**Software Project Engineering**

**Group D Project Report**

**Prepared By:**

1. Tayyab Gulzar (2418049)
2. Muhammad Usama (2418971)
3. Hemalatha Balamurugan (2412095)
4. Muhammad Adnan (2421739)
5. Ahamed Rufaid Shereef (2417208)
6. Pravalika Vakkanti (2426895)

**Real Estate Web Application (True Estate)**

**Instructor: Dr Kit-ying Hui**

# Abstract

The Real Estate web application “True Estate” is a Web Application developed to simplify Property Buy/rent process in the UK. The Application is designed for students, individual and property Owners/Managers. It allows Users to browse and view through available property listings and view detailed property information. Additionally, the Web application includes features such as 3-D property virtual tours, Agent Application portal and contact enquiries for particular property.

The developmental phase of the application was built using the Agile development methodology, which supported progress incrementally. development was structured across three major increments A0, A1 and A2. The project delivered 20 story points. Key scrum activities including Sprint planning, Daily scrum, Sprint Review and Sprint Retrospective meeting were conducted to ensure transparency, communication and team collaboration and coordination.

Furthermore, this report addresses legal, security and ethical considerations ensuring the application is compliant with regional data protection regulations and designed for user privacy and ethically safe.

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# A1: SPRINT PLANNING MEETING

The sprint backlog items for Increment A1 is given in table 5. The sprint tasks or items were assigned to match our goal of creating User interface for the Real Estate Web application. The product backlog after the A0 sprint has been updated in Table 5.

## Table 5: Product Backlog items

|  |  |  |
| --- | --- | --- |
|  | **Product Backlog items** | **Effort Indicator** |
| PBI-4 | As a user, I want to view properties in 3D so that I can get a realistic sense of the space before visiting. | L |
| PBI-5 | As a real estate professional, I want to apply for a position as an agent. | M |
| PBI-6 | As a user, I want to contact the platform’s support team so that I can ask questions or report issues. | M |
| PBI-8 | As a User I can see all details of a particular property | M |
| PBI-9 | As a User I want to book property via form | M |
| PBI-12 | As an admin, I can delete the unnecessary bookings | M |
| PBI-13 | As an admin, I can see or view the contact enquiry | M |
| PBI-14 | As an admin I can delete the unnecessary contact enquiry | S |
| PBI-15 | As an admin I can see the real estate agent applications. | S |
| PBI-16 | As an admin I can download the resume of real estate agent application | S |
| PBI-17 | As an admin I can delete unnecessary agent application | S |
| PBI-18 | As an admin I can add the properties | S |
| PBI-19 | As an admin I can update the existing properties | S |
| PBI-20 | As an admin I can delete the existing properties | S |
| PBI-21 | As an admin I can add the locations | S |
| PBI-22 | As an admin I can delete the locations | S |
| PBI-23 | As an admin I can update the locations | S |

## 

## Table 6: A1 Sprint Backlog:

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Sprint Backlog** | **Effort indicator** | **Acceptance Criteria** |
| SBI-1 | As a user, I want to contact the platform’s support team so that I can ask questions or report issues. | M | User needs to fill out all the fields of contact us form to submit enquiry. |
| SBI-2 | As a User I can see all details of a particular property | M | User will have to click on a particular property to view the details of that property |
| SBI-3 | As a User I want to book property via form | M | User will have filled all fields in property booking form to submit it. |
| SBI-4 | As an admin, I can see and reply to contact enquiry | S | On the admin panel, admin will have to click on reply button and fill that field to reply to the enquiry. |
| SBI-5 | As an admin I can delete the unnecessary contact enquiry | S | On the admin panel, the admin can delete by clicking on the delete enquiry button. |
| SBI-6 | As an admin I can add the properties | S | As an admin, admin will have to click on add properties to add properties by filling out all fields in add properties. |
| SBI-7 | As an admin I can update the existing properties | S | As an admin, admin will have to click on update properties to update properties. |
| SBI-8 | As an admin I can delete the existing properties | S | As an admin, admin will have to click on existing properties and then on delete properties to delete it. |

# A1: Sprint Review Meeting

## A1 Sprint Goals:

Design and implement the User Dashboard for the Real Estate Web Application so all pages are completed and functional according to the Acceptance Criteria. The sprint goal is to ensure users can browse, view, enquire about, rent and book property viewing, also completion of rental applications form, agent application form and testimonials. Admin panels functions such as User/admin should also be able add, edit or delete property listings. Users should be able to fill out a contact form and the admin can view the contact enquiry through admin panel.

## A1 Sprint Overview:

The Sprint ran for 15 days and covered 8 story points. The team was determined to improve their performance following the A0 sprint. The shared aim to revise the product backlog properly, complete and develop all the sprint planned tasks. At the start of the A1 sprint there was a big emphasis on completing the Front-End User Interface. However, upon recognising the importance of clearly understanding and refining user stories in the product backlog, as this directly impacts our ability to build functional and effective features. (Cohn, 2004).

Users can now View, manage and interact with property listings, rental applications, book viewings and make enquiries via forms. Additional features such as agent application and Testimonial page is functional.

A white couch in a room with a lamp and plants

AI-generated content may be incorrect.A screenshot of a contact form

AI-generated content may be incorrect.Figure 1: Contact Us Form Figure 2: Landing page of True Estate

A close-up of a screen

AI-generated content may be incorrect.Figure 3: A1 Sprint Timeline

## Table 7: Status of the Sprint backlog

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Sprint backlog** | **Effort Indicator** | **Acceptance Criteria** | **Status** |
| SBI-1 | As a user, I want to contact the platform’s support team so that I can ask questions or report issues. | M | User needs to fill out all the fields of contact us form to submit enquiry. | Done |
| SBI-2 | As a User I can see all details of a particular property | M | User will have to click on a particular property to view the details of that property | Done |
| SBI-3 | As a User I want to book property via form | M | User will have filled all fields in property booking form to submit it. | Done |
| SBI-4 | As an admin, I can see and reply to contact enquiry | S | On the admin panel, admin will have to click on reply button and fill that field to reply to the enquiry. | Done |
| SBI-5 | As an admin I can delete the unnecessary contact enquiry | S | On the admin panel, the admin can delete by clicking on the delete enquiry button. | Done |
| SBI-6 | As an admin I can add the properties | S | As an admin, admin will have to click on add properties to add properties by filling out all fields in add properties. | Done |
| SBI-7 | As an admin I can update the existing properties | S | As an admin, admin will have to click on update properties to update properties. | Done |
| SBI-8 | As an admin I can delete the existing properties | S | As an admin, admin will have to click on existing properties and then on delete properties to delete it. | Done |

## Sprint Review Feedback

1. Sprint Review Outcome:The sprint had a productive ending with 8 items from the sprint backlog completed and the delivered features were deployable and so there was significant progress which moved the project closer to full functionality. Although there was an issue with the product backlog and sprint backlog at the start of the sprint, but the team was able to refine and restructure the product to improve team functionality and workflow.
2. Work Progress:The team was able to improve the momentum after the mistakes made in the sprint planning meeting, this increased momentum improved the team coordination and focus.
3. Achievements: Key functions such as Property listing, Property Details, rent application form, form enquiries were properly implemented
4. Remaining Work: Significant progress still needed as there are still significant items still pending on the product backlog. The user authentications and user registration still need debugging, so we included it back in the product backlog.
5. Next Steps: Product backlog refinement session is needed to reposition user authentications and user registration so to ensure critical functions are completed in the final sprint. Comments from scrum master about product backlog and the sprint backlog.

# A1: Sprint Retrospective Meeting

## Challenges Faced:

* User Authentication and Registration Issues: During testing the user authentication and user registration were not functional due to some bugs. This affected the access to the user dashboard and admin panel. The backlog refinement was called to address this issue and give more priority so it can be completed in the A2 sprint.
* GitHub Repository Issues**:** The team experienced difficulties when merging code into the shared GitHub repository. Since many members were more familiar with individual repositories, collaboration on shared components, (property listing interface and form submissions) proved to be challenging, resulting in version control conflicts.
* Product and Sprint Backlog: The Product backlog and sprint backlog needs to be restructured according to the scrum framework.

## What to Retain:

* Communication: Clear communication was consistent throughout the sprint, supporting problem solving and decision making in terms of refinement of Product and Sprint Backlog.
* Participation: Engagement in meetings improved, with team members actively involved in scrum ceremonies and project discussions. Daily scrum sessions are recorded in Table 8.
* Team Collaboration: Collaboration improved during the A1 sprint after a bumpy start. The team members collaborated on multiple function and designs, each team member’s goals align in sharing a similar goal to increase productivity and workflow.

## What to Improve:

* Product and Sprint Backlog: Better record of product and sprint backlog is essential in the scrum framework. Better organization is needed and updating of both the product and sprint backlog. This will ensure all the team member understand the priorities of certain functions so they can be completed in time at the end of the A2 sprint.
* Task Management and Time Management: Improved time management is required to ensure progress in the next sprint. Tasks should be organized and allocated efficiently so there are no dependency delays.
* GitHub Uploads: a structured process needed to merge and upload the code on GitHub.

# A1: Backlog Refinement Meeting

## 

## Table 8: Product Backlog Refinement

|  |  |  |
| --- | --- | --- |
|  | **Product Backlog items** | **Effort Indicator** |
| PBI-4 | As a user, I want to view properties in 3D so that I can get a realistic sense of the space before visiting. | L |
| PBI-5 | As a real estate professional, I want to apply for a position as an agent. | M |
| PBI-12 | As an admin, I can delete the unnecessary bookings | M |
| PBI-15 | As an admin I can see the real estate agent applications. | S |
| PBI-16 | As an admin I can download the resume of real estate agent application | S |
| PBI-17 | As an admin I can delete unnecessary agent application | S |
| PBI-21 | As an admin I can add the locations | S |
| PBI-22 | As an admin I can delete the locations | S |
| PBI-23 | As an admin I can update the locations | S |
| PBI-1 | As a new user, I want to register for an account so that I can login successfully. | XL |
| PBI-2 | As a user, I want to securely log into my account so that I can access the properties. | XL |

The following is the result of the Product backlog refinement meeting:

* All remaining 12 items are essential to completion of the real estate web application.
* Login authentication and login registration are moved back into the Product backlog to ensure smooth login and registration process for user without any bugs.
* The remaining items include 3D property viewing and agent application form which will complete all functionalities.

## Table 9: Daily Scrum Activities (A1 Sprint)

|  |  |  |
| --- | --- | --- |
| S/N | Date and Time | Meeting Outcome |
| Daily Scrum Meeting | 28.02.2025 3pm | **Previous Completion:** Signup and Sign In page.  Logout.php.  **Plan for today**: MYSQL Database, Admin panel.  **Blocker**: Dependency Delays |
| Daily Scrum Meeting | 03.03.2025 5pm | **Previous Completion**: MYSQL Database, Admin panel.  **Plan for today**: Property Booking page and property details page configuration.  **Blocker**: N/A |
| Daily Scrum Meeting | 4.03.2025 3pm | **Previous Completion**: Property Booking page and property details page configuration.  **Plan for today**: Contact Us, contact enquiry form and CRUD functions for property listing, contact us enquiry and property bookings.  **Blocker**: Slow pace on Task Execution by team members. |

# A2: Sprint Planning Meeting

## Product Backlog for A2 Sprint:

The A2 sprint is the final sprint for the software project, and it is very important to complete all Product Backlog items in Table 10. The goal is to connect all features and the core applications of the Real Estate Web Application. The User registration and user authentication was moved back in the product backlog for A2 Sprint.

## Table 10: Product Backlog:

|  |  |  |
| --- | --- | --- |
|  | **Product Backlog items** | **Effort Indicator** |
| PBI-4 | As a user, I want to view properties in 3D so that I can get a realistic sense of the space before visiting. | L |
| PBI-5 | As a real estate professional, I want to apply for a position as an agent. | M |
| PBI-12 | As an admin, I can delete the unnecessary bookings | M |
| PBI-15 | As an admin I can see the real estate agent applications. | S |
| PBI-16 | As an admin I can download the resume of real estate agent application | S |
| PBI-17 | As an admin I can delete unnecessary agent application | S |
| PBI-21 | As an admin I can add the locations | S |
| PBI-22 | As an admin I can delete the locations | S |
| PBI-23 | As an admin I can update the locations | S |
| PBI-1 | As a new user, I want to register for an account so that I can login successfully. | XL |
| PBI-2 | As a user, I want to securely log into my account so that I can access the properties. | XL |

## Table 11: Sprint Backlog (A2 Sprint)

|  |  |  |  |
| --- | --- | --- | --- |
| ID | User Story / Task | Effort Indicator | Acceptance Criteria |
| SBI-1 | As a user, I want to view properties in 3D so that I can get a realistic sense of the space before visiting. | L | Users should be able to 3-D view the property listing while clicking the particular property. |
| SBI-2 | As a real estate professional, I want to apply for a position as an agent. | M | User needs to have fill agent form fields to submit application. |
| SBI-4 | As an admin, I can delete the unnecessary bookings | M | Admin can delete the Property booking on admin dashboard by clicking on property on admin dashboard property tabs. |
| SBI-5 | As an admin I can see the real estate agent applications. | S | Admin can view the Real Estate applications on admin dashboard by clicking Agent application. |
| SBI-6 | As an admin I can download the resume of real estate agent application | S | Admin can download the Real Estate applications on admin dashboard by clicking on Agent application download |
| SBI-7 | As an admin I can delete unnecessary agent application | S | Admin can delete Real Estate applications on admin dashboard by clicking on property delete button. |
| SBI-8 | As an admin I can add the locations | S | Admin can add property listing through admin dashboard and clicking property add button. |
| SBI-9 | As an admin I can delete the locations | S | Admin can delete property location through admin dashboard after clicking delete button on the location field. |
| SBI-10 | As an admin I can update the locations | S | Admin can update property location through admin dashboard by clicking on property and change property location. |
| SBI-11 | As a new user, I want to register for an account so that I can register successfully. | XL | User needs to fill all Registration fields such as username, email, password and confirm password to confirm account registration |
| SBI-12 | As a user, I want to securely log into my account so that I can access the properties. | XL | User needs to complete email and password fields to login to the website |

**Sprint Goal:**

The goal of the sprint was to implement 3-D property viewing functionality and develop Admin panel functions to add property locations and contact enquiries and lastly the real estate agent application.

**Sprint Timeline:**

This sprint covers 12 story points and has a duration of 9 days. This sprint covers functionality of real estate agent application and 3-D property viewing configuration. Admin Panel functionality is also covered in this sprint. Add, modify and delete location of property and property listings and admin panel management of contact enquiries from users.

## Figure 4: A2 Sprint Timeline:

# A2: Sprint Review Meeting

## Sprint Goal:

The goal of the sprint was to implement 3-D property viewing functionality and develop Admin panel functions to add property locations and contact enquiries and lastly the real estate agent application.

## Sprint Overview:

The 9-day sprint covers a total of 11 story points including two new product backlog items after the Product Backlog Refinement meeting. The team faced issues with product and sprint backlog which impacted planning and prioritization. The team refocused their efforts on delivering key features of the Real estate web application, including 3-D viewing and Admin Panel configurations. Overall, all tasks were completed which showed immense improvement from the last A1 sprint. After the product backlog refinement, we move the User authentication and User Registration back into the Product backlog to fix recurring issues and the result is in Figure 5 & 6. All product backlog items were completed in the A2 Sprint.

Figure 5: Registration Page Figure 6: 3-D Virtual Tour

A living room with a rug and a fan

AI-generated content may be incorrect.A screenshot of a login form

AI-generated content may be incorrect.

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## Sprint Feedback:

* The Team showed an improved performance after the initial sprint with a restructured Product and Sprint backlog.
* Improve admin panel functionality for adding property listing and property listing as an admin functions.
* Login Authentication and user registration debugging for smooth login and registration process.

## Impediment:

Team consistency was a big issue with approaching deadlines other module assessments which strained sprint activities.

## Table 12: Progress in the Sprint Backlog after the A2 Sprint

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | User Story / Task | Effort Indicator | Acceptance Criteria | Status |
| SBI-1 | As a user, I want to view properties in 3D so that I can get a realistic sense of the space before visiting. | L | Users should be able to 3-D view the property listing while clicking the particular property. | Done |
| SBI-2 | As a real estate professional, I want to apply for a position as an agent. | M | User needs to have fill agent form fields to submit application. | Done |
| SBI-4 | As an admin, I can delete the unnecessary bookings | M | Admin can delete the Property booking on admin dashboard by clicking on property on admin dashboard property tabs. | Done |
| SBI-5 | As an admin I can see the real estate agent applications. | S | Admin can view the Real Estate applications on admin dashboard by clicking Agent application. | Done |
| SBI-6 | As an admin I can download the resume of real estate agent application | S | Admin can download the Real Estate applications on admin dashboard by clicking on Agent application download | Done |
| SBI-7 | As an admin I can delete unnecessary agent application | S | Admin can delete Real Estate applications on admin dashboard by clicking on property delete button. | Done |
| SBI-8 | As an admin I can add the locations | S | Admin can add property listing through admin dashboard and clicking property add button. | Done |
| SBI-9 | As an admin I can delete the locations | S | Admin can delete property location through admin dashboard after clicking delete button on the location field. | Done |
| SBI-10 | As an admin I can update the locations | S | Admin can update property location through admin dashboard by clicking on property and change property location. | Done |
| SBI-11 | As a new user, I want to register for an account so that I can login successfully. | XL | User needs to fill all Registration fields such as username, email, password and confirm password to confirm account registration | Done |
| SBI-12 | As a user, I want to securely log into my account so that I can access the properties. | XL | User needs to complete email and password fields to login to the website | Done |

## 

# A2: Sprint Retrospective Meeting

**Challenges:**

* **Dependency Delays:** Tasks were delayed due to wait time on other team members tasks, which were not completed in time and caused some bottlenecks in the process.
* **Product and Sprint Backlog Management:** misconception on product backlog and sprint backlog caused some confusion and frenzy into the team.
* **GitHub Repository:** The team faced issues with uploading the GitHub code from the start of the project. The code needed to be merged properly, but the absence of structured branching led to frequent conflict, delays and confusion during integration.

**What to Retain:**

* **Collaboration:** Team members performed well after the A2 sprint planning meeting. Collaboration in completing multiple sprint backlog items ensured all team members worked together to complete tasks and pooling in their resources.
* **Team Feedback & Engagement:** Increased scrum participation by all team members showed immense improvement from the A1 sprint. Increased engagement and feedback from team members which fostered a more effective and supportive team environment.

**What to improve:**

* **Sprint Planning and Accountability:** The sprint planning needs to be improved so task flow can efficiently flow from product backlog into the sprint backlog. Separation of backend and frontend form development would improve sprint execution.
* **Version Control & Code Integration:** moving forward, adopting a structured Git workflow such as feature branches, pull requests and clear merging protocol is needed to improve collaboration and reduce integration issues.

## Table 13: Daily scrum meetings (A2 Sprint)

|  |  |  |
| --- | --- | --- |
| S/N | Date and Time | Meeting Outcome |
| Daily Scrum Meeting | 20.03.2025 3pm | **Previous Completion:** Contact Us, contact enquiry form and CRUD functions for property listing, contact us enquiry and property bookings.  **Plan for today**: 3D property viewing & agent application forms  **Blocker**: Dependency Delays |
| Daily Scrum Meeting | 24.03.2025 5pm | **Previous Completion**: 3D property viewing & agent application forms  **Plan for today**: CRUD operations for admin panel.  **Blocker**: sprint and product backlog misconception. |

# Description of Sprint Achievements

The Real Estate web application is developed to provide user/admin functions to view, edit, add and delete certain property features such as property listing and property locations. Contact us form and enquiries through the admin dashboard. The web application serves both tenants and admin/users such as estate agents and admin panels. The application features 3-D property viewing and agent application form.

**Application Design and Architecture:**

The system begins with a Home page with login portal and user registration, dual role authentication for both admin and user log in. Technologies used are PHP based and JavaScript. The login redirects users based on their roles from the Landing page to either user or admin dashboard. The user side allows users to browse and view through different properties with external features such as 3-D property viewing and an agent application portal on the Home page. Admin users are initially created from the backend and later can be added or deleted through the admin dashboard, admin can also add/delete property locations and view/delete contact enquiries from the admin dashboard. Users can browse available properties and submit rent application form, make bookings and make contact enquiries. Contact enquiries are available to the admin on the admin dashboard where they can manage, add or delete unnecessary enquiries and amend property bookings.

## Figure 7: Architecture Design

**A diagram of a computer program

AI-generated content may be incorrect.**

**Domain Background and Relevant Issues:**

The project is designed and developed by postgraduate students at Robert Gordon university studying MSc information technology with Business intelligence. The inspiration of the real estate web applications comes because of the need to simplify property bookings and rental processes for individuals. The app allows 3-D property viewing to view the property by inch and agent application process.

## Consideration of legal, Security and Ethical Context:

**Security Consideration**

Security is major aspect of the application. Access to user profile Throup a PHP based login and registration. ensuring that users can access personalized platform. User privacy is maintained for authorized users only. (OWASP Foundation, 2023)

**Legal Consideration**

The development of the web application aligns with all respective institution policies. Students at Robert Gordon university Aberdeen have developed the application according to all ethical code of conduct and is the property of the university. (GDPR, 2016)

**Ethical Consideration**

Data is handled and processed with strict user confidentiality. The application complies with all the GDPR regulation. which is there to ensure all personal data is securely stored and is only used for the intended purpose. (Moldstud.com, 2023)

**Professional Consideration**

The development process follows all the professional standards for the use of version control (Git), task allocation and peer reviews. Developers follow the British Computer society (BCS,2023) code of conduct

Including integrity, competence and accountability throughout the project. Agile methodology was followed during the development process including sprints for collaboration and efficiency (Highsmith, 2009).

**Social Consideration**

True estate aims to address real world challenges in the Real estate market by offering a user friendly, inclusive and a transparent platform buyer, sellers and renter. This platform supports digital inclusion by offering mobile responsive and accessible solutions. In alignment to fair housing principle True Estate avoids design-based discrimination by ensuring that property listing is not based on Race, Income Level or any other stereotypes. True Estate supports digital access and fair housing (California Law Review, 2023).

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