# Software Development

## The birth of (Project Breeze): Behind the Scenes

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Abstract. To adopt an agile process as a team and demonstrate our understanding of software design, UML Diagrams, and their applications. Appropriate notations are adopted while modelling the requirements to their respective diagrams. In making the application, we adhere to the different artefacts of the software lifecycle. Further, we investigate the best-suited software architecture for the application and analyse the models from a software-development perspective. Finally, we document the outcomes of the work in the form of this technical report.

// Keywords: User Markup Language (UML), SCRUM

## 1 Introduction

In the given scenario, Group 18 employed by a software company is tasked with designing an application for a client company (Mr X) that allows university students and employers to connect via the app where employers offer internships and job opportunities to the students.

## 1.1 Requirements of the Application:

* The Application should allow universities and employer organisations to register with it.
* Both organisational contacts and students should have access to search and filter facilities to easily find information that is of interest to them.
* A recommendation facility which automatically matches students and opportunities and displays the top 10 matches each time a student or an organisational contact logs in to the application.

* **Student USER CASE**: When a university is registered with the app, each matriculated student at the said university will be able to create a profile in the application with the relevant information given below:
  + Academic Transcripts
  + Prior Work Experience
  + Prizes Won
  + Links to Portfolios or Repositories of work
  + Expected Completion Date (Condition)
  + Preferences for Career Positions and Sector (Recommended Function)

**Conditions:**

* Each student affiliated with a registered university can view all opportunities posted by the organisation.
* Once a student reaches the completion date of their programme at the university, they no longer have access to the system.
  + **Employer USER CASE:** Once an employer organisation registers with the application, they would be able to do the following:
  + Create a profile for their organisation
  + Name up to 5 specific contacts within the organisation (Discussable)
  + Add internship and job opportunities in their organisation.

**Conditions:**

* The named contacts within each registered organisation can view all student profiles in the application.
* Each employer organisation is responsible for keeping the status of the opportunities it offers up to date. The status could indicate the following:
* Active
* Withdrawn

Depending on the status above, a student registered with the application and filled in by an external candidate can view only active opportunities (displayed by the application). // Open to Discussion.

**Developer Notes:**

* All data in the system can be used to generate summary reports for the client company to monitor the take-up and effectiveness of the application.

## 3 Phase One – The Beginning

The group first gathered to discuss the needs for designing the application for the client company on obtaining the application's specifications (Mr X). The purpose was to link college students with firms who were offering internships and career possibilities, and that was the fundamental building block the team began to use because it was apparent what the result should be.

Two hours later, After the team has simplified and run over the requirements over satisfiable “n” iterations, the team achieved the basic architectural building blocks of the application’s environment (named: Mother), application’s structure (named: Son) and user flow (named: Uncle). They are as stated below:

The "Mother" Structure

Description automatically generated with medium confidence

### Fig: Whiteboard Illustrating the First Draft of the “Mother” Structure

Application Structure (Son)

Description automatically generated with medium confidence

### Fig: Whiteboard illustrating the First Draft of the “Child” Structure

A whiteboard with writing on it

Description automatically generated with medium confidence

### Fig: Whiteboard illustrating the First Draft of the “Uncle” Structure

Further improvements were made to the basic drafts of the above structure to maintain appropriate diagrams and document the process in a precise and logical manner, the team produced the following:

Graphical user interface, application, Teams

Description automatically generated

### Fig: Image illustrating the “Mother” basic architectural building block.

Graphical user interface, application, Teams

Description automatically generated

### Fig: Image illustrating the “Child” basic architectural building block.

**Note: The above images do not represent the final representation of the system architecture.**

The aforementioned data provided the team with a solid foundation upon which to develop the application and a clear idea of how to get to the desired outcome, and here is how we opted to proceed:

* + By implementing an agile procedure, controlling the division of labour, and equally balancing contributions.
  + Plan and carry out the use of software design, UML diagrams, and their application per the artefacts of the software development lifecycle.
  + Upholding proper notations and modelling that meet the application's standards.
  + Creating the structural and behavioural design and establishing the software architecture.
  + Examining the previous models.
  + Providing high-quality technical documentation with a wealth of content about how Project "Breeze" was carried out.

To the left of the **Basic Whiteboard Drafts** of Mother and Child, we placed the queries that were to be set forth by the development team to the client company (Mr X) to move to the next stage of software development.

The **Queries** that arose are as follows (Categorised according to structure):

**Mother:**

1. Though the requirements were first addressed to the organisation -> University - > Students, there is a mention of external candidates - Would it mention the alumni of a university or anybody out of the mentioned network?
2. If the external candidate refers to a complete outside person, will there be a separate storage requirement apart from registering them to a university?
3. Would the annual report generated by the client be based on,
   1. No. Of Jobs Posted?
   2. No. of Jobs Applied by students?
   3. No. Of universities registered?
   4. No. Of Organisations registered?
4. Should the application generate the report for the app owner on basis of the number of Searches that the organisation or the students registered with the university do? In the case of the external candidate, who will be charged if they are not registered with a university?

**Child:**

1. The search and filter function has a facility, what is the meaning of this facility in terms of organisation and university?

## 4 Business Model

The development team created a business model that satisfied the client's (Mr X) needs and identified the stakeholders. At the time of writing, it is believed that the application will initially target UK institutions and companies. There are over 160 universities in the UK, with over 2,751,865 students, according to reports [1]; in addition, 810,316 companies were incorporated in 2021 [2], creating an untapped economic resource pool.

The application attempts to leverage this situation by creating a seamless and quality experience networking between job-providing organisations and university students.

The application is based on the freemium model where students can access the application resources, however, the client requirements for monetizing the application are as follows:

• The client will charge the universities and employer organizations an annual fee to register with the application.

• Universities are charged a lower fee than employers.

Now of the first version release, The Application is targeted at UK universities and employers in first instance. If successful, it will be deployed on a global scale.

The development team also developed a business model for the Project code-named "Breeze" to identify the stakeholders, resources, and other segments that are related to the application.

### Fig: Business Model Canvas illustrating Project “Breeze” Assets.

## References

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https://www.gov.uk/government/statistics/companies-register-activities-statistical-release-2020-to-2021/companies-register-activities-2020-to-2021, Accessed on 31-10-2022.

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