FACULTY OF COMPUTING & INFORMATION TECHNOLOGY
KING ABDULAZIZ UNIVERSITY

FCIT
KAU

كلية الحاسبات وتقنية المعلومات
جامعة الملك عبدالعزيز

Department of Computer Science

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Harvest

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SOFTWARE ENGENERING CPCS351

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IAR-GROUP 3

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Phase 1: Project Description

1.1 Introduction

Harvest project is about intellectual property rights for students FCIT. In particular, we're planning on making a software that stores the data of all previous and recent projects, including senior projects and course projects for FCIT that is facilitated to check whether it has plagiarized or not.

Harvest project is projected to improve harvest of knowledge from courses of FCIT, and enable FCIT students to share experiences, ideas and previous mistake with easy way.

1.2 System Stakeholders

Harvest team: project Team, the supervisor, Faculty of Computing and Information Technology and King Abdulaziz University in general and companies that deal with it in the future

Users: FCIT students and Faculty members at FCIT

1.3 Project Description and objectives

Harvest project seeks to eliminate some of the problems FCIT student faces in creating their projects related to their courses taught at KAU university, the most important problem is ideas similar or repeat and this reduces the university's benefit to project, another problem student does not understand the course project correctly, which leads to poor starts... etc.

Harvester project is software application all FCIT student projects are placed in it, projects are classified by type of major and courses, in each project includes a pdf file of reports and project details like the owner of the idea, project team, supervisor of the project... etc.

Every FCIT student has account and if he/ she impressed with the project and he/she wants to improve it, he/she can communicate with teamwork of the project and ask permission from them.

If the project is successful (God willing), it must achieve the following goals:

- User friendly.
- Easy to upload user project with its details.
- Easy access to winning projects of various years.
- Users can refine projects to specific course or specific supervisor.
- Users can sort projects by date.
- Easy to create an account.
- Easy to communicate with the teamwork of the project and ask permission from them.

Goals and Scope

1.4 Project Goals

- Preserving intellectual property rights.
- Avoid repeating or similar ideas.
- Helping students to produce new ideas.
- Reducing common mistakes in projects.
- Easy to understand project of specific courses.
- Reducing male and female students' time and effort.
- Help students choose the format and design of the report.
- Continuity of developing previous projects.
- Facilitate project implementation.

1.5 Scope and Sources of Domain Analysis Information

The technology projects are an essential part of governmental and non-governmental companies, especially in the field of education and business administration. Therefore, our project interested in helping university students in their technical projects through Harvest application it serves as a library for FCIT students' projects, which facilitates the process for them by sharing ideas and working methods, which will lead to produce unique projects with developed ideas.

1.5.1 Included

- Registration in the harvest application for male and female students and faculty members of FCIT.

- Each courses' projects of FCIT in each department (CS, IT, IS).
- Special section for senior projects.
- Communication between the project owners and other students by ability to write comments under each project.
- Linking projects with improved projects for them.
- Upload project and Fill out the mandatory and optional details if desired.
- Ability to arrange projects by sortable properties and filter them.

1.5.2 Excluded

- Projects outside the college of FCIT.
- Public and Free Courses' Projects.

Phase 2: Business Requirements Specifications

2.1 Domain analysis

In different colleges of computer and information technology, the establishing projects are an essential part because it helps students in developing the technical and administrative skills, the motivation of our application is to help students at FCIT to create creative projects with developed ideas. It is designed to share students' projects over the years, listing all student projects in all departments of FCIT in one application, made communication with project owners, and scheduling projects for easy access.

Glossary

- Courses projects: are the projects to be submitted for each subject at a specific time.
- Graduate project: A project in the study plan for each student and will be worked on in the last year.
- Project owners: students responsible for attaching their project and adding all its details.
- Beneficiaries of projects: students looking to solve problems in their projects
- Degree of project: the degree of success of the project after being evaluated by the instructor.

General knowledge about the domain

Most of the FCIT students face problems in producing a successful project for several reasons, including the lack of a clear implementation plan, an uncooperative work team, and also they face problems in planning and implementing the graduation project, and there is no application that allows students in FCIT to share their projects over the years in order to benefit from them, develop ideas, take advice and communicate with them.

The environment

Harvest owner, member of FCIT, male and female students of FCIT who's owners of the project and beneficiaries of it, especially who is interested in creating different idea to other projects of FCIT.

Competing software

1. Our system is dedicated to technology projects for FCIT students, but the other system displays general ideas from different fields.
2. Our system provides a lot of information about projects such as the project owners names, degree of project, project production date … etc. But the other system does not display these details.
3. Our system provides communicating with the owners of the project directly, but the other system does not allow that.
4. Our system is easier to use than the other system.
5. Our system provides classification of projects according to each department in FCIT and according to the date of its establishment, but the other system displays projects without classifying them.

2.2 Requirements & its types

2.2.1 Functional Requirements

General Requirements:

Harvest System shall allow all registered users to:

R1: create an account in the system.

R.2: login into the system.

R.2.1: logout.

R.3: Search a list of projects.

R.3.1: filter a list of projects based on major, course, year, supervisor and gender.

R.4: create a discussion session and communicate with others.

R5: write comments below project.

R.6: vote for projects participating in Poster Day.

Module Requirements:

Supervisor: Harvest shall allow Supervisors to:

R.1: make a list of projects that he/she supervises.

R.2: make a list of projects for voting.

R.3: determine the winning projects.

Student: Harvest shall allow Students to:

R.1: add new project with details.

R.1.1: modify and delete his/her project that added.

R.2: add developed project.

R.2.1: request development permission from owner of the project.

R.2.2: Owner of the project allow or deny the development, if an owner of the project allow development, system will link to project and convert mode to project is under development.

R.4: create project teamwork.

R.4.1: connects team members with the supervisor.

2.2.2 Nonfunctional Requirements

Security and privacy: all project files must be protected from damage.

Availability and Portability: the system will be run on application on Android or IOS.

Reliability: insurance for providing appropriate and suitable solutions.

Usability: user friendly interface, download files at high speed.

2.3 Techniques for gathering data

We collected information using two techniques are stakeholder survey and user interviewing.

2.3.1 Survey

We have surveyed for male and female FCIT students who will use Harvest program, and their numbers are in the thousands, but we got an appropriate sample of 109 responses (See appendix A), and these are the results of the survey:

- 80.7% of students said yes, that they face problems in understanding the FCIT course projects correctly.
- Students think time, unclear project plan and number of projects in one semester are the most factors influencing their lack of correct understanding of projects.
- 96.3% of student have their ideas not stolen.
- 77.1% of students did not see the reports of the winning projects in FCIT.
- Most of the students wish before starting a project they had a clear project plan, flexible and interactive supervisor and great team.
- 86.2% of students will share their previous projects in a program for student projects, they will share their projects with their names, the project idea and project details.
- The students mention the services they hope to obtain in the application, the most prominent of which is the ease of use, the ability to communicate with project owners, details of the project and project supervisor evaluation.

2.3.2 Interview

We did interview with Dr.Hanaa Namankani to see the opinion of the supervisors about FCIT students' projects.

- Have you encountered projects with the same ideas?
  No, but I see projects with similar ideas.
- According to your expectations, what is the reason for the similarity of ideas?
  The limited exposure of students to the labor market and the quality of projects on the ground, which limits their ability to present different ideas. Perhaps also because of traditional teaching and students fear of lack of grades, making them shy away from wary of coming up with new and creative ideas.

- Did you pass a creative project that you wished to show to everyone? Yes
- Have you received a project that did not achieve the required skills and the reason is that the student does not understand what is required by the project, taking into account the students ’sufficient understanding of the course?

  Yes, the project was to link the academic concepts in the subject with reality, and the students understood the material, but the students dealt with the project incorrectly, so their answer was between quotations, enumerations and definitions and was free from analysis and presentation of opinions or critical thinking to link concepts with some or link them to reality.

- Does the students 'acquaintance with their previous peers' projects have a role in their understanding of the project and inspires them to produce better and more creative projects?

  Of course, yes.

- In your opinion, would if students get to know other ideas, would they generate different creative ideas for them?

  Yes, if there is a sharing of ideas among students and they brainstorm, they can bring out new ideas that are more effective and creative. If everyone enters with basic ideas and

defines the field of the project, each of them can help the other with ideas and observations that may inspire them.

- After completing the correction of the projects, are they kept or transferred to the archive, or are they disposed of at the end of each semester?
  The answer here varies according to the doctor who gives the course and according to the course, there are courses in whose projects there is more room for activity than others, and there are doctors who prefer to keep the projects of their distinguished students.
  As for graduation projects, it is submitted in an official way to the graduation project coordinator, and in turn, it submits it to the authorities concerned with archiving the final graduation projects.

2.4 Use case description

We will describe 4 main use cases, that are not clear from the first read by brief description of use cases, and what must be occur before it, then what its result.

Create discussion session	
Use Case ID	G4
Description	This option enables users to create session with other users for communication and get answers to any inquiries, for example: one student creates discussion session with his/her team members and their supervisor to discuss their projects.
Actors	Supervisors and Students.
Pre-condition	User must be registered and logged into the Harvest system.
Post-condition	The session appears for all members added in it, when he/she press the button of discussion sessions.

Table 1: Description of (create discussion session) use case

Make a List of Projects for Voting	
Use Case ID	S1
Description	This option is serving supervisor for Poster day, to collect all projects that participated in the Poster day under a specific course, then all projects on the list can be voted on by users, and results of voting are visible in the list.
Actors	Supervisors.
Pre-condition	The supervisor must be registered and logged into the Harvest system.
Post-condition	When users, press a Poster day button, they will see a list of projects for a specific course and can vote on one of the projects on the list.

Table 2: Description of (make a list of projects for voting) use case

Determine the Wining Projects	
Use Case ID	S3
Description	The supervisors can choose winner project by this service, this service helps them to filter many of the project, according achieving the required skills, the number of votes for each project and degree of project.
Actors	Supervisors.
Pre-condition	The supervisor must be registered and logged into the Harvest system. To determine the winning project the supervisor must have a list of projects inserted in Poster Day list.
Post-condition	The winning project must be at the first of list and with star mark, and automatically insert in winning projects list.

Table 3: Description of (determine the wining projects) use case

Request Permission to Develop a Project	
Use Case ID	ST2
Description	This option is given to the student to use project that has already been implemented, by request permission from the owners of the project and display the features that he will be added and other details to them, then wait to allow or deny from the owners of the project.
Actors	Students.
Pre-condition	The student must be registered and logged into the Harvest system. The project to be developed must be completed and can be developed.
Post-condition	A development permission request message for project owners and containing the details sent by who asked for permission.

Table 4: Description of (request permission to develop a project) use case

2.5 Use case diagram for given problems

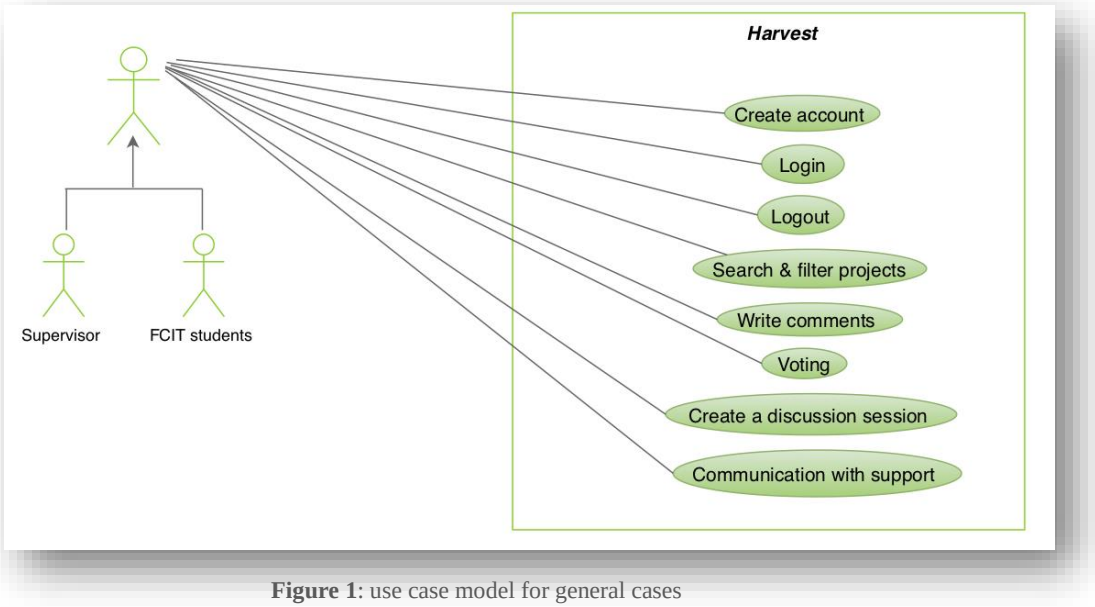


Figure 1: use case model for general cases

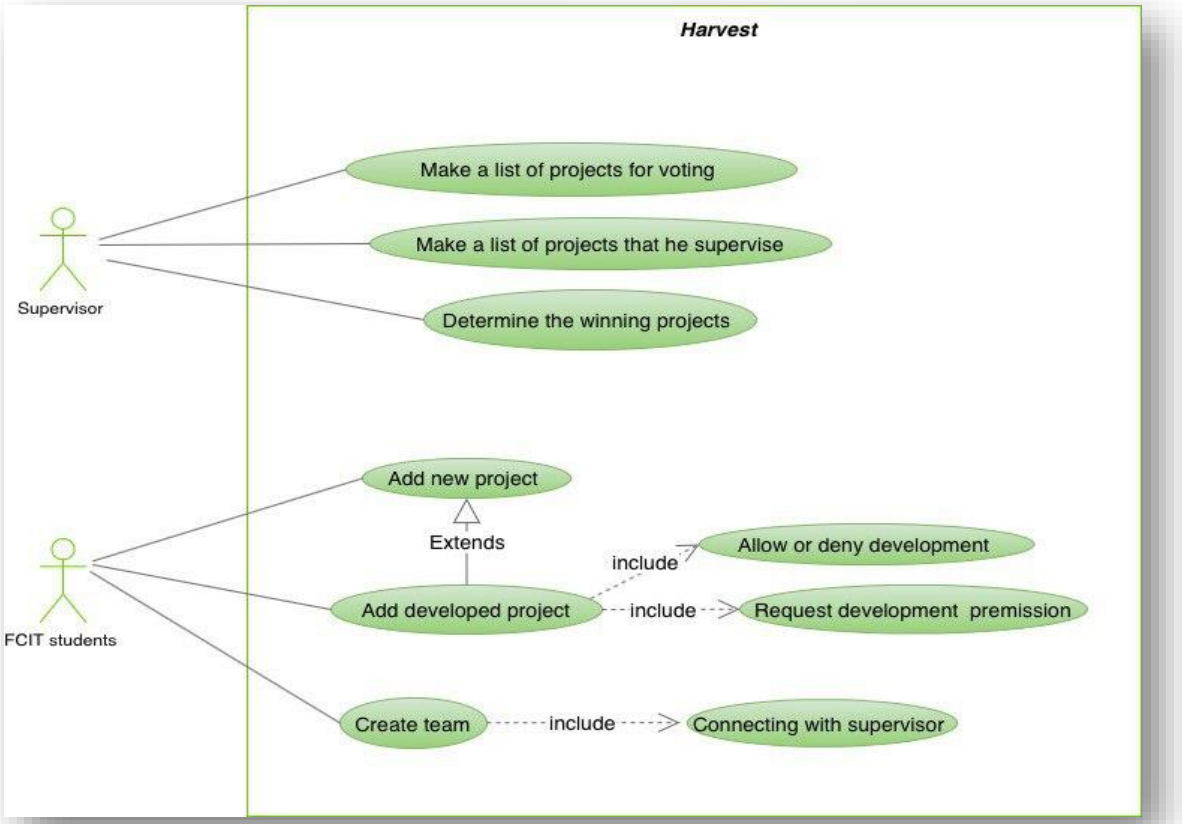


Figure 2: use case model for other cases

2.6 Difficulties & risk analysis in the domain

- The different needs of the students and the diversity of their opinions about the problems targeted by the Harvest application, which caused a conflicting set of requirements.
- Difficulty communicating with doctors, because of distance education, which made the results limited to a small sample of doctors, which do not represent the needs of all the doctors of FCIT.

Phase 3: Diagrams

3.1 Converting use cases to class diagram

3.2 Domain model

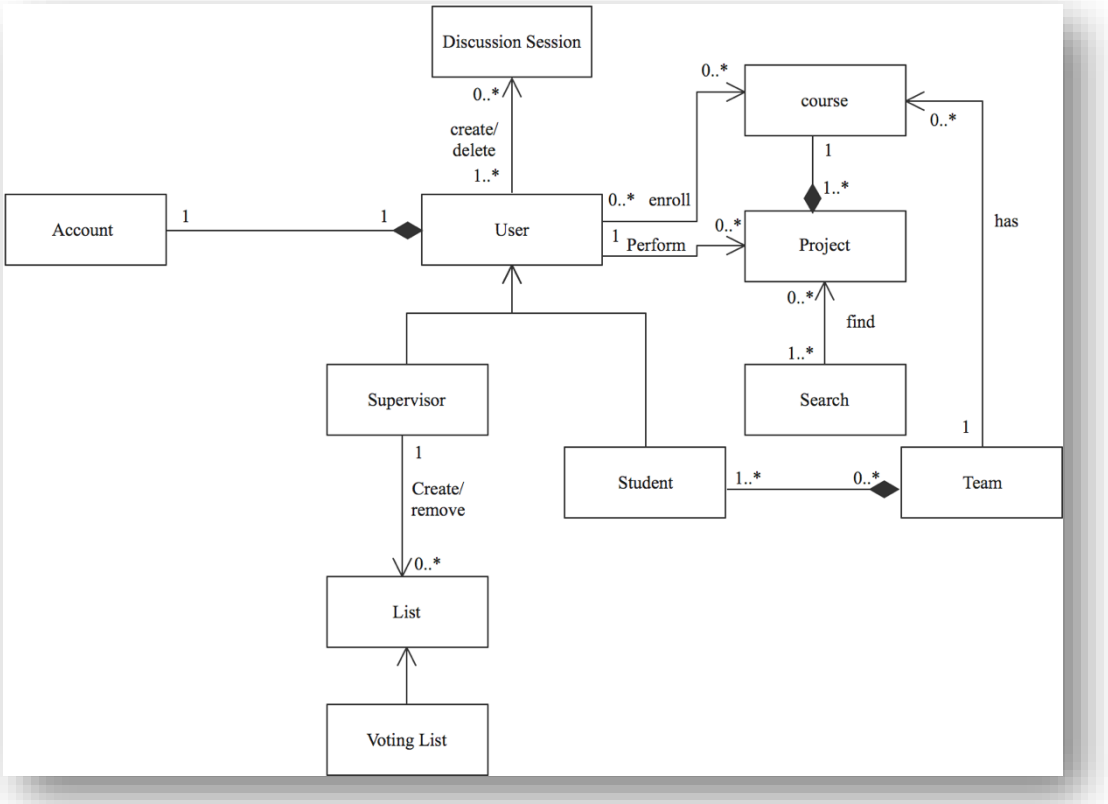


Figure 3: Domain Model

3.3 UML class diagram

3.3.1 Association

3.3.2 Multiplicity

3.3.3 Generalization

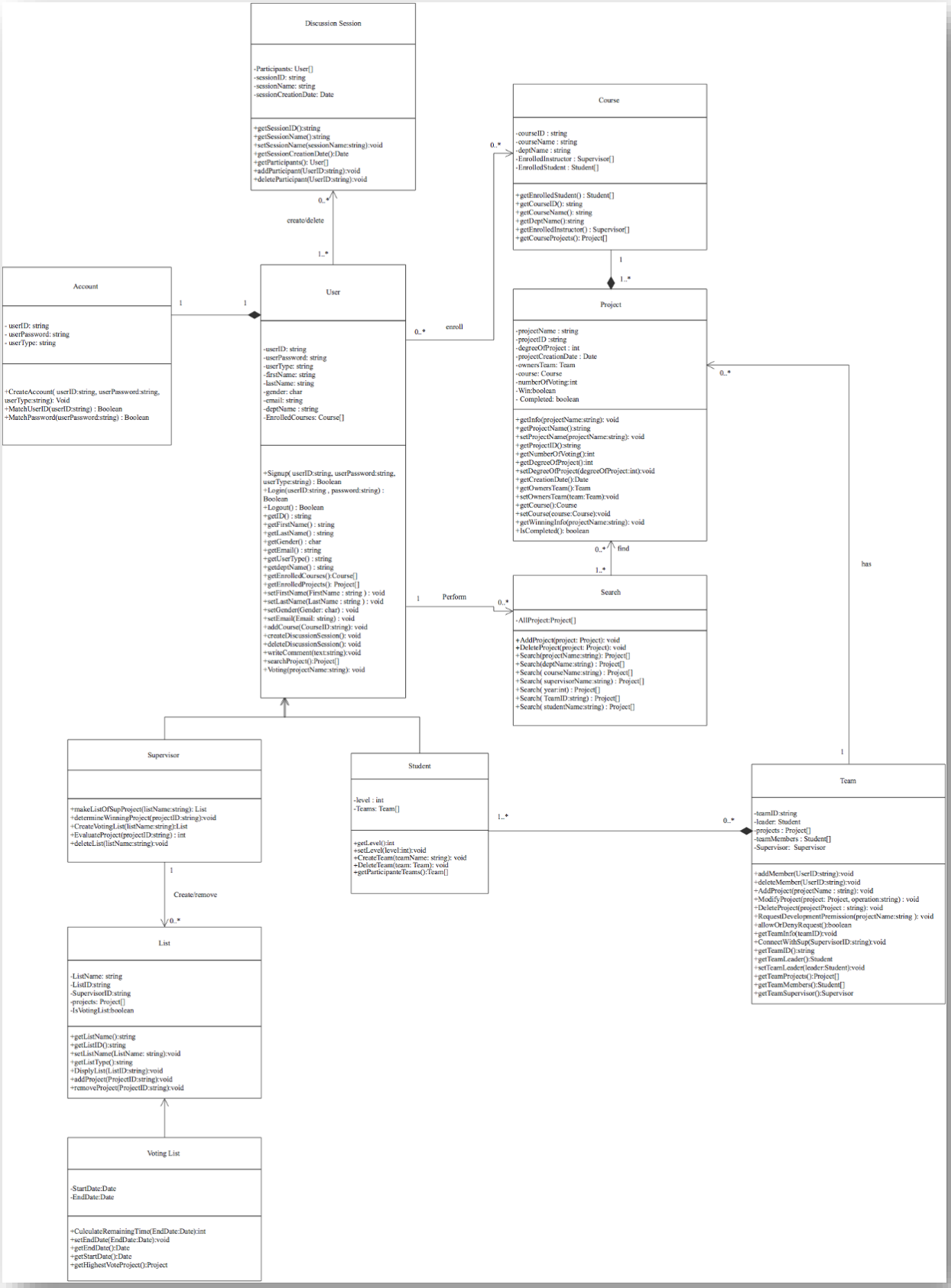


Figure 4: Class Diagram

3.3.4 Object diagrams

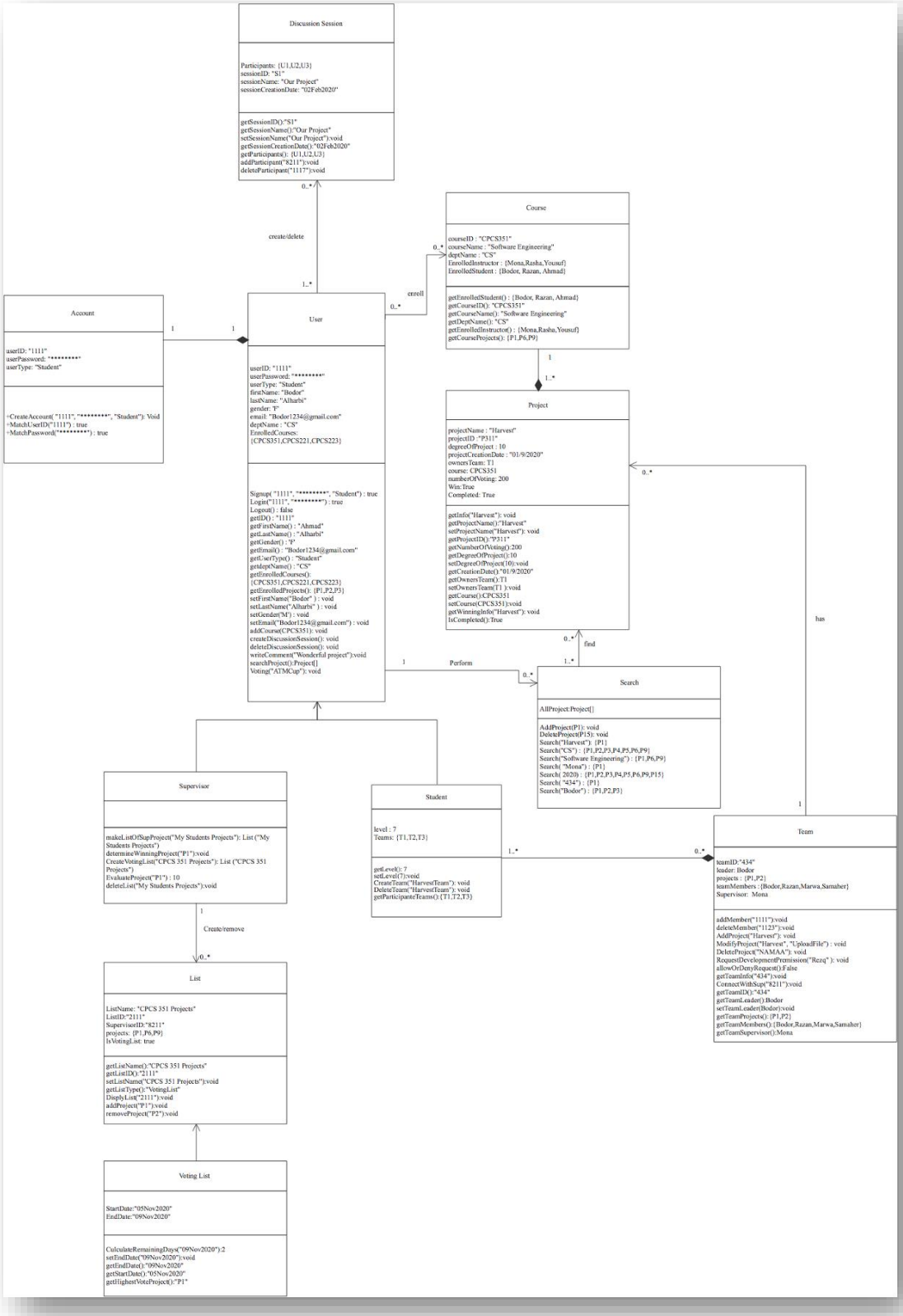


Figure 5: Object Diagram

3.4 System Architecture

Harvest system is a typical interactive system. Therefore, an N-tier structure can be used. One only needs a layered design for dealing with Harvest application. And the processes start and end with the actor.

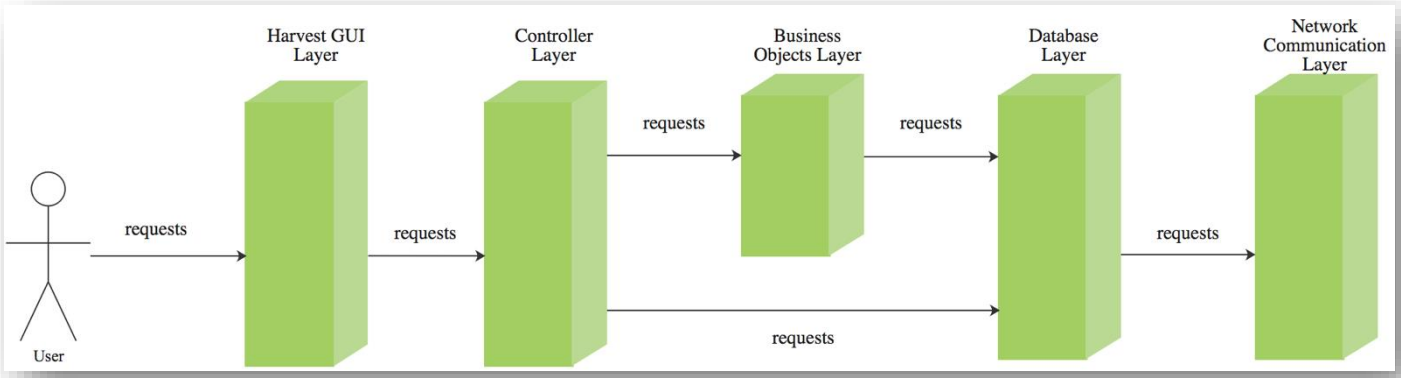


Figure 6: System Architecture

Phase 4: Modelling, Interaction & Behavior

4.1 Interaction diagram

4.1.1 Sequence diagram

Add Project:

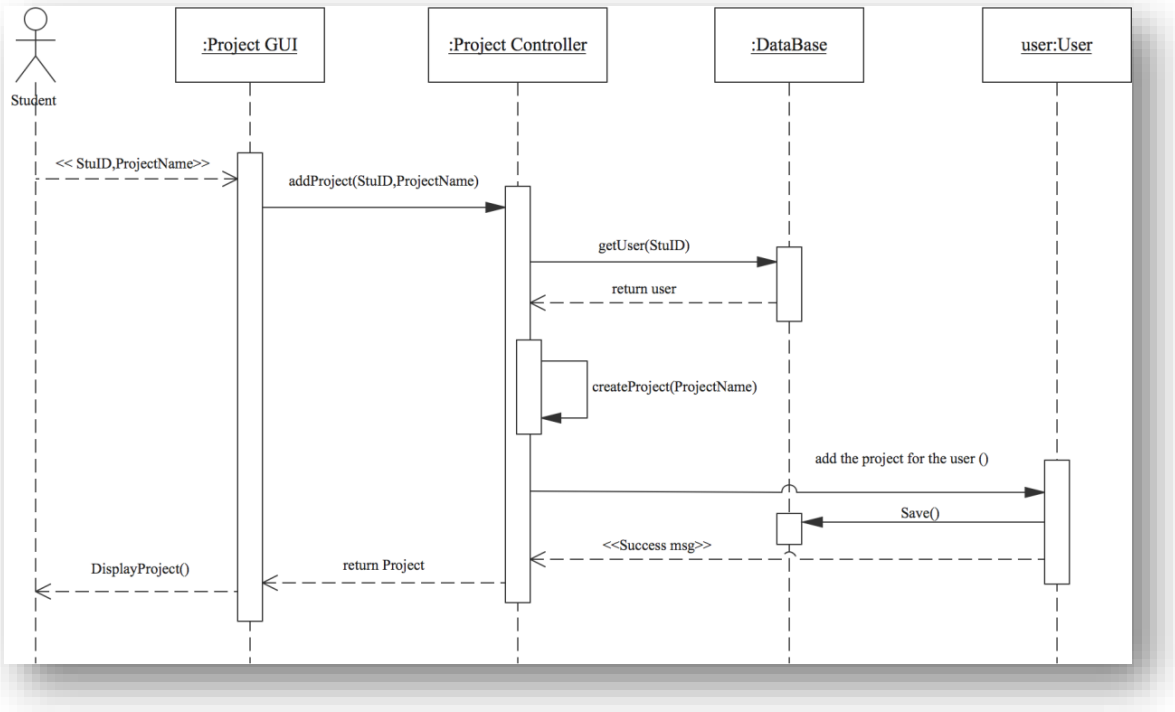


Figure 7: Sequence diagram for add project

Request Development Permission:

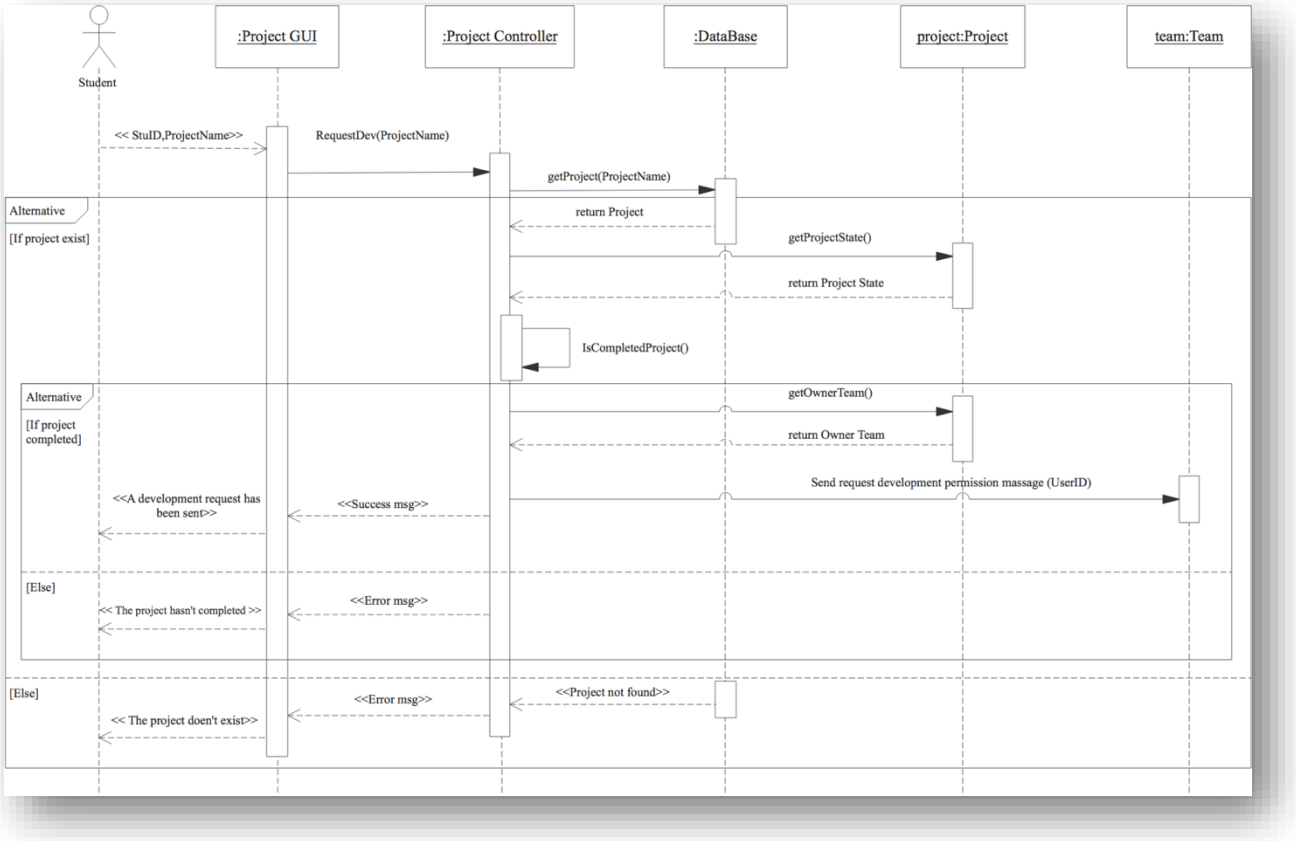


Figure 8: Sequence diagram for request development permission

4.1.2 State diagram

Search:

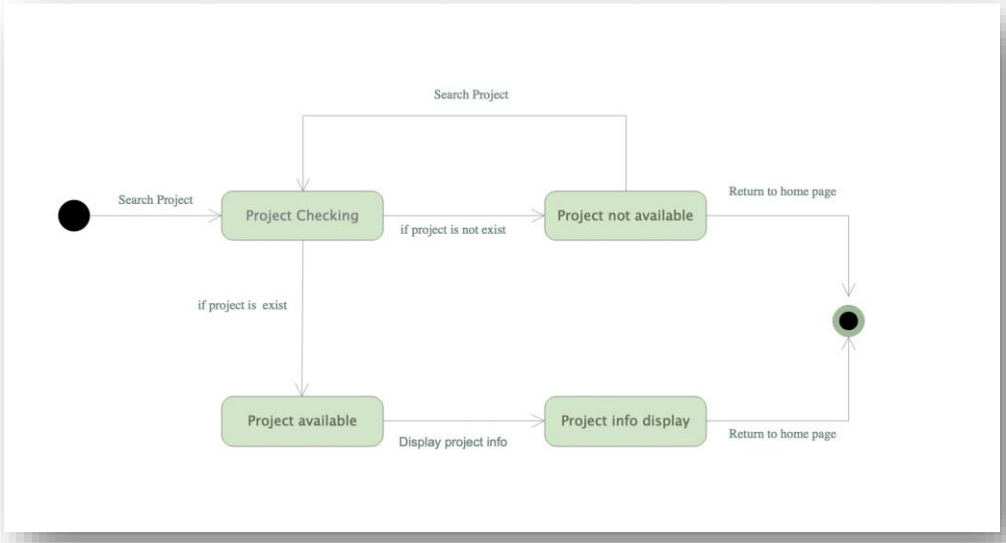


Figure 9: State diagram for search

Project:

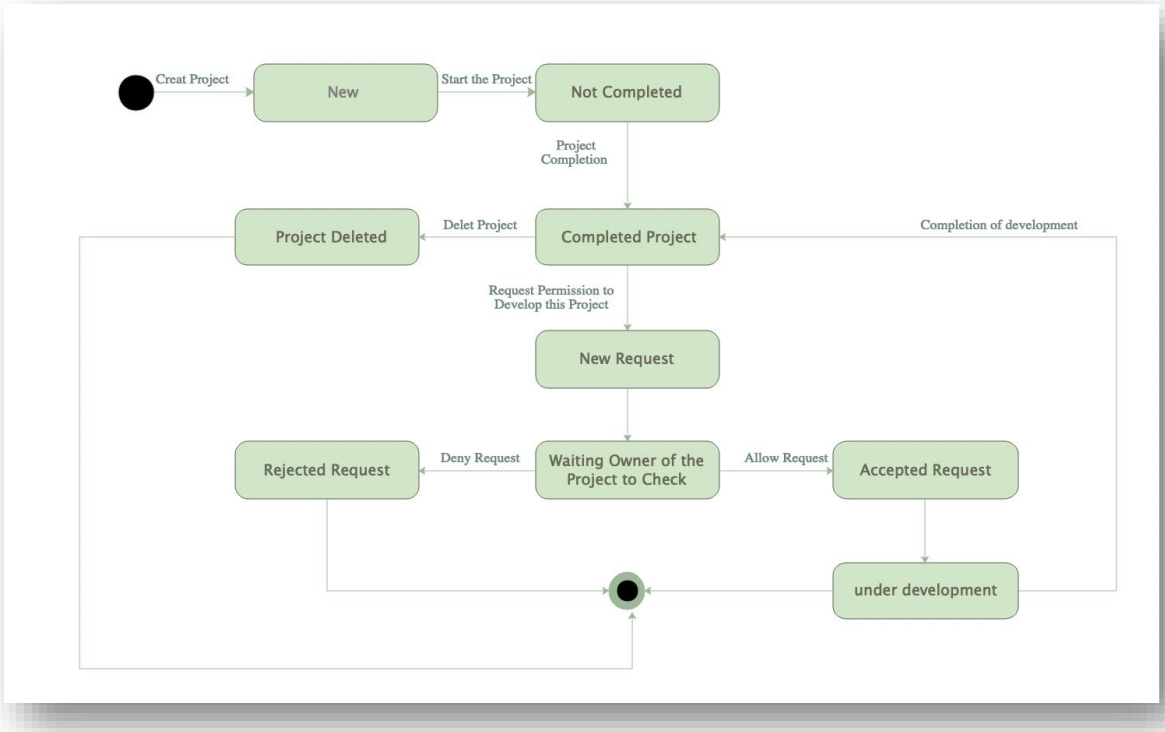


Figure 10: State diagram for project

4.1.3 Activity diagram

Search:

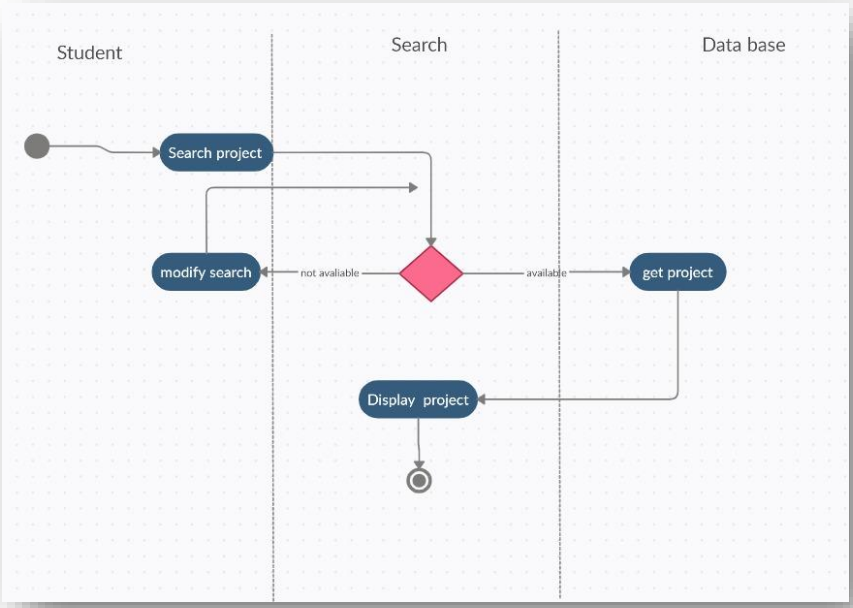


Figure 11: Activity diagram for search

Request Development Permission:

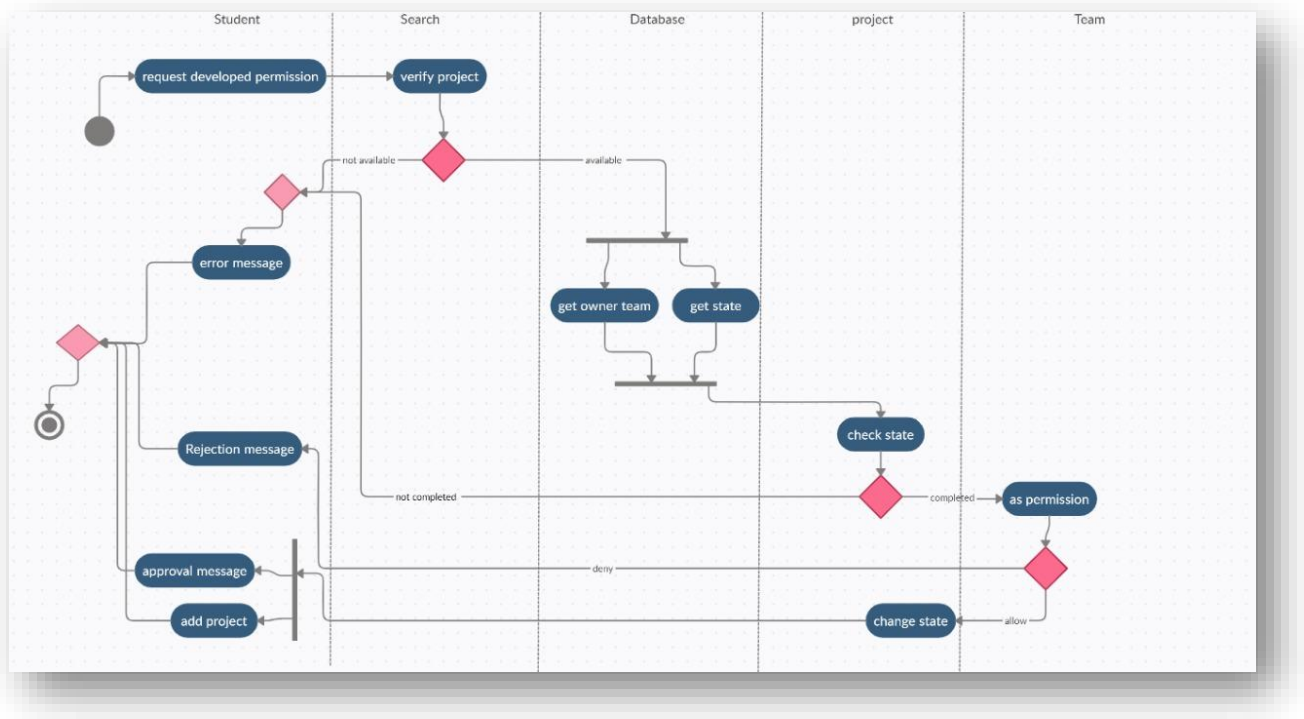


Figure 12: Activity diagram request development permission

4.2 Testing

In this process we will evaluate our system. It involves the identification of gaps, errors, missing requirement in the software without correcting it, normally professionals with a quality assurance background are involved in the identification of bugs.

4.2.1 Testing Objective

Our objectives of system testing reduce risk by finding errors early, verify that the end result meets the customer's requirements, validate that the system is complete and will work as expected, gain the confidence of the customers in the quality of the system as a whole. Also aim to find defects and to prevent it from escaping to higher test levels or production.

4.2.2 Testing Strategy and Approach

We will use Black-Box testing method to test the functional requirement based on our system. There is three techniques of this method and our choice is Decision Table technique which is used for testing the system behavior for different input combinations, were presented in a tabular form that contain conditions with corresponding action.

We will test these three functionalities from our system:

1- Create Account
2- Add Project
3- Create Team

Test Create Account (mapped to G1)

Scenario: My friend in college heard about the Harvest app and wanted to join it to benefit from app services, so I told her to create a new account, I'm observing her.

Precondition (Have Harvest application)
Input (UserID, Password, UserType)
Output (the validity)

Condition	**UserID**	**T**	**T**	**T**	**T**	**F**	**F**	**F**	**F**
	Password	**T**	**T**	**F**	**F**	**T**	**T**	**F**	**F**
	UserType	**T**	**F**	**T**	**F**	**T**	**F**	**T**	**F**
Action	**Expected result**	**Account created**	**Error: Please choice Type**	**Error: Please enter password**	**Error: Please enter password**	**Error: Please enter another ID**	**Error: Please enter another ID**	**Error: Please enter another ID**	**Error: Please enter another ID**

Table 5: Test Create Account

Test Add Project (mapped to ST1)

Scenario: Last week, I met a team of students who present their project in the college, it was an excellent project. I offered to them to publish their project on harvest application and they agreed to that, and I am monitoring them.

Precondition (Have account in Harvest application)

Input (StdID, ProjectName)

Output (the validity)

Condition	**StdID**	**T**	**T**	**F**	**F**
	ProjectName	**T**	**F**	**T**	**F**
Action	**Expected result**	**Successful adding project**	**Error : please enter project name**	**Error : the StdID cannot found**	**Error : the StdID cannot found**

Table 6: Test Add Project

Test Create Team (mapped to ST4)

Scenario: One of my colleagues decided to create a new project and she doesn't have a team, she has a harvest account and she wants to create a specialized team with harvest application to start the project. I'm monitoring her.

Precondition (Have account in Harvest application)

Input (UserID)

Output (the validity to add member to team)

Condition	**UserID**	**T**	**F**
Action	**Expected result**	**This member added to team .**	**Error : UserID cannot found**

Table 7: Test Create Team

4.2.3 Testing Conclusion

At the end of our testing for functionality of our system. We found that our application is easy to use and understand, it meets user expectations, Also it meets our goals and objective.

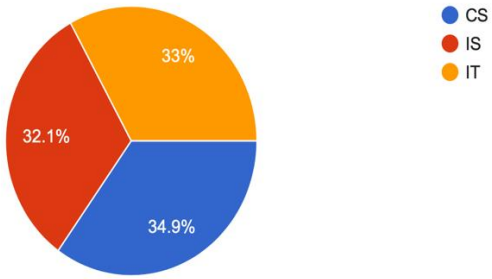
Reference

David C. Kung. (2014). Object-Oriented Software Engineering An Agile Unified Methodology. New York, USA. (text book)

Appendix A

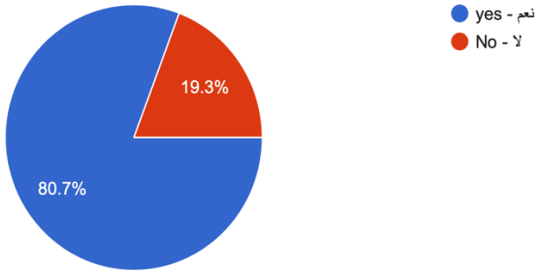
What's your major?- ماهو تخصصك

109 responses



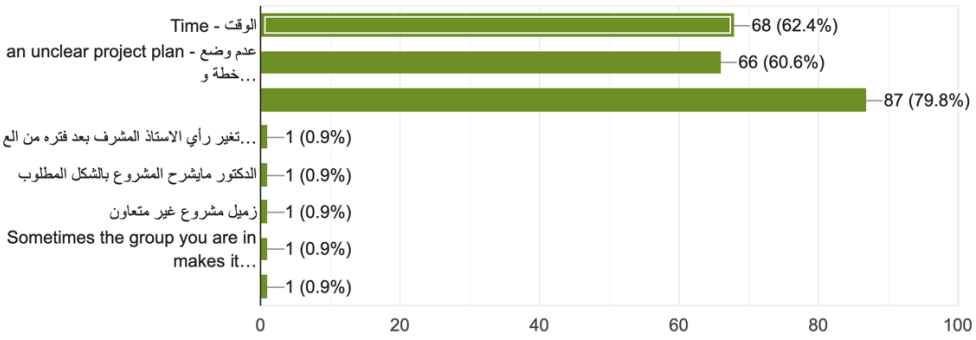
1- Have you faced any problems trying to understand the FCIT courses projects? - هل واجهت مشاكل في فهم مشاريع المواد

109 responses



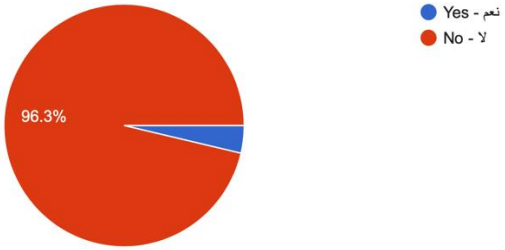
2- What are the factors that make projects difficult to understand? - ما هي العوامل التي زادت من صعوبة فهم المشاريع

109 responses



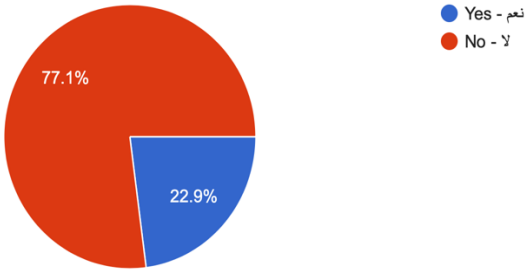
Have your projects ideas been stolen before? - هل تعرضت لسرقة افكار مشاريعك السابقة ؟

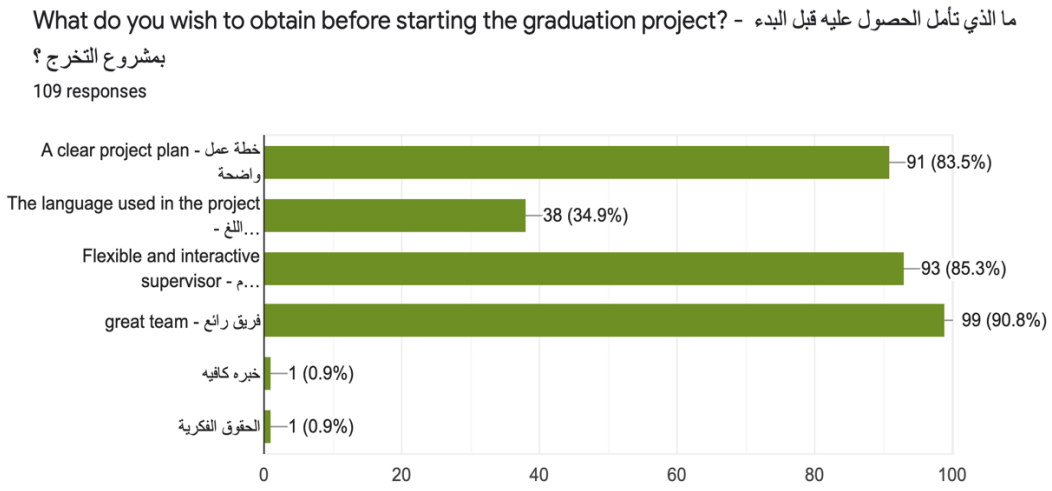
109 responses



Have you ever surveyed the winning projects report at the college level? - هل سبق ان اطلعت على تقارير مشاريع ربحت على مستوى الكلية ؟

109 responses





If there is an application that enables you to see previous ideas and projects: - لو كان هناك تطبيق يمكنك من رؤية الافكار والمشاريع السابقة :

What services do you wish to have in this application? - ماهي الخدمات التي تتمنى وجودها في التطبيق ؟

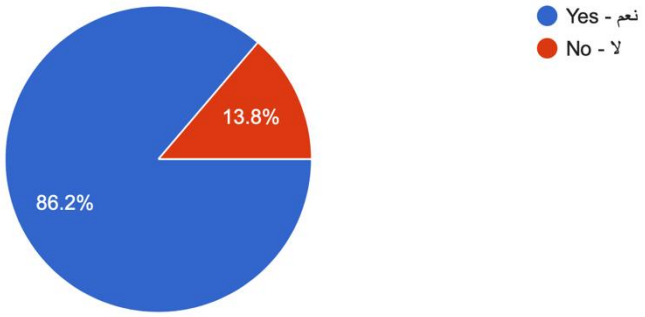
easy to use - shows the report, supervisor and students who worked on it
Flexibility, reliability
view summary of idea, view full report, view resources, a section where they share mistakes, they made
It will be great
It will be really helpful.
Search filter by major, course, year, ...
To be able communicate with the creators of the projects
User-friendly
Other’s experiences
The ability to contact with the project developers
Report- application
easy to use
Shows the code of other projects to take ideas and learn
Have access to the documentation
Previous projects help to form a plan based on previous students’ experiences for your upcoming project
Clarity - easy - filtering
Discussion with group members who worked on the project - Explore solutions to the problems they have faced
Check Uniqueness of the idea
Ideas

easy to use - shows the report, supervisor and students who worked on it
Flexibility, reliability
Steps taken for project completion
المشاريع الفائزة بجوائز
شرح مفصل للمشاريع وأفضل طرق للبداية فيها
سهولة الوصول إلى كافة المشاريع بطرق بحث مختلفة
خدمة الشرح والتعديل
شرح مبسط لفكرة المشروع، درجات المشروع
يكون موضح بالسنوات وكل سنه ايش فيها مشاريع + ماهي المشاريع الي نجحت وايش كانت خطتهم + تصنيف المشاريع ع حسب التخصص
ان يبرز الافكار حسب التشابه
تفاصيل عن المشروع واسباب نجاحه
التجربة التي خاضها كل فريق
ارقام التواصل مع اصحاب المشاريع
افكار متنوعة
التواصل مع فريق المشروع للمساعدات
طرح افكار مشاريع حديده لتنفيذها
التواصل مع اصحاب المشروع - إنشاء فريق من خلال التطبيق
شرح واضح للمشاريع السابقة للاستفادة
ملاحظات مهمة عن المشروع من قبل صاحب المشروع، اخطاء او ملاحظات من قبل الدكتور
تقسيم المنتظم - امكانيه التواصل مع صاحب المشروع
مساعدة من مختصين، وجود نماذج وامثلة لمشاريع سابقة
شرح مفصل للمشروع - مشاريع مشابهه سابقه
مراسله اصحاب المشاريع في حال وجود أسئلة
عرض تفاصيل المشروع بوضوح
أفضل المشاريع وتميزت في ايش
درجات المشروع لنتأكد من صحتها من الاخطاء
مساحة الوقت
افكار للمشروع
وجود طريقة تواصل مع اصحاب فكرة مشروع
عرضه من أي جهاز سواً كان جوال او لابتوب - امكانية تنزيل الملفات المعروضة فيه بسهوله ومشاركتها أيضاً
سهولة البحث فيه
مجالات المشاريع
جميع تفاصيل المشروع
وجود نصائح وشرح للمشاريع و ارفاق الكود للاستفادة
امكانيه المشاركة .. ضمان عدم سرقة الافكار .. كتابة صحيحة
خطة العمل والتفاصيل
شرح الافكار
عرض درجة المشروع
لا توجد فكره
شرح أساسيات المشروع

تسجيل فكرة مشروعي و الاطلاع على المشاريع السابقة و وضع خطط لمشروعي
خطوات المشروع
التقنيات المستخدمة والمواد المطبقة من الكلية
تسلسل واضح لجميع الخطوات مع مصادر يمكن الاستفادة منها
توضيح السنة التي اطلق فيها المشروع، كافة تفاصيل المشروع، المشرفة، المتطلبات قبل البدء في فكرة المشروع
مرتبه
لا يوجد
المشروعات السابقة، المشروعات الفائزة، المشرفين الذين فازت مشاريعهم، المشرفين المتاحين، خانة تحتوي على مقالات مكتوبة أو فيديوهات عن التجارب الشخصية لأصحاب المشاريع أو حتى المشرفين أنفسهم
تكون واضحة ومفصلة
البرامج المستخدمة لعمل الفكرة
بيانات التواصل مع اصحاب المشروع
صور وفيديوهات توضحه وشرح كافي
اقتراحات تخص خطة عمل لتنفيذ المشروع، حلول سابقه، اخطاء شائعه يجب تفاديها
سنة اصدار المشروع
ملاحظات المشرف
التقنيات المستخدمة.. تقسيم المهام بين أعضاء الفريق
القصور في تلك الافكار -"future work" طرح المشاكل التي تم مواجهتها- اهم الافكار التي يمكن تطويرها لكل فكرة
اقدر اشوف واستعرض معلومات المشاريع، و اقدر اتواصل مع اصحاب الفكرة
امكانية التواصل مع اصحاب المشاريع
فكره المشوره ومدى نجاحه
الخطة المتبعة في تنفيذ المشروع
الكفاءة
شرح للأخطاء المتواجدة في المشروع، توضيح لكيفية سير خطة العمل
نماذج للمشاريع السابقة
جميع التفاصيل اللازمة لعمل التطبيق
رؤية مشاريع الطلاب السابقين لإخذ الافكار منها
: للتقنيات المستخدمة مثلا libraries تفاصيل عن كيفية ربط الهاردوير بالسوفت وير - الادوات المستخدمة و من فين حصلوا عليها -اسماء برامج او - Keras for deep learning and how to implement it
رؤية تفاصيل المشروع من اللغة المستخدمة الى التقنيات التي تم استخدامها
اطلاع على الية عمل المشروع - اللغة المستخدمة - الاطلاع على صنع واجهة التطبيق - مراجع مفيدة تساعد على بصنع تطبيق ناجح فعال
السرعة
خدمة للاستفسار
معلومات عن المشاريع وامثلة
الارشفة بحيث يمكنني تنقل بين افكار المشاريع باستخدام الاعوام
تحديد افكار المشاريع التي تتدرج تحت نفس المفهوم ٢- توضيح المصادر لكل بحث -١
التواصل مع اصحاب المشروع
اقسام خاصه لكل موضوع
طريقة عمل المشاريع وجميع تفاصيله لتسهيل الفهم

will you sharing your previous projects in this application ? - هل ستشارك مشاريعك السابقة في التطبيق ؟

109 responses



if your answer is yes, what are the details that you will share with them .- اذا كان اجابتك نعم ماهي التفاصيل التي ستشاركها معهم ؟

97 responses