Design Patterns

## Composite Pattern

Composite patterns allow each object to function with the same interface. This allows clients to treat objects and their compositions the same way. We found this useful because we have several types of course requirements that are classes having functionality that is much the same as seen in the snapshot below:



# High Cohesion

High cohesion is an evaluative pattern that attempts to keep objects appropriately focused, manageable, and understandable. High cohesion is generally used in support of low coupling.

The term cohesion is used to indicate the degree to which a class has a single, well-focused responsibility. Cohesion is a measure of how the methods of a class, or a module are meaningfully and strongly related and how focused they are in providing a well-defined purpose to the system.

Our use of this concept is evident when you look at the efficiency of our class methods demonstrated in the graphic below:

CoreCourse	GelsCourses	LiberalStudies	ElectiveCourses	RIGR
CourseID CourseName Credits	CourseID CourseName Credits	CourseID CourseName Credits	CourseID CourseName Credits	CourseID CourseName Credits
GetCourseName() GetCourseCredits()	GetCourseName() GetCourseCredits()	GetCourseName() GetCourseCredits()	GetCourseName() GetCourseCredits()	GetCourseName() GetCourseCredits()

## Appendix A

Users/Actors	Use Cases/Functionalities
<b>Student</b>	<ul style="list-style-type: none"> <li>• Login</li> <li>• Select Major</li> <li>• Upload Transcript/Dars Report</li> <li>• View Results</li> <li>• Print Results</li> <li>• Download Results</li> </ul>
<b>Administrator</b>	<ul style="list-style-type: none"> <li>• Login</li> <li>• Upload CSV File</li> </ul>

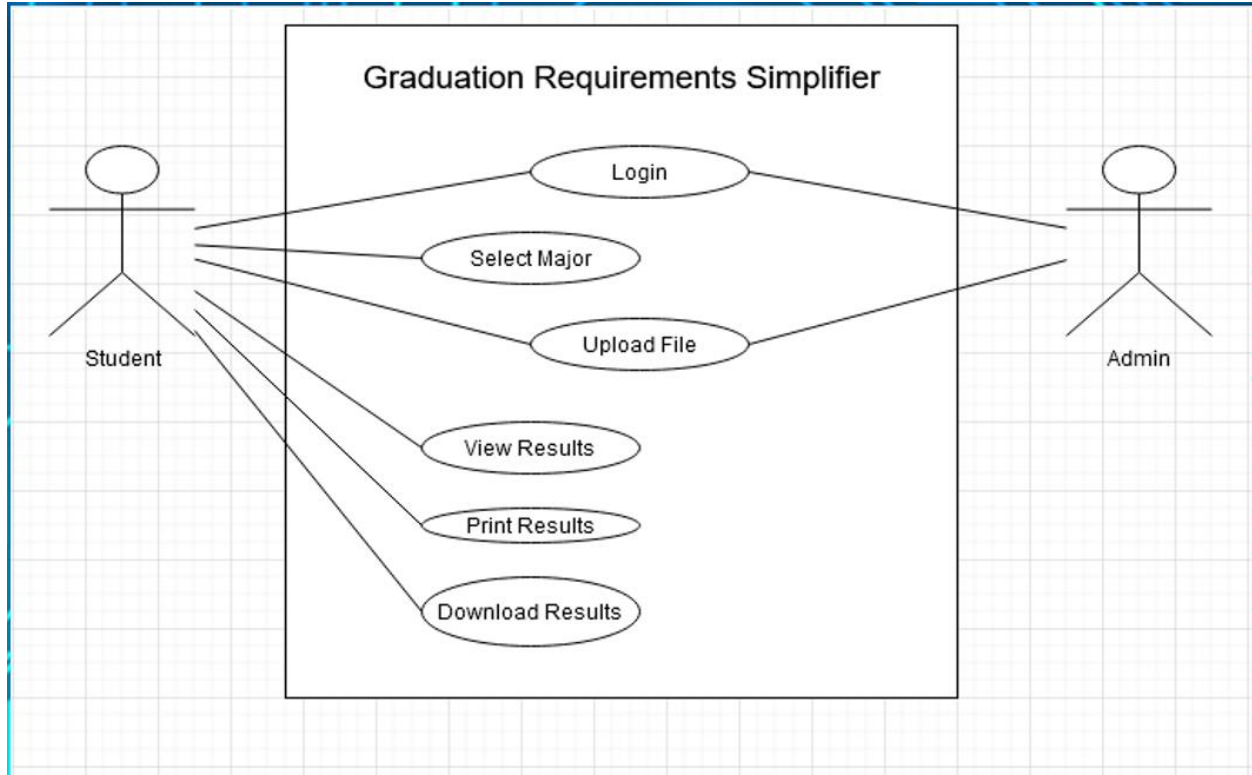
## **Student**

The student will be the primary actor in our system. The student will have to be able to login to access the interface of the program. Upon gaining access to the interface, the student will need access to several program features. These features include the ability to select a major course of study, upload a transcript or Dars Report, run the program, and access the results. Additionally, the student will need to view, download, or print the results.

## **Administrator**

There will be a system administrator that needs to interact with the system. The administrator will need to be able to login to access the administrative features of the program. Upon gaining access to the administrator interface, the instructor will need the ability to configure and maintain program majors and requirements.

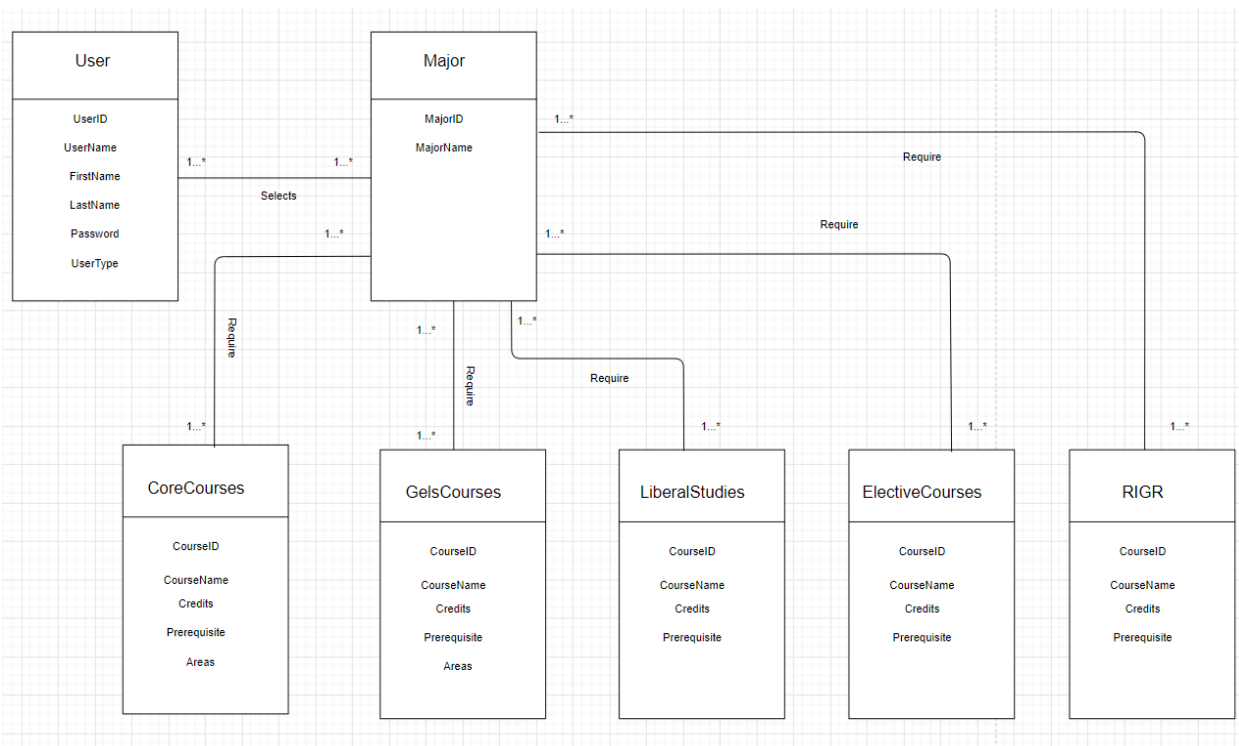
# Use Case Diagram



# Appendix B

## Domain Model

The domain model represents relationships between the conceptual classes in our system.



## Appendix C

# Software Architecture Document

### Issues:

- Moving from python to a web app
- Generating and retrieving data
- Building databases
- Missing logic to build the fastest approach to completing a major
- Missing logic to ingest files
- Missing logic to handle searching
- Missing logic to handle logging in

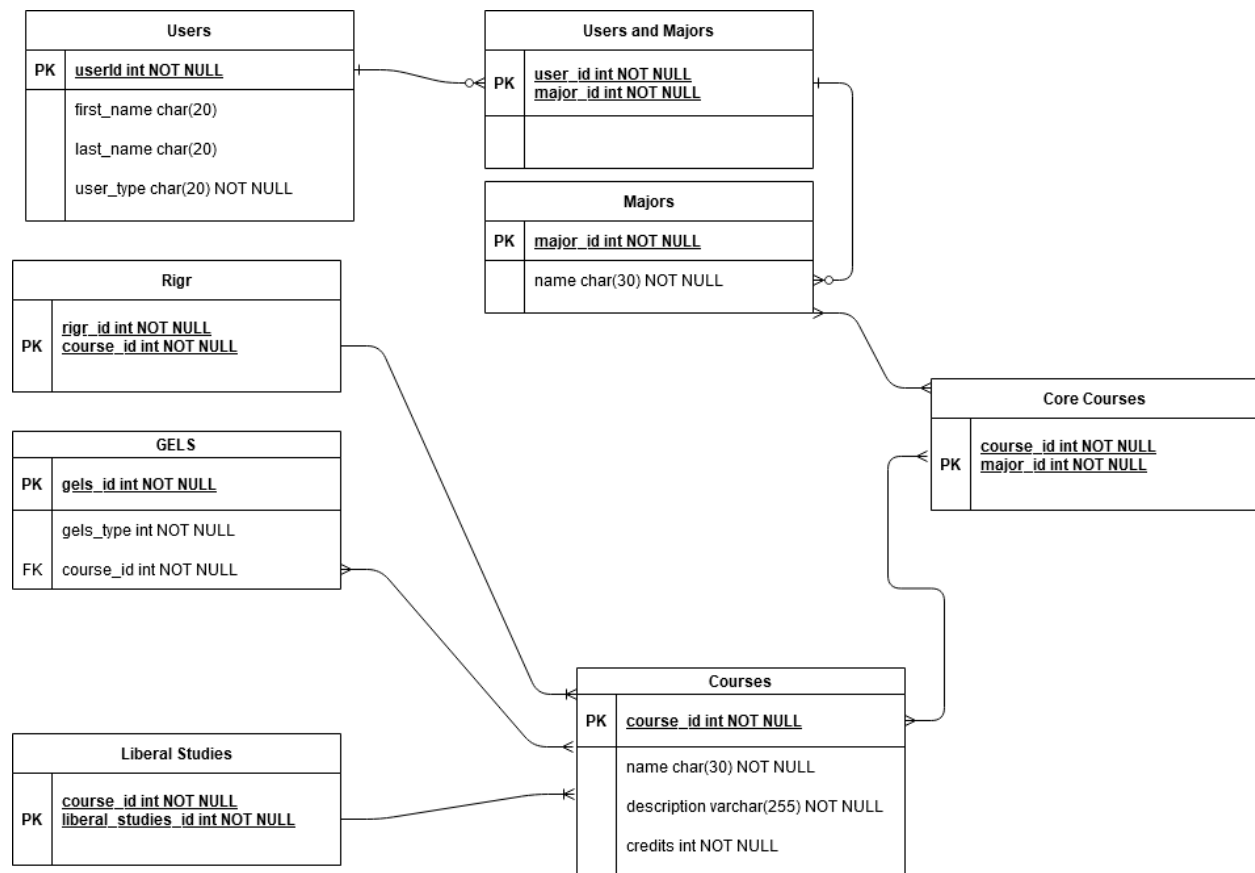
### Resolutions:

- Moving to from python to a web app has been successful, the UI has been fully migrated and there is now more data than was in the original prototype. This should be considered complete.
- Generating and retrieving data was in flight and will be an ongoing issue. Through the usage of existing helper code the generation of relevant data for the databases can be harvested and cleaned.
- Building the databases has been completed
- File ingestion
- Search logic
- Logging in to the system
- Fastest possible path to Major completion



# Appendix D

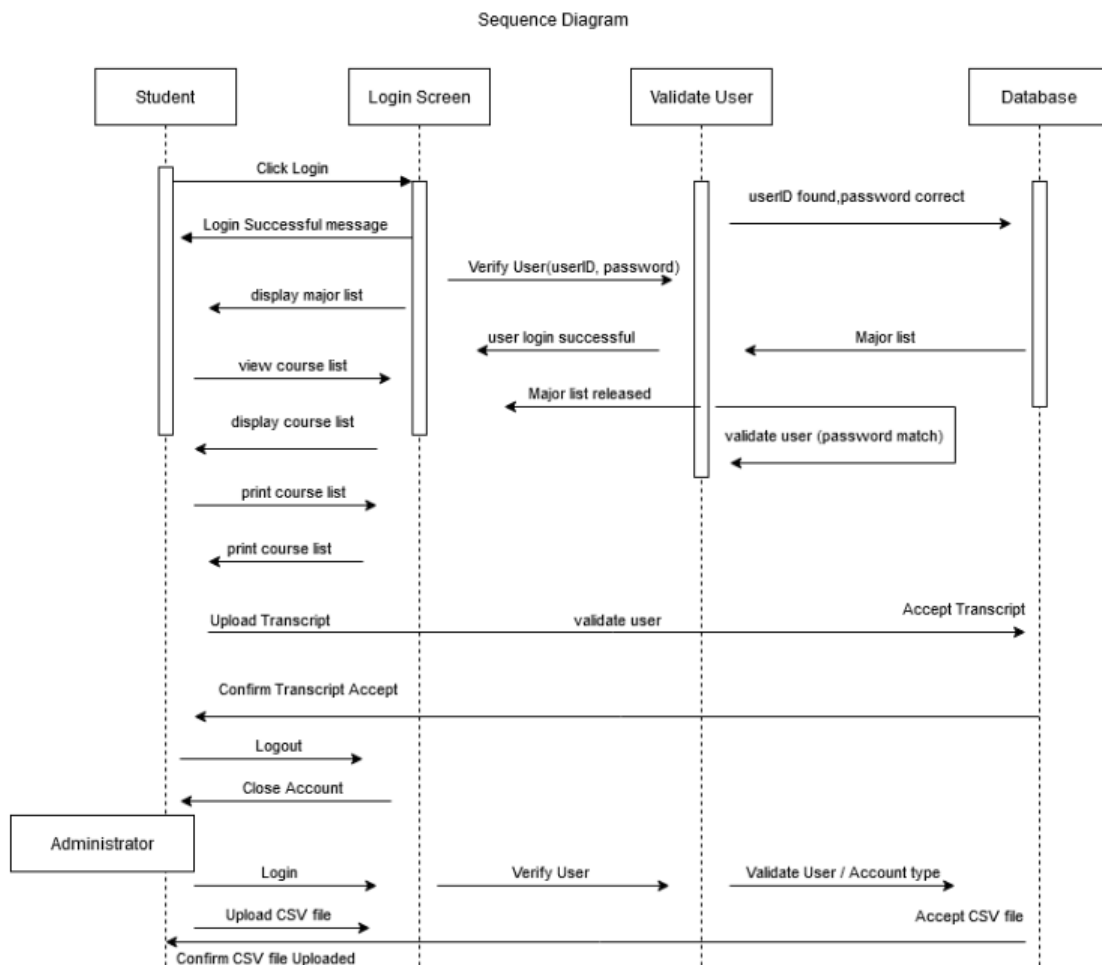
## Data Model



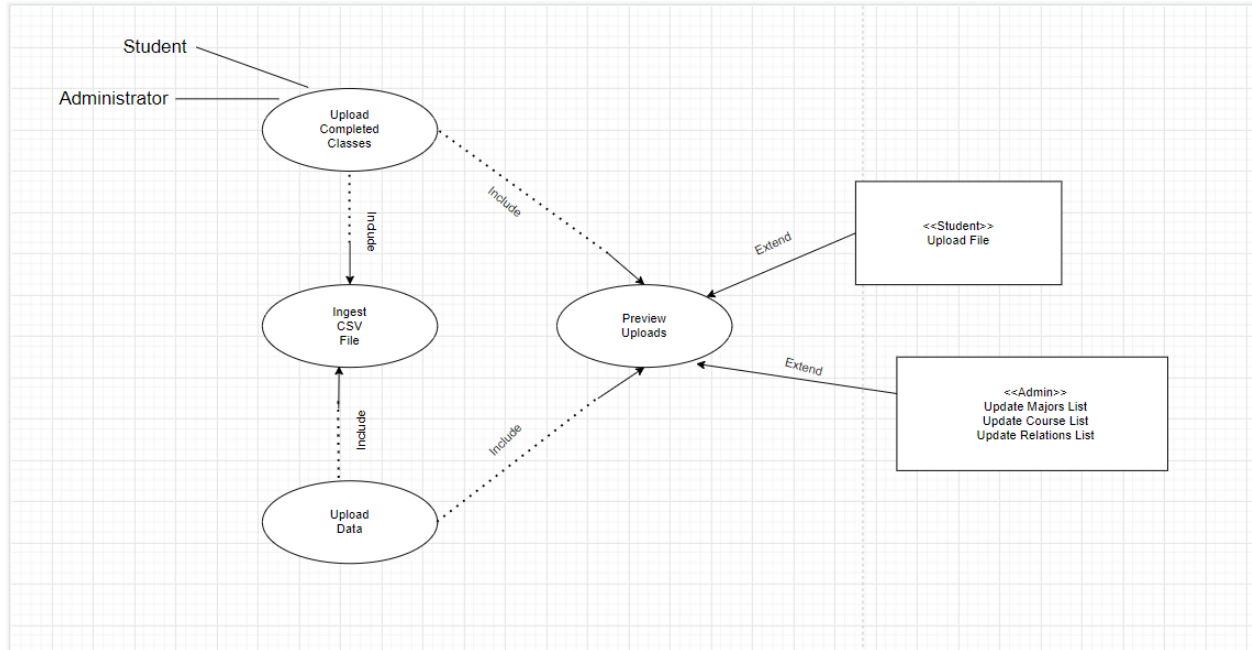
# Appendix E

## System Sequence Diagram

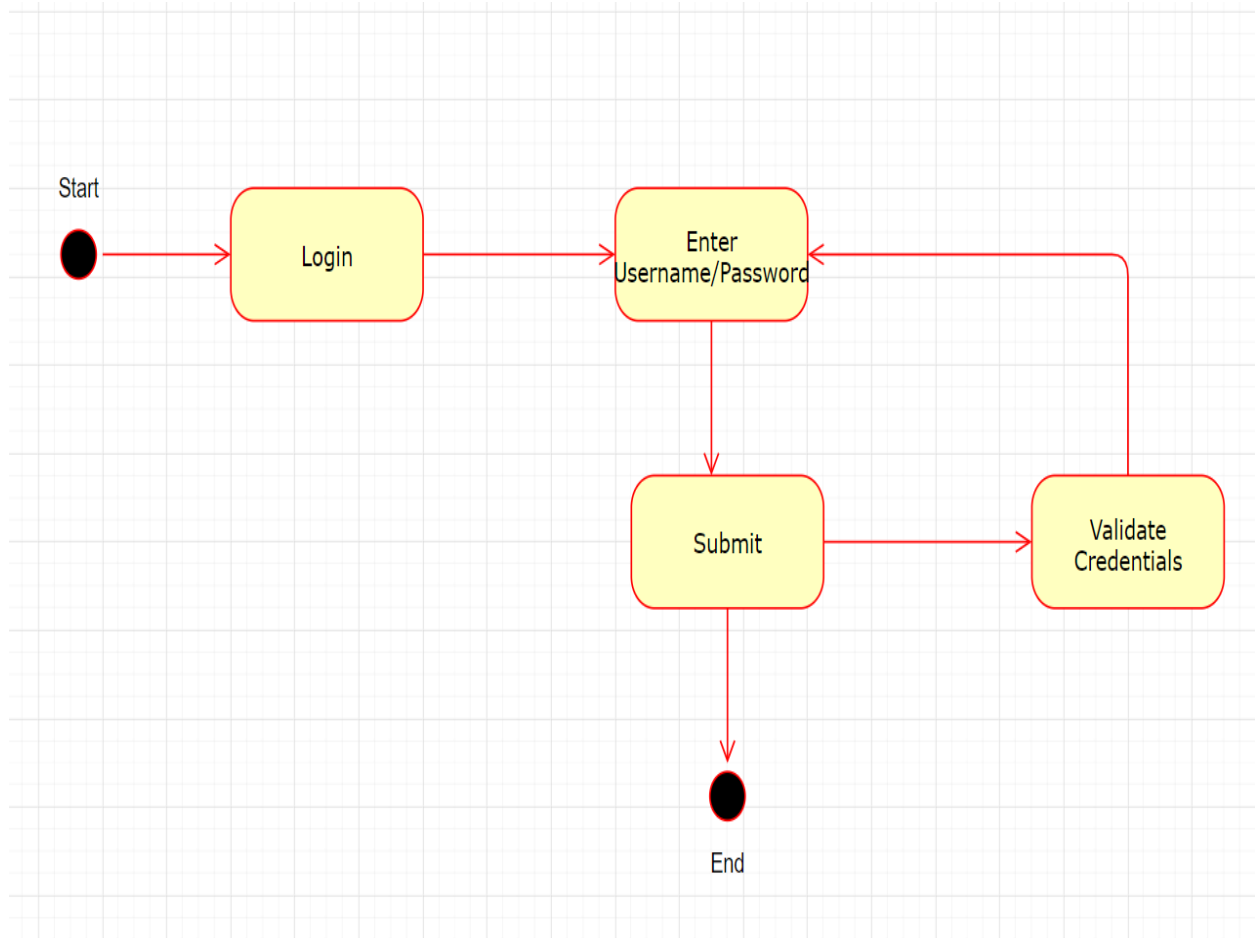
The system sequence diagram below describes how the actors interact with the system. It captures the input and outputs as actions and events occur within the system.



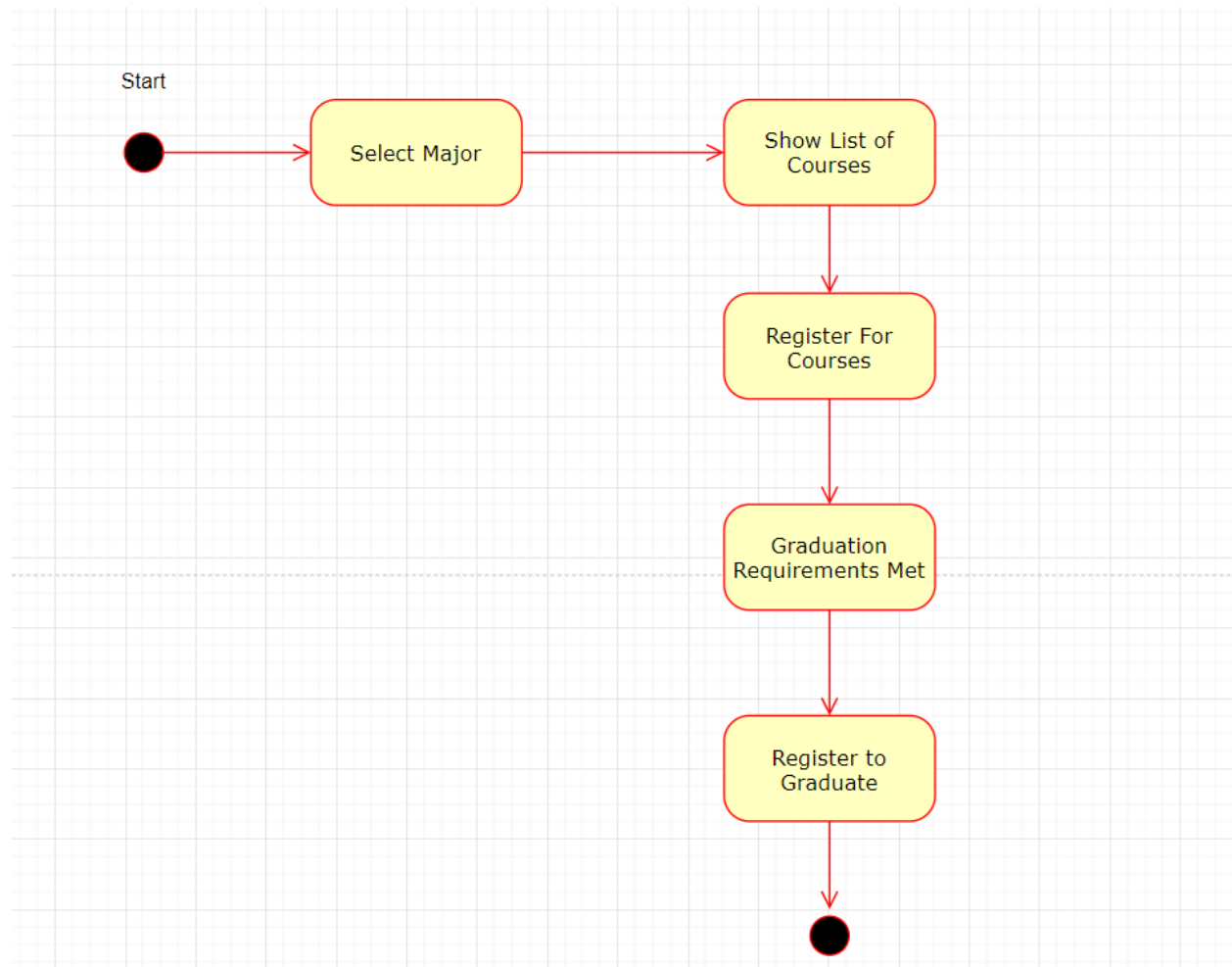
# Activity Diagram 1



## Activity Diagram 2



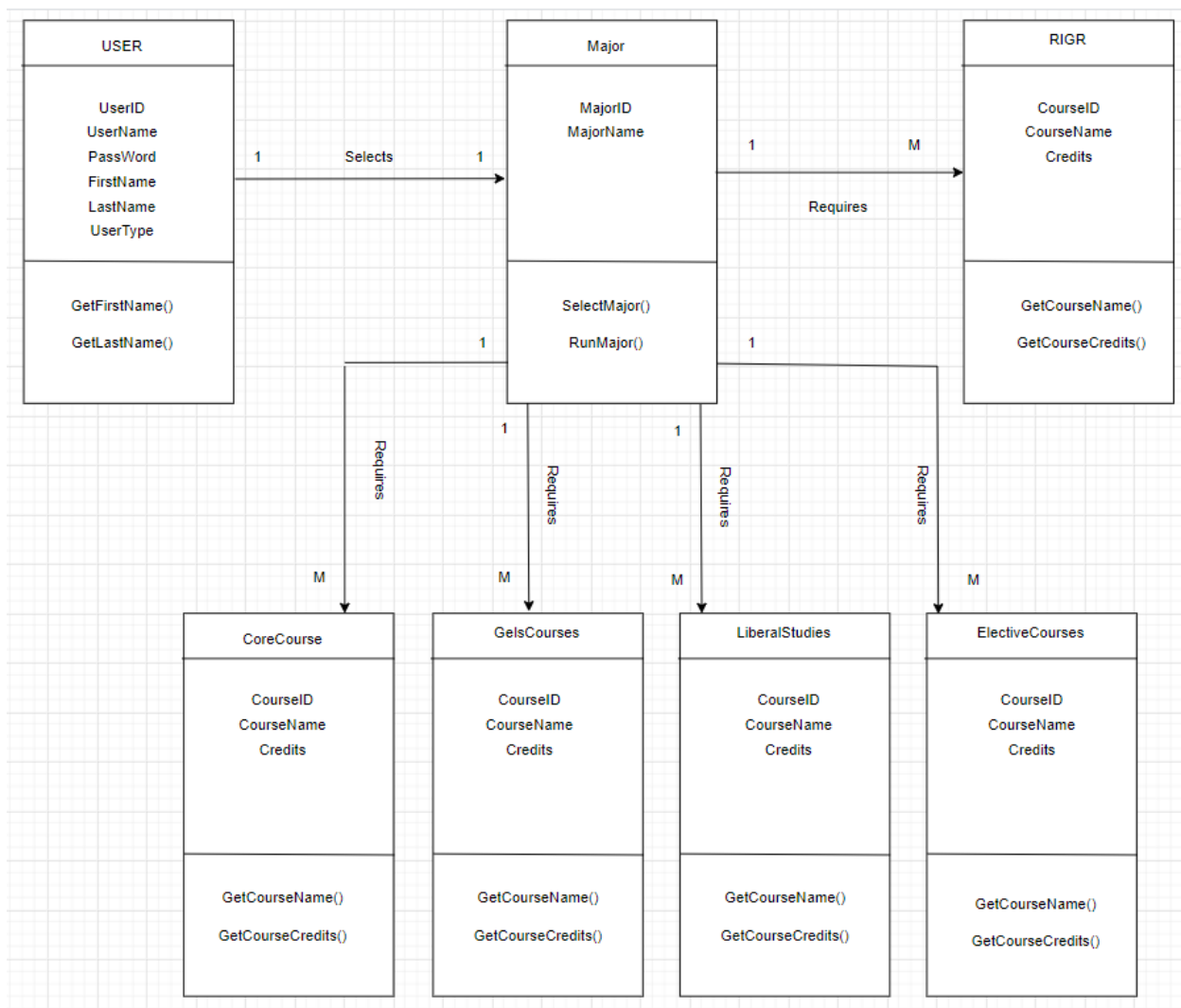
## Activity Diagram 3



# Appendix F

## Class Diagram

The class diagram below consists of the set of classes that need to be developed within our system. Each class appears with its attributes and methods. Relationships between classes are also defined.



## Appendix G

## Prototype information and Examples

**Current code count including helper code is 1181 lines, and 182 files were generated.**

Core Courses	Liberal Studies	Racial Issues Graduation Requirement	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9	Goal 10	Electives
<u><b>Core Courses</b></u>													

Search for your major here

Search

Clear search

Select your major below

Select your major below

Accounting BS

Adult Basic Education Certificate

Advanced Dental Therapy MSADT

Advertising Minor

Advocacy and Leadership Track, Social Science BA

Advocacy and Political Leadership MAPL

Aging Studies/Gerontology Minor

Alcohol and Drug Counseling BS

Alcohol and Drug Recovery Counseling MS

Anthropology Minor

Anthropology Track, Social Science BA

Applied Statistics Minor

Biochemistry BS

Biology BA

Biology BS

Biology Minor

Business Administration BS

Business Administration DBA

Business Administration MBA

Goal 3

Goal 4

Goal 5

Goal 6

Goal 7

# Graduation Requirements Simplifier

Search for your major here

Accounting BS

Core Courses   Liberal Studies   Racial Issues Graduation Requirement   Goal 1   Goal 2   Goal 3   Goal 4   Goal 5   Goal 6   Goal 7   Goal 8   Goal 9   Goal 10   Electives

## Core Courses

ACCT 210 Financial Accounting
ECON 201 Macroeconomics
ECON 202 Microeconomics
MATH 115 College Algebra
MIS 100 Fundamentals of Information Technology in Organizations
STAT 201 Statistics I
DSCI 434 Introduction to Operations Management
FIN 390 Principles of Finance
MGMT 310 Management Principles and Practices
MIS 310 Principles of Management Information Systems
MKTG 300 Marketing Principles
ACCT 311 Intermediate Accounting I
ACCT 312 Intermediate Accounting II
ACCT 320 Strategic Management Accounting
ACCT 340 Accounting Information Systems
ACCT 510 Advanced Accounting
ACCT 512 Auditing
ACCT 520 Advanced Strategic Management Accounting
ACCT 530 Business Taxation
MGMT 499 Case Studies in Strategic Management
ACCT 515 Financial Statement Analysis
ACCT 515 Financial Statement Analysis
BLAW 310 Business Law: UCC and Contracts

Search for your major here

Accounting BS

Core Courses   Liberal Studies   Racial Issues Graduation Requirement   Goal 1   Goal 2   Goal 3   Goal 4   Goal 5   Goal 6   Goal 7   Goal 8   Goal 9   Goal 10   Electives







































## Racial Issues Graduation Requirement: 3 credits

All new or readmitted undergraduate students admitted fall 2016 or later must complete an approved learning experience (at least 3 credits) with a significant focus on race and racism to graduate with a bachelor's degree from the university. Upon review, an approved prior learning, independent study, theory seminar or transfer course from other accredited institutions may also be used to meet this graduation requirement.

BIOL-107	Biology, Race, and Racism	4
CJS-360	Diversity in Criminal Justice	4
COMM-372	Health Communication	4
EDU-430	Historical and Cultural Foundations of Urban Education	3
ETHS-100	Introduction to Ethnic Studies	4
ETHS-200	Theories of Race, Ethnicity and Culture	4
ETHS-302	Immigrant Communities and the Trajectories of Othering	4
ETHS-304	Environmental Justice and Public Policy	4
ETHS-318	Trauma and Traumascape: Identity, Legacy, and Memory	4
ETHS-370	Black Thought	4
HRM-335	Understanding and Addressing Race in the Workplace	4
HSCD-303	Racial and Cultural Considerations for Alcohol and Drug Counseling	4
HSCD-304	Substance Use and Native Americans	4
HSER-395	Intersection of Race and Diversity in Human Services	4
LING-326	Language and Culture	4
LIT-315	Gender and Race in Literature and Film	4
LIT-362	Black Women Writers	4
MGMT-360	Managing a Diverse Workforce	4
PHIL-366	Race and Racism: Philosophical Problems	4
PSYC-212	Introduction to Diversity and Ethics in Psychology	3
PSYC-356	Early Childhood Development within a Social Cultural and Historical Context	3
SOWK-341	Comparative Racial Ethnic Analysis I	4
SOWK-542	Comparative Racial Ethnic Analysis II	4



## Graduation Requirements Simplifier

Name
 Accounting BS.csv
 Adult Basic Education Certificate.csv
 Advanced Dental Therapy MSADT.csv
 Advertising Minor.csv
 Advocacy and Leadership Track, Social Science BA.csv
 Advocacy and Political Leadership MAPL.csv
 Aging Studies Gerontology Minor.csv
 Alcohol and Drug Counseling BS.csv
 Alcohol and Drug Recovery Counseling MS.csv
 Anthropology Minor.csv
 Anthropology Track, Social Science BA.csv
 Applied Statistics Minor.csv
 Biochemistry BS.csv
 Biology BA.csv
 Biology BS.csv
 Biology Minor.csv
 Business Administration BS.csv
 Business Administration DBA.csv
 Business Administration MBA.csv
 Business Administration Minor.csv
 Business Analytics GCERT.csv
 Business Analytics Minor.csv
 Chemistry BS.csv
 Chemistry Minor.csv
 Child Psychology Minor.csv
 Civic Engagement Minor.csv
 Community and Applied Social Psychology Minor.csv
 Community Organizing and Development Minor.csv
 Computer Application Development BAS.csv
 Computer Forensics BAS.csv
 Computer Forensics Minor.csv
 Computer Forensics Post-baccalaureate UCERT.csv
 Computer Information Technology BS.csv
 Computer Science BS.csv
 Computer Science MS.csv
 Computer Science PSM.csv
 Co-occurring Disorders Recovery Counseling MS.csv
 Creative Writing BA.csv