

## Software Innovation Studio Team Charter (2022 Spring)

### TEAM INFORMATION

Team Name	<i>HAM<sup>2</sup></i>
Product Owner / Team Lead	Himanshu Mehta
Scrum Master	Mitchel Treeves
Scrum Team Members	Harrison Crowe-Maxwell, Anesu Chakaingesu, Maria Jamal, Jacob Taylor, Amana Ramzeen, Ahmed Khursheed

Name	Role	Knowledge / Experience	Expectation(s) and commitment(s)	Assigned tasks
Himanshu Mehta	Team Lead/ Front end dev / BA	Java, Python, HTML, CSS	10 – 15 hrs	TBD
Harrison Crowe-Maxwell	Back-end dev / BA / System Tester	Python, SQL, C++, JavaScript	20 hrs	TBD
Mitchell Treeves	Back-end dev / Scrum Master	Python, C++, Java, SQL, Typescript	10 – 14 hrs	TBD
Anesu Chakaingesu	Full stack / Back-end dev	JavaScript, jQuery, PHP, SQL, HTML (Bootstrap), CSS	15 hrs	TBD
Maria Jamal	Back-end dev / BA	Java, JS, GO, python, typescript	10 hrs	TBD
Jacob Taylor	UI – UX / Front end dev	Java, JS, Node, HTML, SQL, CSS	10 hrs	TBD
Ahmed Khursheed	Back-end/ ML Data Science	Python, HTML, SQL,	10 hrs	TBD
Amana Ramzeen	Front end dev / BA	Java, Python, HTML, SQL, CSS	10 hrs	TBD

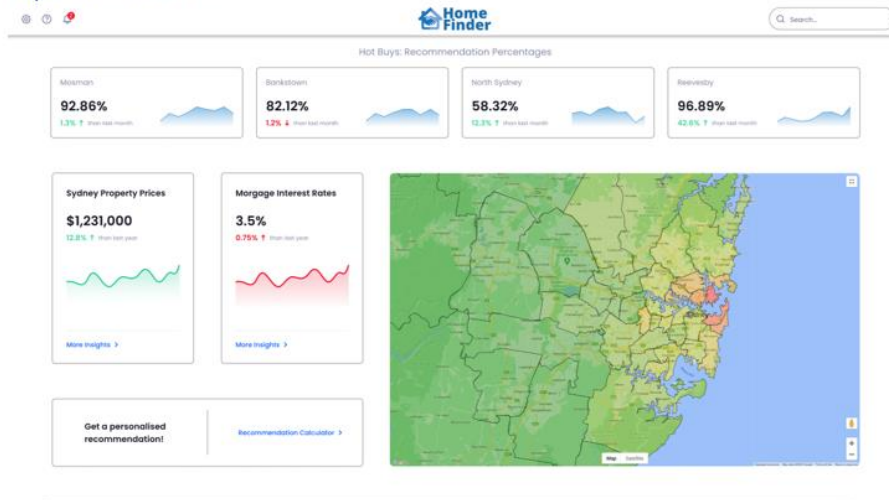


## PROJECT

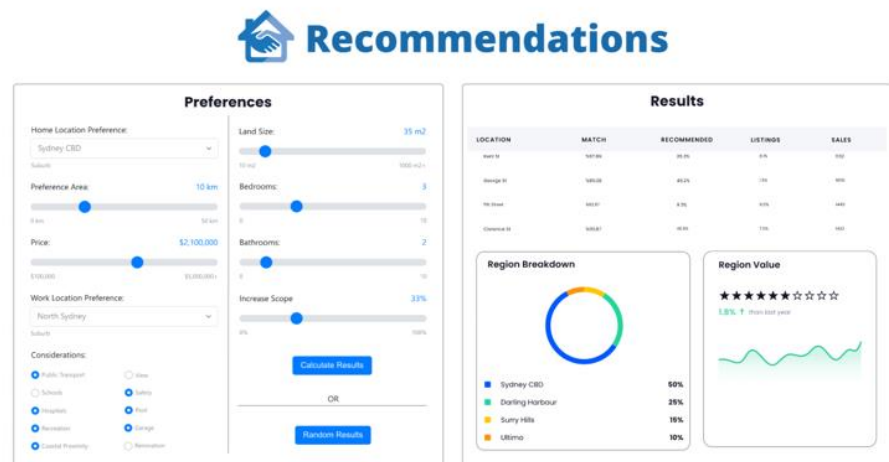
### Project scope and benefit

A web-based application that takes preferences from the user about a property they are looking to buy and generates recommendations. These recommendations account for attributes that are identified by a machine learning model to fit with the preferences and overall market performance in the area. The application can also provide a heatmap of different areas green/blue being recommended and red being not recommended for the individual's preferences. Functionality can also be extended to an area or postcode, so you can get the average price of different areas and potentially an extended machine learning section of the app which can predict how much a house will sell for in a few years in the current market based on the change in house prices and cost of living.

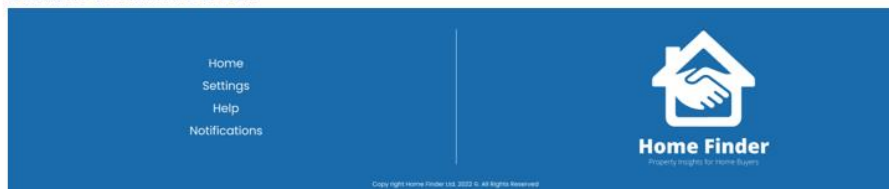
## Top of Home Screen



## Middle of Home Screen



## Bottom of Home Screen



## Targeted users

Those with the intention of participating in the property market or those interested in following its trends. This may include but is not limited to:

- First home buyers – who may be unsure of how to decide on a home and what to look for.
- Individuals moving house – who may want more insight into a particular area or want the benefits of analysing recommendations based on their preferences.
- Investors – who may want to analyse market trends or recommendations for the target demographic of renters they are interested in buying a property for.

## Field or background research

Upon performing a basic background research, our team found the following companies/websites providing services in the same market. Some of these are listed below:

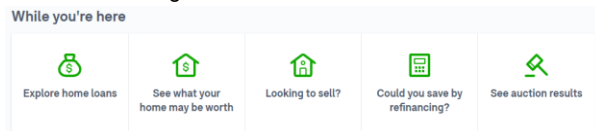
### Example 1 – Domain.com.au:

- Advantages
  - Popularity
  - Abundance of Australian Data
  - Firsthand data sources
  - Large amount resources
  - Established infrastructure
  - Relied on by other property businesses for API data

#### API Packages

Here you will find multiple **API Packages** along with guides and references to the endpoints included in the packages. Each API package provides access to a distinct set of resources. Browse through the API packages and add them to your [projects](#).

- Disadvantages
  - No recommendation system
  - Large amount of resources makes it hard to pivot quickly
  - No machine learning basis



### Example 2 – Realestate.com.au:

- Advantages
  - Market leader
  - Australian Based
  - Access to live auctions and results
  - Large data pool
  - Mainstream access portal
  - Large User base
  - Price prediction models

## Explore all things property

Buying

Renting

Selling

Researching



### Explore suburb profiles

Check out different suburb profiles and find one that's right for you.

[Research suburbs](#)



### Need help with a mortgage?

Compare your finance options to make an informed call.

[Explore home loans](#)



### Get estimated property prices

See how much a property's worth, whether you own it or want to buy it.

[Check property values](#)

- Disadvantages
  - No recommendations
  - Large number of resources makes it hard to pivot quickly
  - Focus on price prediction rather than learning users



realestate.com.au

Buy

Rent

Sold

New homes

Find agents

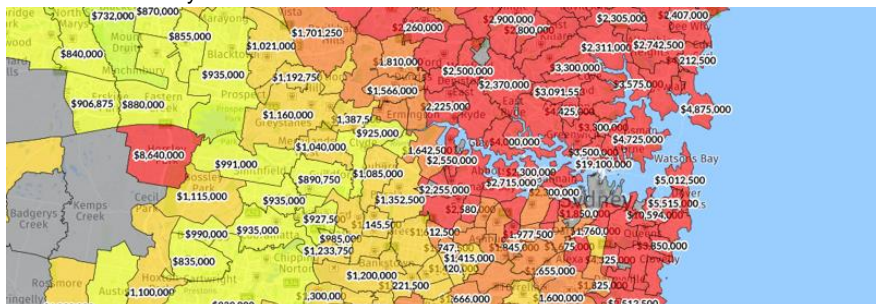
Home loans

News

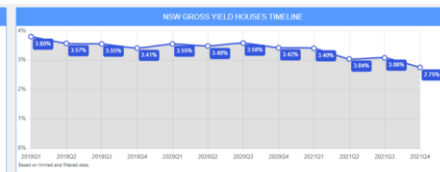
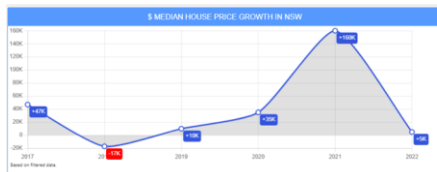
Commercial

## Example 3 – Heatmaps.com.au

- Advantages
  - In-depth data
  - Many data sources
  - Very visual

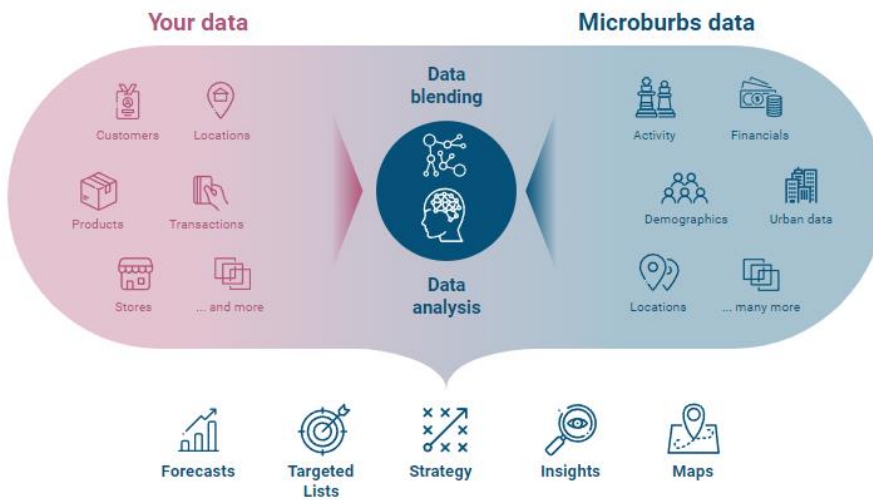


- Disadvantages
  - No recommendations
  - Not property specific / has other ventures
  - Cluttered UI
  - Not found by general property buyers

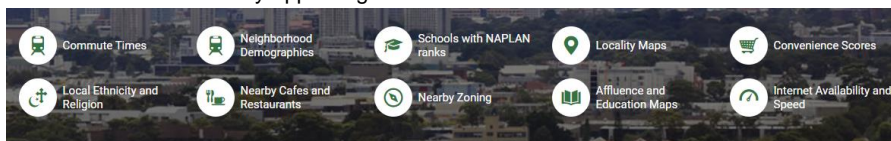


#### Example 4 – Microburbs.com.au

- Advantages
  - Popularity
  - Australian market
  - In-depth data

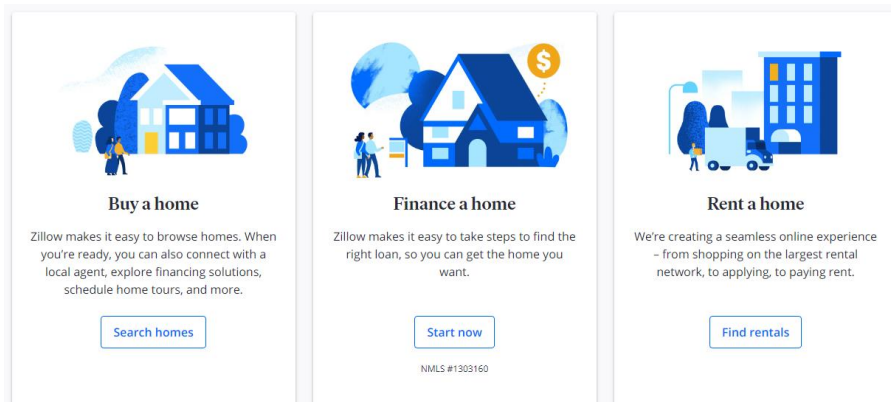


- Disadvantages
  - No recommendations
  - Focuses on suburbs only
  - Not visually appealing



#### Example 5 – Zillow.com

- Advantages
  - Popularity
  - Funding
  - Allows immediate exposure of a property
  - Visibility to home prices



- Disadvantages
  - No recommendations
  - US Market
  - Unrealistic evaluations
  - Agents pay for exposure

Buy Rent Sell Home Loans Agent finder



## Functionality composition

Function / Task	Priority	Difficulty	Complexity	Member(s)	Testing	Definition of Done	Resources
Recommending Suburbs	1	4	4	Everyone	<p>Everyone (Unit and Integration tests and run this through CI/CD pipeline)</p> <p>E2E testing – whoever writes the functionality.</p>	<p>The product must have a functioning Machine Learning component.</p> <p>The product must have a functioning database for storing the results produced by the machine learning algorithm.</p> <p>The product must have an algorithm which determines the most viable properties for the user based on user attributes, inputs and definitions.</p>	<p>DomainAPI - <a href="https://developer.domain.com.au/">https://developer.domain.com.au/</a></p> <p>Google Distances - <a href="https://developers.google.com/maps/documentation/distance-matrix/overview">https://developers.google.com/maps/documentation/distance-matrix/overview</a></p>



HeatMap	2	3	4	Everyone	Unit, System and Acceptance Testing for API calls and algorithm data manipulation.	<p>The heatmap must highlight each suburb in the Greater Sydney area based on the recommended attributes for the user.</p> <p>Heatmap colour coding must be based off the recommendation of real estate in the Greater Sydney area.</p>	Heatmap Library - <a href="https://www.patrick-wied.at/static/heatmapjs/">https://www.patrick-wied.at/static/heatmapjs/</a>
Connecting the recommendation to the FE (backend task)	1	3	3	MJ	Azure Test Connection Automation. Send a ping and a version request to the Azure SQL Database and determine if a connection exists based on the response	<p>The frontend webpage is able to collect all assets and load the pages specified correctly. Data verification checks are met.</p>	<p>React.js - <a href="https://www.freecodecamp.org/news/how-to-consume-rest-apis-in-react/">https://www.freecodecamp.org/news/how-to-consume-rest-apis-in-react/</a></p> <p>Express.js - <a href="https://expressjs.com/en/4x/api.html">https://expressjs.com/en/4x/api.html</a></p>
Dashboard	2	2	2	HM, AG, JT	User Acceptance Testing and approval of select criteria	The product must have an interactive dashboard which allows users to input their preferences and then provides recommendations clearly displayed to them.	<p>Mock Up Dashboard:</p> <p><a href="https://xd.adobe.com/view/38d792f6-eab1-4ec9-8a08-ddcbf03df6e5-6d84/?fullscreen&amp;hints=off">https://xd.adobe.com/view/38d792f6-eab1-4ec9-8a08-ddcbf03df6e5-6d84/?fullscreen&amp;hints=off</a></p>
Selection Criteria for Recommendations	2	2	1	Everyone	<p>Must produce recommendations within selection criteria range.</p> <p>Should display the recommendations to the end user in a reasonable amount of time</p>	On submit, suburbs produced are only within area defined by selection criteria.	<p>DomainAPI - <a href="https://developer.domain.com.au/">https://developer.domain.com.au/</a></p> <p>Google Distances - <a href="https://developers.google.com/maps/documentation/distance-matrix/overview">https://developers.google.com/maps/documentation/distance-matrix/overview</a></p>

## Acceptance testing for product

(A)

We will be implementing multiple stages of testing to ensure that all developmental tasks which have been completed adhere to the requirements elicitation.

First set of tests will be completed by the developers of that task. As each developer completes a task, they will be required to tick of a set of test cases to ensure it passes. This will be considered a basic unit testing. Once all passed, the set of tasks will be directed to the User Acceptance Tester and System Tester to complete a wholistic test of these tasks amongst the rest of the system.

Testing as a whole will be facilitated through the use of User Acceptance Testing, Operational Acceptance Testing and generic Unit Testing at High Level checking whether they are functional when integrated with all other attributes. Once these tests have been completed and passed, the task will be considered as done and functional.

### Definition of done for product as well as single function

(1)

- The product must have a functioning Machine Learning component.
- The product must have a functioning database for storing the results produced by the machine learning algorithm.
- The product must have an algorithm which determines the most viable properties for the user based on user attributes, inputs and definitions.
- The product must have an interactive dashboard which allows users to input their preferences and then provides recommendations clearly displayed to them.

### User Story and User Story Map

*(List user stories and a user story map based on the functions above)*

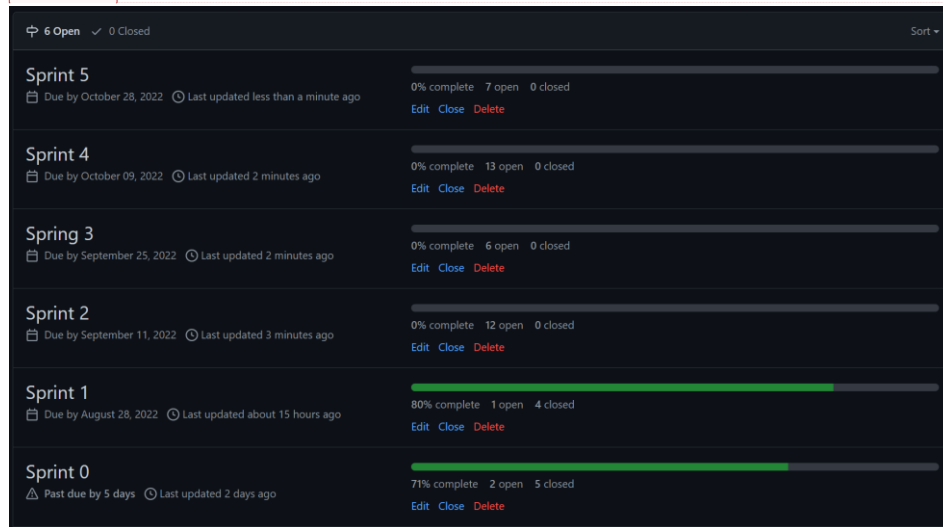
- As a user, I want to visually see the areas which have the best viable home, so that I can purchase a property best reflective of my wants and needs.
- As a user, I want to read a price prediction of properties in a certain area, so I can be more informed of which areas are most likely to have a faster or slower growth in price.
- As a user, I want an intuitive website that is readable and easy to navigate.
- As a user, I want to be able to input frequently visited locations, so that get recommendations of suburbs which are best catered to my requirements.
- As a user, I want to see the distance to the nearest public sites such as shopping centres, train stations, school etc., so that I can decide which property suits my needs

### Project scale and sprint planning

<b>Sprint period, milestone(s), and deliverable</b>	Sprint 1: 19/08 - 28/08 <i>Milestone:</i> <i>Deliverable: Web System Frameworks and Azure Database Functional</i>
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	<p>Sprint 2: 29/08 - 11/09 <i>Milestone: Integration and Deployment Pipelines, Graphics and Data scrape for ML</i> <i>Deliverable: Database Integration with Backend and Frontend. Database populated with scraping information. Frontend framework completed.</i></p> <p>Sprint 3: 12/09 - 25/09 <i>Milestone: Dimensional data network.</i> <i>Deliverable: ML Data Clustering and Frontend pages, refactored.</i></p> <p>Sprint 4: 26/09 - 09/10 <i>Milestone: Display heatmap and listings. Neighbouring Algorithm</i> <i>Deliverable: Cluster listing associated with preferences</i></p> <p>Sprint 5: 10/10 - 28/10 <i>Milestone: Preference Input with Correct data. ML Batch processing.</i> <i>Deliverable: Full stack integration. Frontend, Backend and Database linking.</i></p>
<b>Weekly meeting time (extra meeting is highly welcome)</b>	<p>In weekly workshop, Friday 6 pm</p> <p>And</p> <p>Every Sunday 10 am</p>

## Timeline



**Commented [YW1]:** Please list the task and weekly schedule clearly.  
Please use the spreadsheet to arrange the timeline as well as assign the tasks.

## Sprint 0:

2 Open 5 Closed		Author	Label	Projects	Milestones	Assignee	Sort
<input checked="" type="checkbox"/>	Complete Team Charter	documentation	High Priority	#7 opened 5 days ago by 1crowie1	🔄 Sprint 0		
<input checked="" type="checkbox"/>	Add mockup to README.md	documentation	Low Priority	#6 by 1crowie1 was merged 2 days ago	🔄 Sprint 0		
<input checked="" type="checkbox"/>	Project requirements	documentation		#5 by treevesy was merged 7 days ago	🔄 Sprint 0	🕒 1	
<input checked="" type="checkbox"/>	Weekly journal template	documentation		#4 by treevesy was merged 7 days ago • Changes requested	🔄 Sprint 0		🗨 2
<input checked="" type="checkbox"/>	Documentation template	documentation		#3 by treevesy was merged 12 days ago • Approved	🔄 Sprint 0		🗨 1
<input checked="" type="checkbox"/>	Document Requirements	documentation	Medium Priority	#2 opened 12 days ago by 1crowie1	🔄 Sprint 0		
<input checked="" type="checkbox"/>	Document Technology Stack	devOps	documentation	High Priority	#1 by 1crowie1 was closed 5 days ago	🔄 Sprint 0	🗨 1

Sprint 1:

<input type="checkbox"/> 3 Open <input checked="" type="checkbox"/> 4 Closed		Author ▾	Label ▾	Projects ▾	Milestones ▾	Assignee ▾	Sort ▾
<input type="checkbox"/>	Start Azure SQL Database	Backend	devOps	High Priority			
#14 opened 14 seconds ago by 1crowie1 ↻ Sprint 1							
<input type="checkbox"/>	Create ERD	Backend	documentation	High Priority			
#13 opened 1 minute ago by 1crowie1 ↻ Sprint 1							
<input type="checkbox"/>	Created Initial Suburb Level Attributes Dataframe	Backend	feature	High Priority			
#12 opened 15 hours ago by 1crowie1 • Approved ↻ Sprint 1							
<input type="checkbox"/>	Mockup Documentation and Algorithm Design document		documentation	Medium Priority			
#11 by 1crowie1 was merged 15 hours ago ↻ Sprint 1							
<input type="checkbox"/>	test pr		documentation				
#10 by 1crowie1 was merged 2 days ago • Approved ↻ Sprint 1							
<input type="checkbox"/>	main and model created with logging template	Backend		Medium Priority			1
#9 by 1crowie1 was merged 2 days ago • Approved ↻ Sprint 1							
<input type="checkbox"/>	Basic Front-end setup	Frontend		High Priority			2
#8 by himanshumehta-6 was merged 2 days ago • Approved ↻ Sprint 1							

Sprint 2:

<input type="checkbox"/> 4 Open <input checked="" type="checkbox"/> 0 Closed		Author ▾	Label ▾	Projects ▾	Milestones ▾	Assignee ▾	Sort ▾
<input type="checkbox"/>	Scrape Data For ML	Backend	feature	Medium Priority			
#19 opened 27 seconds ago by 1crowie1 ↻ Sprint 2							
<input type="checkbox"/>	Create Graphics		documentation	Frontend	Low Priority		
#18 opened 1 minute ago by 1crowie1 ↻ Sprint 2							
<input type="checkbox"/>	Setup Continuous Deployment Pipeline	Backend	devOps	Frontend	High Priority		
#16 opened 3 minutes ago by 1crowie1 ↻ Sprint 2							
<input type="checkbox"/>	Setup Continuous Integration Pipeline	Backend	devOps	High Priority			
#15 opened 4 minutes ago by 1crowie1 ↻ Sprint 2							

Sprint 3:

<input type="checkbox"/> 4 Open <input checked="" type="checkbox"/> 0 Closed		Author ▾	Label ▾	Projects ▾	Milestones ▾	Assignee ▾	Sort ▾
<input type="checkbox"/>	Finalise Dimensional Dataframe	Backend	feature	Medium Priority			
#23 opened 10 seconds ago by 1crowie1 ↻ Sprint 3							
<input type="checkbox"/>	Maintain CI/CD	Backend	devOps	documentation	Frontend	Low Priority	
#22 opened 10 minutes ago by 1crowie1 ↻ Sprint 3							
<input type="checkbox"/>	Initial Clustering for ML	Backend		High Priority			
#21 opened 12 minutes ago by 1crowie1 ↻ Sprint 3							
<input type="checkbox"/>	Create Graphing Templates	Frontend		Medium Priority			
#20 opened 14 minutes ago by 1crowie1 ↻ Sprint 3							

Sprint 4:

5 Open	0 Closed	Author	Label	Projects	Milestones	Assignee	Sort
Display Heatmap	Backend	Frontend	Low Priority				
#28	opened 13 seconds ago by 1crowie1						
Display Listings	Frontend	Medium Priority					
#27	opened 1 minute ago by 1crowie1						
Nearest Neighbour Algorithm for Output Listings	Backend	High Priority					
#26	opened 2 minutes ago by 1crowie1						
Initial Fitting Algorithm for Recommendations	Backend	High Priority					
#25	opened 3 minutes ago by 1crowie1						
Produce Listing Attribute Clusters	Backend	High Priority					
#24	opened 3 minutes ago by 1crowie1						

### Sprint 5:

5 Open	0 Closed	Author	Label	Projects	Milestones	Assignee	Sort
Full Stack Integration	Backend	Frontend	High Priority				
#33	opened 1 minute ago by 1crowie1						
Full Stack CI/CD Check	Backend	feature	Frontend				
#32	opened 3 minutes ago by 1crowie1						
Docker ML Daily Batch Processes Setup	Backend	devOps	feature	High Priority			
#31	opened 4 minutes ago by 1crowie1						
Finalised Frontend Display	feature	Frontend	High Priority				
#30	opened 4 minutes ago by 1crowie1						
Input for Preferences	Backend	Frontend	High Priority				
#29	opened 5 minutes ago by 1crowie1						

## Team operations

- **Frequency of meeting:** Meetings will be conducted twice a week, one during the workshop on Friday between 6-7pm and another on Sunday between 10-11am via Teams.
- **Trello/Git policy:** Discord, Messenger and Teams chat is the primary mode of communication. The code for the project will be on GitHub. Project planning and ticketing systems will also be on GitHub.
- **Meeting Preparation:** Prior discussions of meeting agenda.
- **Progress report:** During weekly catchups, each team member must discuss their tasks, what has been completed and what is still outstanding. This needs to reflect GitHub Project Timeline status.
- **Attendance of meeting:** All members are expected to attend stand up meetings. There will be smaller meeting with the relevant team members depending on the task that is being worked on. A voting system will take place aid in decision making.
- **Team's decision-making processes:** All members are expected to contribute and input their ideas.

## RISK CONTROL

List the potential risks and mitigations/solutions during the project (see an example below)

Risk summary	Risk detail	Impact	Probability	Mitigation
Team member is overworked	Due to the busy schedules of the team, a member might be overloaded with work for one sprint.	The system might be delivered late if tasks are of a high priority and might deliver a low-quality product.	4	The team communicates their workload at weekly team meetings, and voices when they need assistances
Time constraints / large	Due to the enormity of the proposed and busy schedules of team members there may not be enough time to complete the task	The system may not be delivered at all or a low- quality product may be delivered	3	The team needs to have a deadline for when each task is meant to be complete. The team members also need to check in on one another to ensure deadlines are met
Project is beyond the capabilities of the students	The students may not have the skills, resources or knowledge available in order to compete the required tasks.	Students will feel overwhelmed with the lack of support. They may give up on the project	3	Students need to ensure they have chosen a project that is do-able and within their capabilities yet challenging.
Project is too easy for team members	Students may not feel motivated to complete the task since it is not challenging or interesting to them	Students may complete the project rashly	2	The team needs to choose a project that is not too easy for the team members. The project needs to be interesting and challenging to keep them engaged
Lack of organisation	Due to lack of foundation and organisation, there may not be	Students may use their time improperly ending in unfinished work or poorly completed work.	2	The team will need to establish a foundation to follow. This will provide stability and consistent progress throughout the subject.
API Limit Exceeded	If the team during the development process exceeded the maximum amount of API requests for either the Google Maps API or Domain real-estate data then a large charge could be the result.	A bill of potentially hundreds of dollars which the team would have to finance.	2	Ensure that the software checks and mitigates API requests. Remove API request functionality from any automated testing pipelines. Have safeguards and limits on the accounts for the API keys.
User Data Leaked	User inputs would be saved in the system for comparison and	Users have personal information released to the	2	Ensure all data is encrypted in transmission and storage as well as ensuring 2FA on any ways of logging

	trend analysis. There is a risk that the sensitive data such as location and preferences can get leaked.	public which the application is responsible for. This can leave them vulnerable to hackers or identity theft.		into the backend aspects of the project which may contain sensitive user data.
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## Other notes

### Signature of team members:

Name: <u>Anesu Chakaingesu</u>	Signature: <u>AC</u>
Name: <u>Jacob Taylor</u>	Signature: <u>JT</u>
Name: <u>Harrison Crowe-Maxwell</u>	Signature: <u>HCM</u>
Name: <u>Maria Jamal</u>	Signature: <u>MJ</u>
Name: <u>Himanshu Mehta</u>	Signature: <u>HM</u>
Name: <u>Amana Ramzeen</u>	Signature: <u>AR</u>
Name: <u>Mitchell Treeves</u>	Signature: <u>MT</u>
Name: <u>Ahmed Khursheed</u>	Signature: <u>AK</u>