The white paper

The vision:

(1) Motivation:

Our project aims to provide a web page which can have the ability of matching the roommates for the customers. It will be very helpful when the freshmen enter the college because it will provide them a platform to get a relatively suitable roommate.

(2) Key Features:

In the web page, the customers need to finish a questionnaire concerning their habits of getting up, showering time etc. There are totally 13 questions which will be the basis of the matching, and then they are required to give each questions a score which are combined to be a total of one hundred, and our project will calculate the score between the customers and everything else that are waiting for roommates matching in the system according to the weights that the customers give to each question.

(3) Major Constraints:

Because of the constraints of the algorithm, the system can only work well when the customers only need one roommate, but when it comes to the multi-person dormitory, it will give an unexpected return value, and it may broke down, failing to give the final outcomes.

The initial business case:

(1) Existing competition (if any):

Nowadays more and more colleges have their own software that can help them to provide a Platform for the student to do the roommate matching，and almost all these softwares can be helpful in the situation of multi-people dormitories.

(2) Business Context:

Nowadays more and more people are able to go to the school and they need to live in the dormitories，and most of the time whether people live happily will depend on whether the roommates of them are suitable to them，so a software that can help to give people an opportunity to hit the target will be very popular, especially for the people in the college who cannot change their roommates randomly.

(3) Product Impact:

A suitable roommate is very important in our daily life especially for the student that are living in the dormitories of school because they will have to see each other every day, and our product can provide a platform for them to get a relatively suitable and satisfying roommates, so that they can get a relatively comfortable life in the dormitories to help them concentrate on their own work.

(4) Measurable Business & Financial Criteria for Project Success:

The criteria to measure whether our project is success is the number of schools or other institution that will use our software, and the total money that they pay for our soft code and web page.

(5) Strategies To Commercialize the Application:

Firstly, improve our applications and overcome the shortcomings of our projects and then give publicity to our projects for example advertise our software on the Internet and the television to attractive the customers to use our web page and the institution s to buy our source codes.

(6) Financial Plans:

Firstly, investing a half of the money in building the project to overcome the major constructions and advance our web page.

Secondly using 25% of the money in advertising our applications.

Finally spending the remaining money in maintaining the source code and web pages of our project.

Step	**Proportion of total funds**	**Time**
Building	50%	The whole process
Advertising	25%	After the production of

		relatively complete products
Maintaining	25%	The whole process

The technical details of the application:

(1) The conception of the product

The aim of our product is to match appropriate roommates for postgraduates quickly, simply, and accurately. We focused on the product's time-efficiency and match-accuracy. In order to make our product satisfying the two features mentioned above, we designed our product that simply need the user to complete a questionnaire with some matching-relevant questions. After all the users who participate the roommates matching finish the questionnaire, the program will show the matching result to the users timely. To realize the functions of the product, the design procedure was divided into three parts, they are front-end design, back-end design, and design. Firstly, the front-end design was to make web pages that users can see and edit, which are used to provide product-relevant information, show the questionnaire and matching result. Secondly, the back-end design was to store the data from the front-end in a database and transfer it to the algorithm. Lastly, the algorithm was designed to match roommates based on the data provided from the database.

(2) The involved in the product

① front-end technologies

A. HTML

HTML was used to design the basic structure of the website page. It created the necessary tags and initialized the needed components of the pages. For example, the texts of the questionnaire questions and product information.

B. CSS

CSS was used to decorate the website pages. The style of the entire pages is designed as black and white, which is simple and good-looking. The web layout was optimized and buttons were well designed using CSS.

C. JavaScript

JavaScript was simply used to optimize the weight questions in the questionnaire. If the choosing weight is not satisfy the requirement, it will inform the users to rechoose the weight.

② back-end technology

For better use of data, MySQL was used in the back-end to store the questionnaire data transferred from the front-end.

③ algorithm technology

The main language of writing product's algorithm was Python as it includes plenty of useful packages, such as math and openpyxl, which supports the algorithm programming. Data structure like list and recursion were also used in

the algorithm.

(3) How the product works

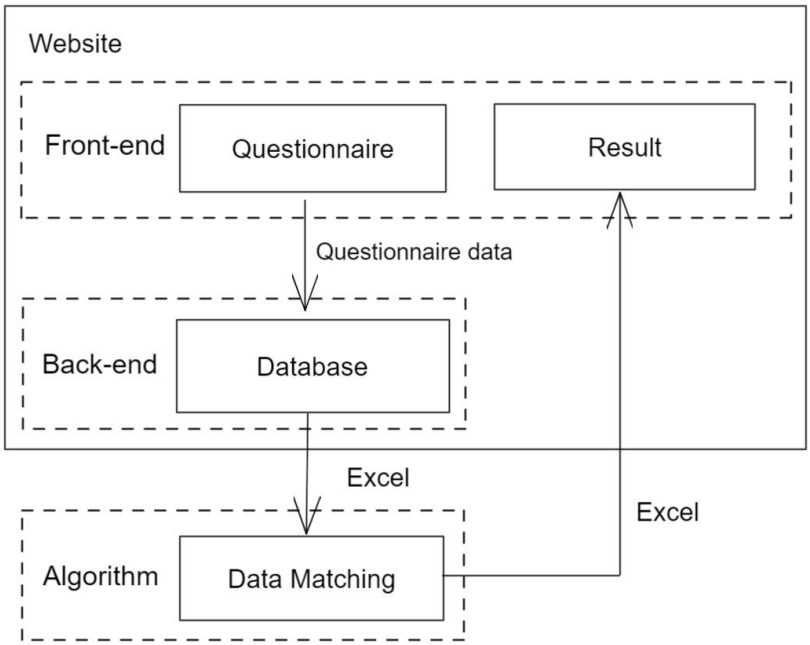
① product requirements

A. The users need to provide some basic information and personal view to perfect roommates through filling up a questionnaire. The questionnaire includes different aspects of questions, such as personal hygiene, sleeping habit and so on. These kinds of question can help to a better match.

B. The number of users need to be even as the program only provides even number matching.

② product architecture

There are mainly three parts of the product, which are front-end, back-end and algorithm. The front-end was designed to collect the user's data and show the result. The data collected from the front-end will transfer to the database in the back-end. After all the users complete the questionnaire, the data storing in the back-end will transfer to the algorithm using excel. Then, when the data matching is complete, the matching result will send back to the front-end and show to users.



A. front-end architecture

Four web pages were designed. The first page is the cover page, which serves as the “lobby” to contact with other pages. It includes some information about the product and buttons to other pages. The second page is the questionnaire page. The roommates-matching questions are placed in this page and users are required to complete all the questions for matching. The third page is the feature page, which includes some product’s features in order to provide more information about the product to users. Finally, to provide the way to contact the product’s designers, the contact page was designed as the last page of the front-end. The questionnaire, features, and contact page are all designed a button to return the cover page.

B. back-end architecture

The back-end is to export two Excel tables from the database and use pymysql to connect to the front-end. The web page can be filled in the local database and then

the algorithm uses two Excel tables to analyze.

C. algorithm architecture

Algorithm architecture uses data from the front-end to find a matching roommate and then sends the data to the back-end. It tries to build two classes, a human class, and a dormitory class. The dormitory class includes the dormitory personnel and the matching degree of the dormitory. It uses twelve functions to calculate the matching degree between two people's answers to each question. One of the functions counts the total and one of the functions makes the match.

③ product limitations

A. The product only supports two persons' matching.

B. The number of users need to be even.

C. Only can see the matching result after all the users complete the questionnaire.

The future:

(1) Introduction：

Our application is made up of the front-end of the questionnaire page, back-end database processing and algorithm matching in order to build a good college students' roommate matching website. The approach to implement this application in the market is if there is demanding for it. Through online search and sampling survey, we found that college students have a great demand for roommate matching, because a matched roommate can not only create a

wonderful college life for you, but also prompt yourself to become a better person.

(2) Risk management:

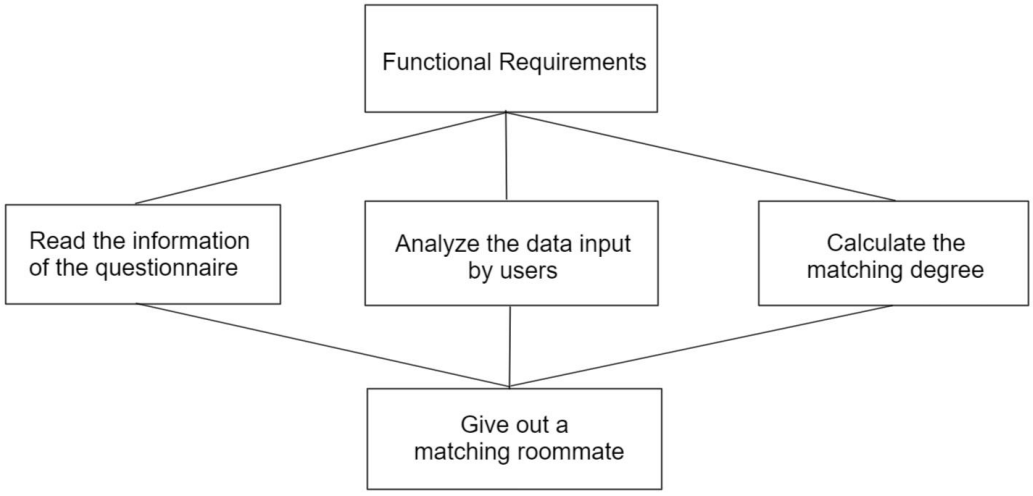
We will estimate the startup feasibility of this project, that is, the possibility of its application in real life, and whether its audience agrees with our algorithm. Because if the majority of users don't approve of our matching system, then the purpose of the system would be lost. At the same time, we will also set the completion time of the project. Just like our previous programming process, we will divide the project into three groups: front-end, back-end and algorithm. We will report the progress of the group once a week and follow up the work progress at any time.

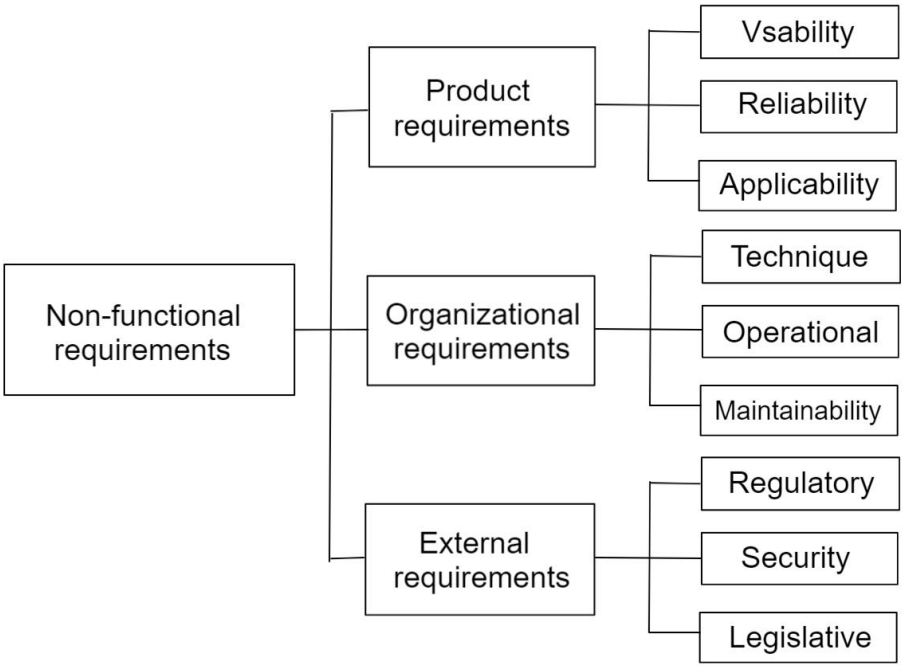
(3) Optimization:

We plan to control the number of screens and pages on our website in an optimal range in the next step: not to make our users feel bored in the process of filling in, but to maximize the access to more information of users, so as to maximize the matching degree. We will also use the code of the imperative module, using different programming languages to execute the specific operations required. In order to provide our customers with quality software products, we will continue to optimize our code to make it efficient and accurate.

(4) Requirements engineering process：

We will proceed the requirements elicitation and analysis， requirements specification and requirements validation for our product. When necessary, we will write the requirements documents to better demonstrate that our product meets all the needs of our users and can perform the completely and smoothly. Meanwhile, in addition to the use requirements of the product, we also consider the external requirements. That is, according to laws and regulations and public feedback, we will develop and complete a reasonable, legal, efficient, and user-friendly roommate matching system to meet the needs of college students, but also meet the expectations of the community.





(5) Organizational measures:

In order to communicate with stakeholders (college students), we plan to put the software into use before the dormitory allocation has been formed at the beginning of the semester, so as to realize its functions more accurately. Meanwhile, we will also communicate and cooperate with the educational administration system of the school and sign a confidentiality agreement. By then we are planning to promise that we won't hesitate to maintain the security of the system when involving the privacy of students' personal information.

(6) Rationality：

The roommate matching algorithm we adopt not only matches people with similar interests, but also takes people with complementary personalities into

consideration, which achieves a more reasonable arrangement: two people with too high similarity living under the same roof may trigger a greater probability of contradiction. Therefore, complementation is also a good choice. (We do this by allowing users to choose whether they are extroverts or introverts.)