



Proposal

CS252 Software Project Management

Faculty of Information Technology

Macau University of Science and Technology

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1 Title of the project

MUST Graduate Application Forum

2 Team Members

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2.1 The distribution of the proposal

Lu Jie: Problem Definition and Goals

He Xinyi: Related Works and Market Analysis

Chen Rui: Process, Risk Management, Project schedule

Cao Yulong: Methods, Programming Language, Frameworks and Tools

2.2 The division of project for this project

Software Task	Task details		Leaders
A	Requirement Analysis	Feasibility Analysis	He Xinyi
		Market Analysis	Cao Yulong
		Requirement Analysis	Chen Rui
B	Prototype Design	Prototype Design	He Xinyi
		Prototype Development	Lu Jie
		Prototype Modification	Chen Rui
		Confirm Prototype	Cao Yulong
C	System Design	Profile Design	Lu Jie
		Detailed Design	Chen Rui
		Design Changes	He Xinyi
		Design Confirmation	Lu Jie
D	Coding	Register Function Module Coding	He Xinyi
		Login Function Module Coding	Cao Yulong
		Information Sharing Function Module Coding	Chen Rui
		User Personal Home Page Function Module Coding	He Xinyi
		Offer Display Function Module Coding	Lu Jie
		Database Establishment	Cao Yulong
E	Testing	Unit Test Case Writing	Chen Rui
		Testing	Lu Jie
F	System Test Run	-	He Xinyi
G	Post-maintenance	-	Cao Yulong

3 Problem Definition and Goal

3.1 The definition of MUST Graduate Application Forum

MUST Graduate Application Forum is a website which can provide MUST students with cases of successful applications of previous MUST students, as well as an interactive platform for MUST students who are preparing to apply for graduate admission and MUST students who have successfully applied.

3.2 The target scope

MUST Graduate Application Forum is aimed at MUST students who are preparing graduate application and MUST students who have successfully applied for postgraduate studies.

3.3 Situations of MUST students on applications

In order to understand the actual situation more realistically, we conducted a questionnaire survey on campus. The questionnaire mainly covers five items:

- Do you have a study abroad goal now?
- If you want to study abroad, do you know which school is more suitable for you?
- Do you know the application requirements of the schools you want to apply to?
- Do you now understand the Graduate Application status of seniors?

- If there was a forum where seniors of our school shared admissions data and experience, would you go and check the information?

In response to these five questions, we present the collected data in the form of a pie chart, as shown in Figure 3.1.

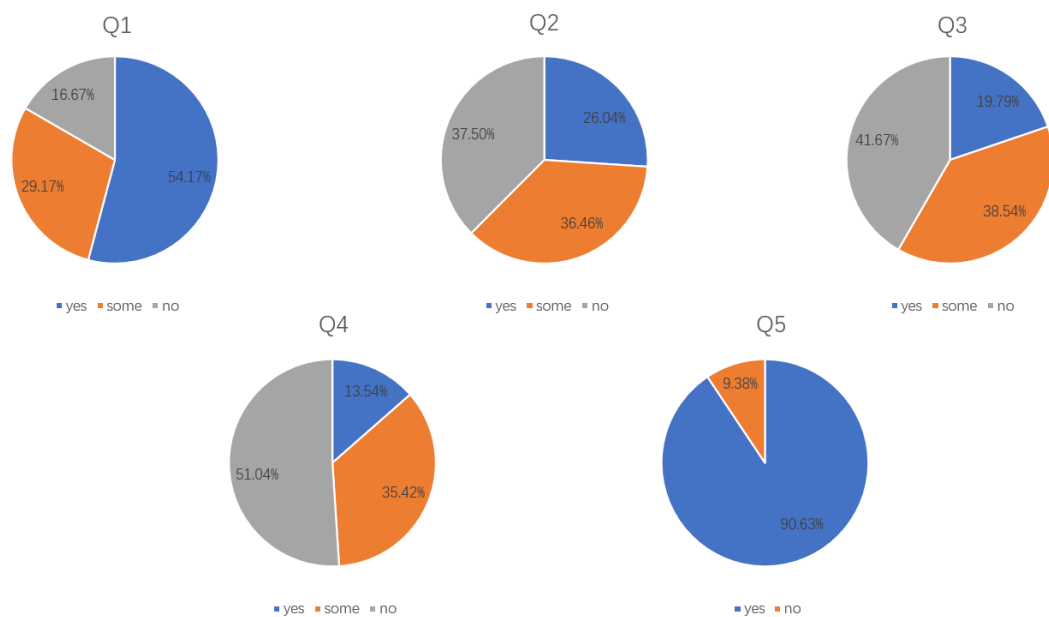


Figure 3.1 the collected data

According to the collected data, it can be seen that about 83.33% of the students in our school have their own target schools or have some ideas about their own target schools. However, about 73.96% of the students are not particularly clear about how to determine the suitable target schools according to their actual situation, and 80.21% of the students are not very clear about the application requirements of their target schools. In addition, 86.46% of the students do not know much about the application of seniors. If the school has a forum to share senior admissions data and experience,

more than 90% of students will be willing to go to the forum to review relevant information.

3.4 The features of MUST students

MUST students have many outstanding characteristics in applying for Graduate Application, and these characteristics also reflect the superiority of the MUST Graduate Application Forum.

- About 80% of MUST students want to apply for a master degree, which is a very large proportion.
- The background of MUST students is relatively special, and we belong to special overseas undergraduate students. It is difficult to determine whether we belong to 985 colleges, 211 colleges, or ordinary colleges. Therefore, the amount of data is very small, and the reference value of the data is not high.

3.5 The features of MUST students

From the results of the questionnaire, it can be seen that the students do not know much about the relevant information of Graduate Application. And the background of MUST students has a certain particularity, which leads to less information that can be obtained. So the main purpose of our

design of the MUST Graduate Application Forum is:

- Let MUST students provide each other with some information that is beneficial to Graduate Application.
- Let MUST students interact with seniors who have successfully applied.
- Providing timely answers and guidance for some students who are confused about applying.
- Let MUST students understand the Graduate Application information more clearly after using MUST Graduate Application Forum, so as to get satisfactory application results.

3.6 Salient features

As an application consultation website dedicated to MUST students, MUST Graduate Application Forum has the following salient features: The cases we share on the website are all application cases of previous MUST students, which are of great reference value for MUST students who are preparing to apply.

- The application experience shared by MUST students who have successfully applied can let students who are preparing to apply know how to proceed with the application process.
- Can solve the confusion encountered in MUST student application in time, and the responses obtained are also based on the actual situation

of MUST students.

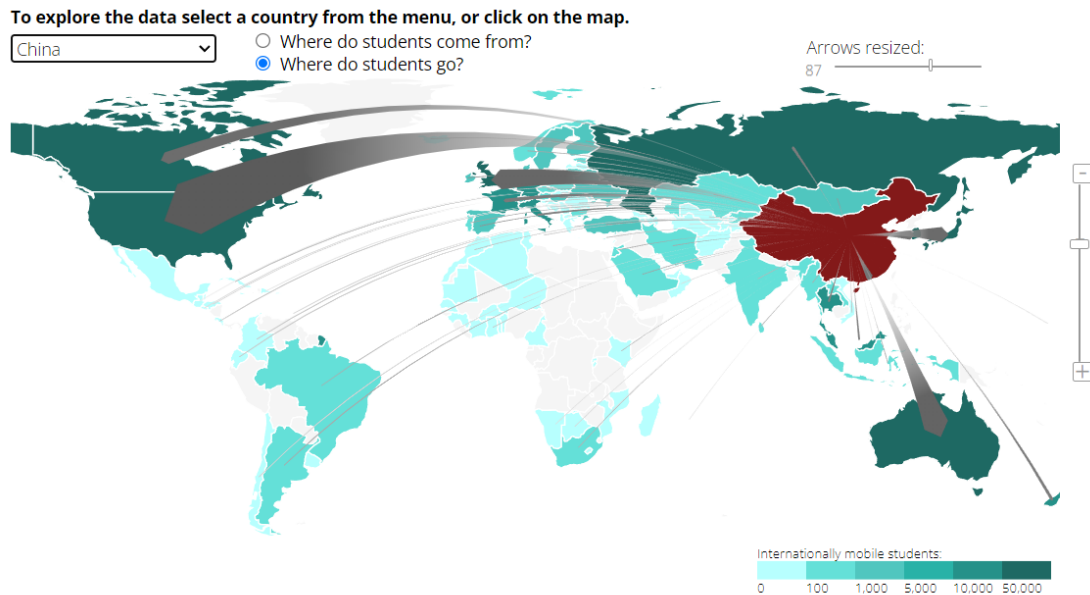
4 Related Works and Market Analysis

As the previous section has been mentioned, our project MUST Graduate Application Forum is aimed at helping MUST students to achieve better results in Graduate Application. Thus, in this section, we do the market analysis of the Graduate Application industry on a macro-level. The result shows that the Graduate Application market has huge potential with a prospective profit margin, and our project is also highly feasible.

Since our project focuses on graduate applicants, we investigated the Graduate Application Market of its market size and its market trend.

4.1 Market Size

According to the collected data from several main countries or regions to which most Chinese graduate applicants apply, the global market size of the graduate application continues to increase steadily in the past few years[1]. Besides, as the largest source of international students in the world, China has always maintained an increase in the number of students studying abroad. According to the Ministry of Education of China, the total number of Chinese students studying abroad in 2019 was 703,500, an increase of 41,400 or 6.25% over 2018, which is far ahead in the world[2].



China

Figure 2[1]

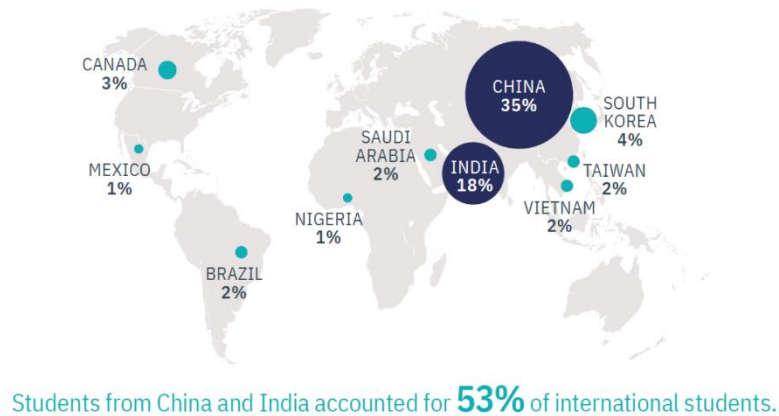
The following is related data in countries or regions that Chinese graduate applicants like to choose most, with the data from UNESCO official website [1].

● United States

United States is the most favored country where Chinese graduate applicants head for[1]. According to the report of the Council of Graduate Schools (CGS) in the United States, graduate applications increased by 7.3 percent in fall 2020 compared to the year before[3], and the total applications from international graduate students increased 3% from fall 2019 to fall 2020[4]. Among all the countries that international students come from, China remains the leading source of international students in the United States, with Chinese students increasing for the seventeenth

year[5]. There were over 372,000 Chinese students in the U.S. during 2020/2021, driven by continued growth in Chinese graduate students (+3%)[5].

LEADING PLACES OF ORIGIN OF INTERNATIONAL STUDENTS, 2020/21



Source: The Open Doors Report on International Educational Exchange is a comprehensive information resource on international students in the United States and U.S. students studying abroad. It is sponsored by the U.S. Department of State with funding provided by the U.S. Government and is published by IIE. For more information, visit www.opendoorsdata.org.

opendoors

- Hong Kong SAR

In the last two years, since the Hong Kong society situation has gradually become stabilized, while some mainland students couldn't go to study abroad in European and American countries due to the pandemic, the graduate applications for Hong Kong have rebounded. The total number of China mainland students studying in Hong Kong was closed to 40,000 in 2021[1]. According to Professor Wu Hongwei, Dean, and Professor of the Fok Ying Tung Graduate School of HKUST, the number of research-based postgraduate programs (RPG) in 2021-2022 increased by 48% compared with the same period last year[7].

- United Kingdom

China has become the leading source of overseas students in British

universities. According to the Higher Education Statistics Agency(Hesa), there were 43,530 Chinese students in the UK in 2007-2008. After ten years, the total number of students had risen to 106,530, with 60,460 postgraduate students and 46,070 undergraduates. The University of Manchester has Europe's largest Chinese student population. With about 5,000 Chinese students out of a total of just over 40,000, about one in eight students are Chinese[8].

4.2 Market Trends

In terms of the market trend of graduate applications, in addition to the large proportion of Chinese applicants across the world mentioned above, the decline in the ratio of seeking help from application consultants or agencies and the rising trend of the proportion of DIY applications done by applicants themselves are also two big prevailing trends. As a result of these trends, some types of internet platforms for DIY applicants to obtain information become prevailing.

The traditional application consultants or agencies often help the applicants to prepare all the materials and submit the applications while earning the service charge from them. On the other hand, DIY applicants always handle all the application stuff by themselves. In the past, there were several main reasons which kept Chinese applicants to choose

application consultants or agencies helping them, rather than doing the DIY applying by themselves:

1. Before the prevalence of the internet, information about the overseas school application industry was hard to find. There are few channels for students to obtain effective information efficiently.
2. It's difficult for the applicants to get a satisfactory score in standardized tests like IELTS, Toefl, and GRE without training from an application agency.
3. There are plenty of materials in the foreign language to be prepared for an application, including essays, personal statements, lots of certifications, and so on, which are difficult to be done by a non-native speaker.
4. The enrollment systems of foreign countries are quite different from China's, which requires comprehensive abilities to accomplish and also takes plenty of time.

Thus, Chinese applicants are more likely to spend lots of money on application consultants or agencies, to save more time and energy on studying.

However, there is a marked upward trend in the number of applicants deciding to accomplish the application by themselves. One of the most significant reasons is that, with the arrival of the internet age, the information barrier has been broken down, and the information asymmetry

does not yet exist. All the applicants can search most of the information on the internet, including but not limited to the skills for the standardized test or writing the essays, the admission requirements, and data, and also contacting the previous applicants for their experience.

Nowadays, DIY applicants account for more than 50% of the market share. According to the survey data of the Chinese Overseas Study Service Center of the Ministry of Education, only 35% of the students had the intention to do the DIY application in 2012, and this number rises to 70% in 2021[9]. With the transparency of study abroad information, the function of traditional application consultants or agencies is being reduced.

On the other side, lots of internet platforms with application information have become prevailing with the increasing number of DIY applicants. For example, one of the most famous international forums for applicants, "The GradCafe Forums"[10], has a total of 650.5K visits in Jan 2022[11]. For most Chinese DIY applicants, the most familiar website will be a Chinese applicants forum named "1Point3Acre"[12], which even attracts some international applicants to use with a translator, since there are so much helpful information and data, like the GPA score range for each master program.

By these above analyses for nowadays graduate application market, we have confidence in the potential of our project.

5 Process

This social platform is a simple and practical communication platform, through which visitors can learn about postGraduate Application-related matters and share experience. We plan that the social platform is mainly composed of five functional modules: registration function module, login function module, user function module, Information sharing function module and offer display function module.

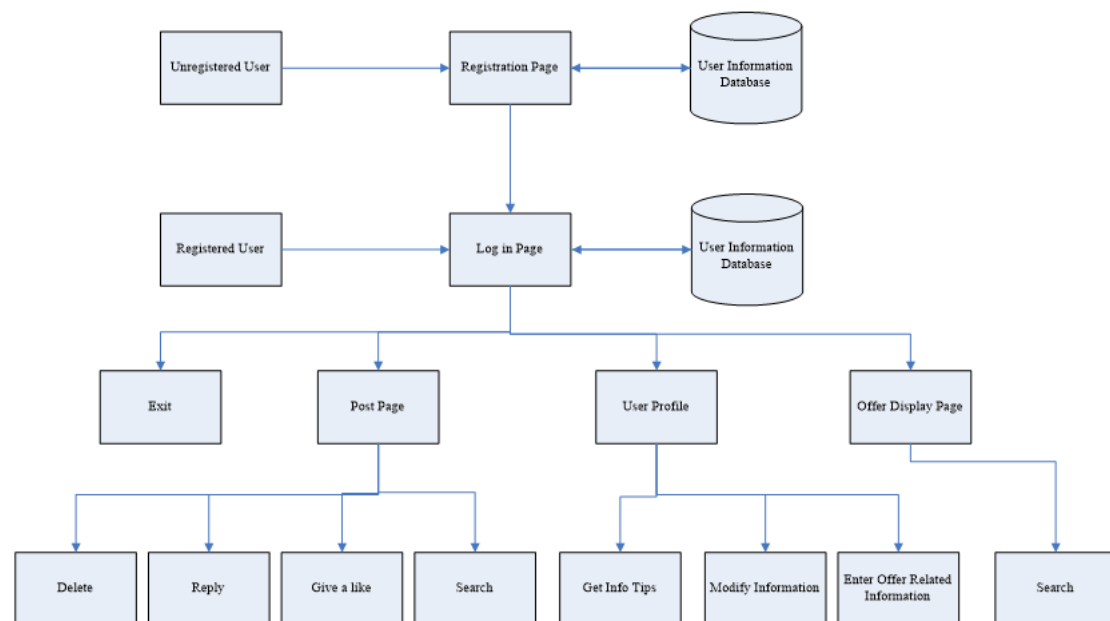


Figure 5.1 System Structure Diagram

5.1 Register function module

This page is located on the first page of the platform, and mainly provides the function of user account registration for unregistered users.

- Users click the register button to enter the user registration page.
- Users enter basic information to complete the account registration

(such as username, password, etc.).

- Successfully registered users will be redirected to the login page.

5.2 Login function module

This page is located on the first page of the platform, and mainly provides an interface to log in to the registered account.

- User enters account and password to log in.
- Log in successfully will jump to the information sharing interface.

5.3 Information sharing function module

This module is mainly designed to provide users with an information exchange platform and the function of retrieving information. In this interface, users who have successfully obtained an offer can post posts to impart their own experience; users who are interested in applying can also post posts to inquire about related matters, and users can also filter the required information by themselves according to tags or input keywords. In this module, we will also complete the following functional details:

- Users can post posts that contain text and images.
- Users can comment on or give a like to posts.
- Users can reply to others' comments.
- Users can delete their own contents or posts.

- Posting users will bring relevant tags such as the profession, country, etc. for which the post is directed.
- Posts will be sorted in descending chronological order.

5.4 User personal home page function module

User function module will have two sub-modules, information management module and information prompt module.

For the information management module, users can complete or change the following personal information:

- User's avatar
- User details
- User password modification
- Message box style
- Upload the picture, country, school and other related information of the offer

The information prompt module will prompt the user the following:

- A summary of the likes received in the post
- Summary of comments received on posts
- Summary of other people's responses

5.5 Offer display function module

This module will enter the offer related information uploaded by the user on the personal information interface into a form, and a conditional search box will be set at the top of the form. The user can select a specific country, related major, school name, etc. to search for the target content, and the form will display the following:

- Admission country
- Admission to the University
- Admission major
- GPA
- Standardized test

6 Methods

Generally, we plan to write frontend and backend code as two uncoupled modules and transfer data between two parts formatted by json, so that the backend and frontend code may be developed and tested independently.

For each module stated in pt.5, an independent single-page application is instantiated with its own database and exchange data between other modules is achieved using pre-defined interfaces using json in a similar manner similar to the data exchange between backend and frontend.

By the time of composing this proposal, the detailed implementation of each module is not yet clear and will be determined shortly afterwards after

the development starts.

7 Programming Language, Frameworks and Tools

- Frontend: HTML5 + CSS + JavaScript and vue.js.
- Backend: The backend will be using Python3.7.9 as the language of choice, which we will use Flask library as our web server.
- Database: MySQL.
- Testing: We plan to use unittest library to test our backend code.

By the time of composing this proposal, we have not yet decided which method or tool to use to test the front-end code, yet some universal automated GUI-based test frameworks, such as Airtest and pyautogui may prove to be useful.

8 Project risk management

8.1 Project risks

Major risks we have determined for this project are as follows:

- Late delivery
- Changes in requirements
- Lack of Development Experience
- Deviation from software engineering standards
- The product user scale is different from the actual one

- Technology does not meet specifications

8.2 Risk Mitigation, Monitoring and Management

Risk mitigation, monitoring, and management helps us pre-determine any possible major risks that may occur during development of this software. For each of these existential risks, we list Risk Mitigation, Monitoring, and Management (RMMM) plan.[13]

Risk: Late Delivery

- Mitigation

The design scheme gives full consideration to potential factors and leaves room for changing. The assignment of tasks is detailed. The preliminary design is fully discussed with the team and predictive suggestions are put forward as far as possible so as to establish a reasonable delivery time.

- Monitoring

The timeline has been established to monitor project status. Falling behind schedule would indicate a potential for late delivery. The schedule will be followed closely during all development stages.

- Management

If the project cannot be delivered on time, the only course of action available would be to request an extension to the deadline from the

customer.

Risk: Changes in requirements

- Mitigation

The project was set up by team members, and to prevent this from happening, we held regular meetings, which ensured that the product was the same as the original goal.

- Monitoring

The discussion should ensure agreement and mutual understanding among team members.

- Management

If members realize that our design is different from the original idea, they should discuss whether any changes are required and what steps need to be taken.

Risk: Lack of Development Experience

- Mitigation

To prevent this from happening, the team should conduct market research and develop appropriate estimation methods.

- Monitoring

Ensure appropriate research and estimation methods.

- Management

The member of the team that is the most experienced in a particular facet of the development tools will need to instruct those who are not as well versed.

Risk: Deviation from Software Engineering Standards

- Mitigation

Deviations from software engineering standards are possible, but unlikely. All team members had a good understanding of the software processes and how we planned to implement them in the process.

- Monitoring

A technical review involving comparisons between documentation and actual projects will help determine whether deviations have occurred. All relevant documentation must be as complete and accurate as possible to ensure that the work will comply with expressed software engineering standards.

- Management

Should deviation occur, steps must be taken to guide the project back within the standards expressed in accompanying documents. Technical reviews help to determine what must be done to keep the project in line with established software engineering standards

Risk: The product user scale is different from the actual one

- Mitigation

To prevent this from happening, the team should research the market, develop appropriate estimates, and have alternative methods

- Monitoring

The discussion should ensure agreement and mutual understanding among team members.

- Management

If the original plan is found to be inconsistent with the facts, changes should be discussed immediately.

Risk: technology does not meet specifications

- Mitigation

In order to prevent this from happening, we have regular meetings with the team against the original plan to make timely adjustments where necessary.

- Monitoring

The meeting should ensure that team members are fully aware of the technical implementation and the correctness of the technical direction.

- Management

If the development team becomes aware of a technical deviation, it

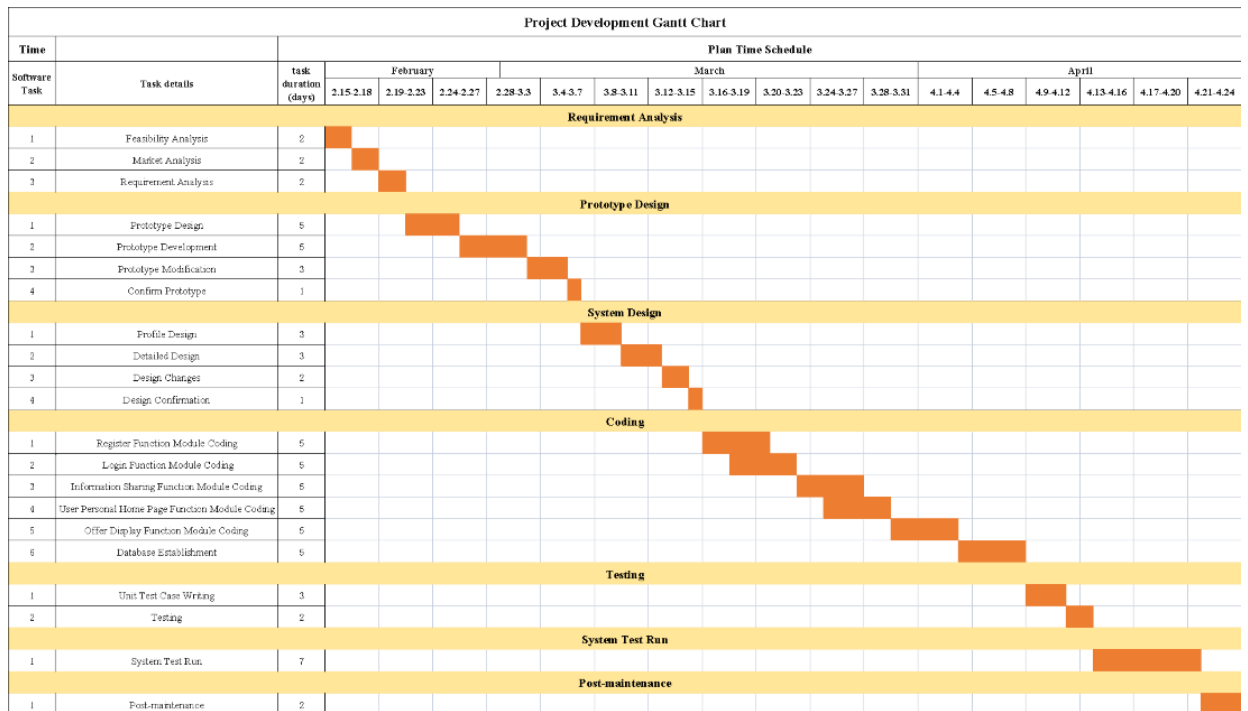
should immediately convene a meeting to correct it.

9 Project schedule

9.1 Project work breakdown

Software Task	Task details		Task Duration (Days)
A	Requirement Analysis	Feasibility Analysis	2
		Market Analysis	2
		Requirement Analysis	2
B	Prototype Design	Prototype Design	5
		Prototype Development	5
		Prototype Modification	3
		Confirm Prototype	1
C	System Design	Profile Design	3
		Detailed Design	3
		Design Changes	2
		Design Confirmation	1
D	Coding	Register Function Module Coding	5
		Login Function Module Coding	5
		Information Sharing Function Module Coding	5
		User Personal Home Page Function Module Coding	5
		Offer Display Function Module Coding	5
		Database Establishment	5
E	Testing	Unit Test Case Writing	3
		Testing	2
F	System Test Run	-	8
G	Post-maintenance	-	3

9.2 Gantt Chart



10 References

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