Project Delivery Report Part B

Information System Development Methodologies 31257

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Distribution

Refer to Assignment Log

Empathy Maps and Journey

The stakeholders chosen for the empathy map and journey map are: housing applicants, government officials, and AI developers. The housing applicants are individuals seeking access to government-allocated residences and are in direct impact by the fairness and efficiency of the application process. These individuals may face financial, social, or medical hardships. Government Officials are a body of individuals that oversee the residence application system. They receive recommendations based on the AI systems decision making process and ensure that decisions are lawful, transparent and equitable, while also managing appeals when applicants challenge outcomes. The AI developers are tasked with designing, building and maintaining the automated assessment system by balancing technical performance with ethical considerations. These groups play a critical role in the success and integrity of the housing allocation process.

Below are the Empathy Maps and Journey Maps of the three stakeholders.

Empathy Map 1

Designed for: Social Housing Applicants

Designed by: Samuel, Timothy, Aaron

Date: 15/04/2025

Version: 1

1 WHO are we empathizing with?

GOAL

- Individuals or families applying for social or government-subsidized housing in the Netherlands.
- This may include low-income earners, young adults, elderly citizens, students, single parents and vulnerable groups seeking stable and affordable accommodation.
- They could be in urgent need of secure housing but need to navigate through a complex and competitive application process. May have limited resources and unfamiliarity with digital tools, facing long wait times and or unclear eligibility requirements. Their current living situation may be unstable, adding emotional pressures.
- They are housing applicants – end users of the system and primary beneficiaries of the new system. They submit accurate applications, meet eligibility, choose suitable residences, appeal decisions when necessary. They rely on the system's ability to provide fair, transparent and timely assessments of available homes.

2 What do they need to DO?

What do they need to do differently?
What job(s) do they want or need to get dor
What decision(s) do they need to make?
How will we know they were successful?

- Complete application process digitally instead of traditional in-person paper based
- Apply so that they are allocated a suitable housing for specific needs
- Applicants must trust AI decisions to ensure they are eligible for housing
- Applicants should receive confirmation of application submission and know the outcome of application

7 What do they THINK and FEEL?

PAINS
What are their fears, frustrations, and anxieties?

- Anxiety over eligibility and overarching fear of rejection.
- Frustration waiting times with unclear reasons to approval rates, contributing to distrust in the system, theorizing possible biases.
- Stress of instability where housing insecurity pressures wellbeing, family and finances.
- Overwhelmed with process difficulty and technical awareness.
- Fear of being overlooked, AI decisions won't understand their situation and only conduct automated actions.

GAINS
What are their wants, needs, hopes and dreams?

- Their primary need is to stable, secure and affordable home, wanting equal opportunity regardless of background.
- Hoping for clarity and transparency to understand how and why decisions are made.
- Speed and efficiency within the system.
- Empathy and understanding, feeling of being acknowledges as a person
- Control and confidence in knowing what happens throughout the process.
- Hoping for a better future, stability for their family, work and wellbeing.

What other thoughts and feelings might motivate their behavior?

3 What do th

What do they see
What do they see
What do they see
What are they watching and reading?

- Difficulties in securing rental housing in desired locations
- Long waitlists for applications and lack of transparency of application status and eligibility
- Applicants see frustrated peers and families in similar situations which leads to complaints
- Limited housing availability
- Information is shared on social media, online forums and government websites

6 What do they HEAR?

What are they hearing others say?
What are they hearing from friends?
What are they hearing from colleague
What are they hearing second hand?

- Others complain about long wait times, confusing eligibility criteria, negative AI opinions (rejection and lack of empathy), lack of direct feedback and reception.
- The system is nebulous, superstition like applying to less popular areas to acquire a successful allocation, the AI system works for some people, issues with contacting offices, advice to ensuring application success.
- Recommendations from colleagues to constantly check the portal as there are no notifications, older applications get priority, uncertainty with the AI's possible performance, approval is dependent on area.
- Possible rumors such as: government using AI to cut corners, system discrimination, lack of attention due to system automation, the system can be exploited to get a successful allocation, knowing that there is misinformation around the system.

What do they SAY?

What have we heard them say?
What can we imagine them saying?

- Complaining about long wait times, process confusion, unknown reasons for rejection, why others are getting their allocations despite longer wait time, lack of direct feedback or attention to their needs.
- Hoping the AI-system is fair, knowing if there is a queue line and processing is fair, voicing that the AI system doesn't discredit their housing importance, wanting to receive feedback to improve their chances and if they're conducting the process correctly

5 What do they DO?

What do they do today?
What behavior have we observed?
What can we imagine them doing?

- Register on the housing platform, filling out application forms, entering personal and household information.
- Browse available residences, comparing locations, availability and eligibility criteria.
- Submit one or more applications (in hopes to getting a successful outcome)
- Frequently checking system for updates
- Communicate with officials, submitting queries, submitting appeals for unwanted outcomes
- Appealing decisions for both current and future integrated application outcomes.

- Gather and find supporting documents and manually verifying their eligibility for certain considerations
- Contacting support via phone, email or in-person if they encounter any issues
- Asking for help or assistance from family members, friends or social workers to understand the process
- Manage expectations, balancing hope with concern about delays or rejections.

Empathy Map 2

Designed for: Netherlands Government Officials

Designed by: Samuel, Timothy, Aaron

Date: 16/4/25

Version:1

- Government officers are local public servants responsible for overseeing, reviewing and managing applications and appeals, ensuring fairness and integrity of the social housing process.
- Are overwhelmed by number of applications, which affect residents
- They allocate residents based on criteria met and specific requirements applicants need

WHO are we empathizing with?

Who is the person we want to understand?
What is the situation they are in?
What is their role in the situation?

GOAL

2 What do they need to DO?

What do they need to do differently?
What job(s) do they want or need to get done?
What decision(s) do they need to make?
How will we know they were successful?

- Make decisions based on recommendations from AI system
- Officers need to assess decisions based on AI system and allocate residents housing based on eligibility criteria
- Provide outcome for applications and provide reasonings for denied applications
- Provide feedback for AI accuracy and efficiency
- Address applicant appeals for AI decisions.

7 What do they THINK and FEEL?

PAINS
What are their fears, frustrations, and anxieties?

- Fear AI system can produce false reports which causes blame or backlash
- Frustration with possible system confusion or complexity
- Overload of appeals from denied applications that require their reasoning and second opinion
- Anxiety over losing control or understanding of decisions when the new system is implemented.
- Ethical concerns and public trust.

GAINS
What are their wants, needs, hopes and dreams?

- Easy and streamline process of identifying suitable and non-suitable applicants
- Relief stress from officers
- Allocated applicants are in housing that suits their requirements
- New system will aid in work efficiency and garner positive public reputation
- Tools are easily usable, explainable and manageable.

What other thoughts and feelings might motivate their behavior?

- A sense of responsibility as a public servant
- Desire to be seen as competent and fair

3 What do they SEE?

What do they see in the marketplace?
What do they see in their immediate environment?
What do they see others saying and doing?
What are they watching and reading?

- Sees a growing adoption of AI in government services and increased demand for digital transformation and data transparency
- Sees an increase in workload for rental applications and demand for rental housing, colleagues juggling case reviews and public inquiries
- Seeing some mixed views on the new system, concerns about AI bias and technical failures.
- Officers see pressure from management and public expectation
- Officers read social media and government news

6 What do they HEAR?

What are they hearing others say?
What are they hearing from friends?
What are they hearing from colleagues?
What are they hearing second-hand?

- Dissatisfaction towards current state of rental housing distribution
- Mixed thoughts on the introduction of AI systems to determine eligibility criteria from others
- Good direction of government in streamlining housing applications in a housing crisis from colleagues
- Concerns from others regarding selection and biases within the AI system
- They hear that their jobs will be easier with some automation from friends.
- Public sentiment from news and social media about unfair or slow allocations and complaints passed down from leadership

- Officers are unhappy with how governments methodologies
- Officers share bad experiences with peers, friends and family which causes bad reputation of government
- Talks about job satisfaction between peers and family, considering changing roles

5 What do they DO?

What do they do today?
What behavior have we observed?
What can we imagine them doing?

- Currently application process is done manually taking significant time for each application and their respective appeals
- They feel that the applications are never ending and want to make sure each applicant has a fair share, relying on experience and policy rules.
- They are cautious of new tools and are concerned for accountability and compliance
- They are unable to efficiently assess and allocate rental housing due to the demand of applications and long application process
- Officers may mistakenly deny or approve applications due to stress and work overload

- We can imagine them learning and adapting to the use of an AI system, monitoring the AI decisions for patterns and providing feedback to improve the system

Empathy Map 3

Designed for: AI System Developers *Designed by:* Samuel, Timothy, Aaron *Date:* 16/04/25 *Version:*1

GOAL

- Tasked with building transparent and efficient system for assessing residence applications
- Automate a decision-making process that impacts residents access to housing
- What machine learning model can be the most transparent to different users and how to audit the system for biases and performance degradation, maintaining ethical and regulatory AI principles alongside performance metrics
- Quick and efficient application process with low rate of successful appeals
- Support appeal mechanisms and human override capability
- To know they were successful, the system processes applications accurately and fairly, stakeholder feedback, appeal frequency and management.

1 WHO are we empathizing with?

Who is the person we want to understand?
What is the situation they are in?
What is their role in the situation?

- AI system developers responsible for creating software to assess residence applications
- Working in a public sector setting that requires balancing of technical feasibility, ethical concerns, and human consequences
- They are developing a government-critical system under strict time, accuracy and policy constraints
- Are in collaboration with public officers, and must balance technical challenges with ethical, social and regulatory considerations.
- Designing, building, training, testing, and maintaining AI system, while ensuring integration with external databases and government services

2 What do they need to DO

What do they need to do differently?
What job(s) do they want or need to get
What decision(s) do they need to make?
How will we know they were successful

7 What do they THINK and FEEL?

PAINS
What are their fears, frustrations, and anxieties?

- Creating a system that biases, discriminates and excludes certain characteristics of people
- Causing high error rates
- Ethical dilemmas of automating sensitive decisions
- Concern with stakeholder not understanding AI limitations
- Unsubstantial improvements in efficiency and customer satisfaction

GAINS
What are their wants, needs, hopes and dreams?

- Gain publicity for their successful project
- Increase in trust of AI models
- Gain more opportunities for future projects
- The model is impactful and socially beneficial
- AI solutions can be more abundant in other problems
- Needs support from policy and legal teams to ensure alignment

What other thoughts and feelings might motivate their behavior?

- A sense of pride and responsibility for serving real people and providing support in their lives

3 What do they SEE?

What do they see in the marketplace?
What do they see in their immediate environment?
What do they see others saying and doing?
What are they watching and reading?

- AI allows for easy automation of manual tasks however, algorithmic transparency in government systems is crucial
- Technology infrastructure in the public sector has challenges
- Rising demands for ethical and explainable AI, concerns about bias and algorithmic discrimination
- Tech blogs, government guidelines, and AI ethics papers on bias detection in AI systems

4 What do they SAY?

What have we heard them say?
What can we imagine them saying?

- How can all the applicants have a fair assessment when creating an AI system?
- Can this system be misused or intercepted which would affect all users
- Ethical implications of creating a government AI system for rental allocation that can affect millions
- AI models are necessary for repetitive tasks due to its efficiency and accuracy it provides
- The policy behind the AI model is imperative to the system's reputation and success

5 What do they DO?

What do they do today?
What behavior have we observed?
What can we imagine them doing?

- Train and validate AI models
- Analyse database to integrate with AI model
- Tweak model to meet performance and benchmarks
- Stress test system against adversarial attacks
- Adjust parameters to reduce systemic bias and other known edge cases

6 What do they HEAR?

What are they hearing others say?
What are they hearing from friends?
What are they hearing from colleagues?
What are they hearing second-hand?

- The system should not incur any AI bias
- Good initiative from the government to reduce time and speed efficiency for a known issue
- Due to working in a public sector, issues from this project will generate immense negative perceptions of them
- There have been case studies of multiple projects involving AI systems for categorisation to be complete failures

Last updated on 16 July 2017. Download a copy of this canvas at http://gamestorming.com/empathy-map/

NN/g JOURNEY MAP 1

PERSONA

Netherlands Social Housing Applicants

SCENARIO

Applying for social housing that fits their requirements

USER EXPECTATIONS

User expects seamless integrated experience in the application process to be allocated to their desired social housing

	PHASE 1	PHASE 2	PHASE 3	PHASE 4
	Registration	Application for Residence	Automated Eligibility Assessment	Result and Appeal
DOING	- Submit personal details and creating an applicant profile	- Selecting appropriate social housing based on their requirements	- Constantly checking application and waiting for the outcome - View criteria	- Receive and reviewing outcome - Accepting outcome - Appealing outcome
THINKING	- Does my situation align with their requirements which would allow me to have a social housing allocation - Unclear of eligibility requirements and if suitable for rental housing	- Uncertain about outcome of application - Want to be accepted to their desired housing	- Anxious about outcome of application - Begin to think of next stages based on outcome	- Excited about allocation and when can they move in - Why was the application rejected and what are the options
SAYING	- Want a social housing allocation to be successful and their needs are met	- Hope the process does not take long - Hope their situation aligns with the requirements of their selected social housing	- Uncertain if social housing will be accepted - What other resources can aid me if this is unsuccessful	- Happy about the outcome and thankful - Appeal process or applying for different residencies

INSIGHTS

- Those that are successful with the application will be satisfied by the allocation process whilst those that unsuccessful tend to be disgruntled and unhappy with the outcome
- Setting expectations of likelihood of success and presenting transparent evaluation methods for applicants will minimize dissatisfaction with the system

INTERNAL OWNERSHIP

- Application success rate should exceed 50%
- Allocation process time should decrease by 200%
- Application appeal rate should decrease by threefold

NN/g JOURNEY MAP 2

PERSONA

Netherlands Government Officials

SCENARIO

Reviewing and managing applications and appeals, ensuring fairness and integrity of the social housing process Applicants

USER EXPECTATIONS

Netherlands Social Housing Applicants

	PHASE 1	PHASE 2	PHASE 3	PHASE 4
	Review Application	Provide Outcome	Review Appealed Applications	Provide extra support
DOING	- Sort through applications - Review against eligibility criteria provided by system - Understanding applicant's situation	- Reviewing system results - Determining whether system evaluation is correct - Choosing successful applicants	- Sort through appealed applications - Reevaluate application against successful application - Cross evaluate with colleagues outcome - Provide further reasoning for denied applications	- Providing resources and other means of non-rental housing support - Advise on how to increase chances of success - Help them understand the system
THINKING	- Does this applicant meet the requirements - Has this applicant created similar requests before - Comparing with other applications, which one is more serious	- Is the chosen applicant the most suitable for this residence - Has the system corrected placed applicants as per the evaluation criteria - Will there be any changes to this decision	- Was this application denied with correct reasoning? - Was there bias in the decision making - Is there reasoning behind the appeal	- Will this denial affect the applicant significantly - Is providing support enough - Will providing support increase the applicants' chances of success
SAYING	- Theres too many applications and not enough available - This system has allowed for more eligible applicants to apply	- This system aids in evaluating applicants faster with ease - The applicant should be satisfied with their allocation - Those who are not successful should understand why	- There seems to be less appeals due to transparency in decision making - How can we still help the applicant in the event of unsuccessful housing allocation	- I hoped everyone was successful however there is not enough social housing - Everyone deserves a roof over their head

INSIGHTS

- Allows officers and applicants to understand the depth of government assistance regardless of approved or rejected applications
- Enables future development with automated AI systems
- AI systems have allowed resources to be reallocated to increase efficiency not just in the specified system

INTERNAL OWNERSHIP

- Government officials: Final outcome of applications and handles appeals

NN/g JOURNEY MAP 3

PERSONA

AI System Developer

SCENARIO

Building transparent and efficient system for assessing residence applications

USER EXPECTATIONS

Netherlands Social Housing Applicants

PHASE 1	PHASE 2	PHASE 3	PHASE 4
Understand Problem and Planning	Designing System	Building and Testing	Launch & Feedback
DOING - Understanding requirements and eligibility rules - Discuss with stakeholders on requirements of the project	- Drafting system architecture - Defining rules for AI model - Designing integration with external databases	- Creating code that checks eligibility from the government rules - Running test case and debugging scenarios - Simulating applications for accuracy and fairness	- Deploy model and monitoring performance - Iterating model based on feedback or policy changes - Reviewing results from inaccurate evaluation and feedback
THINKING - How is this project going to be designed? - How can this system be transparent - Is the budget and timeline proposed feasible	- Is the AI model unbiased? - Does the system architecture meet the governments requirements? - Is AI model a good approach? - Will the model be transparent and efficient with its decision making	- What happens if model doesn't perform as expected - How can outliers be controlled - How to secure system in the event of adversarial attacks - What can be implemented to ensure the model performs to its expectations with minimal downtime	- Will there be any criticism from the public from going live - Will this be scalable for future changes and regulations - Did our rigorous testing cover all current threat scenarios
SAYING - This system will be designed with the intent to be unbiased, transparent and efficient - Working in a public sector will be different to previous projects	- This architecture is designed to be user friendly - We understand this model will not be 100% accurate however methods will be used to improve its capability over time	- Our rigorous testing and debugging ensures accuracy and fairness of the model - This model is prepared for a variety of threat scenarios	- This partnership with the government was a success - We encourage all feedback from others - This project will be continuously maintained and monitored - With the project success, we hope future collaborations will be possible

INSIGHTS

- Opportunities for further developments in the government sector
- Projects typically will not lead to expected end results however being prepared and understanding common oversights will ensure smooth integration

INTERNAL OWNERSHIP

- Software development Team: produces sufficient system that meets performance and efficiency
- Quality Assurance Team: Testing functionally and ensuring standards meet government guidelines
- DevOps Team: streamline development and deployment team

Problem Definition with POVs

Using insights from stakeholder empathy and journey mapping, we receive insights that concisely define the key challenges and problems as Point of View (POV) statements. These statements help ensure our solutions remain human-centered, actionable and grounded in accordance with real user needs.

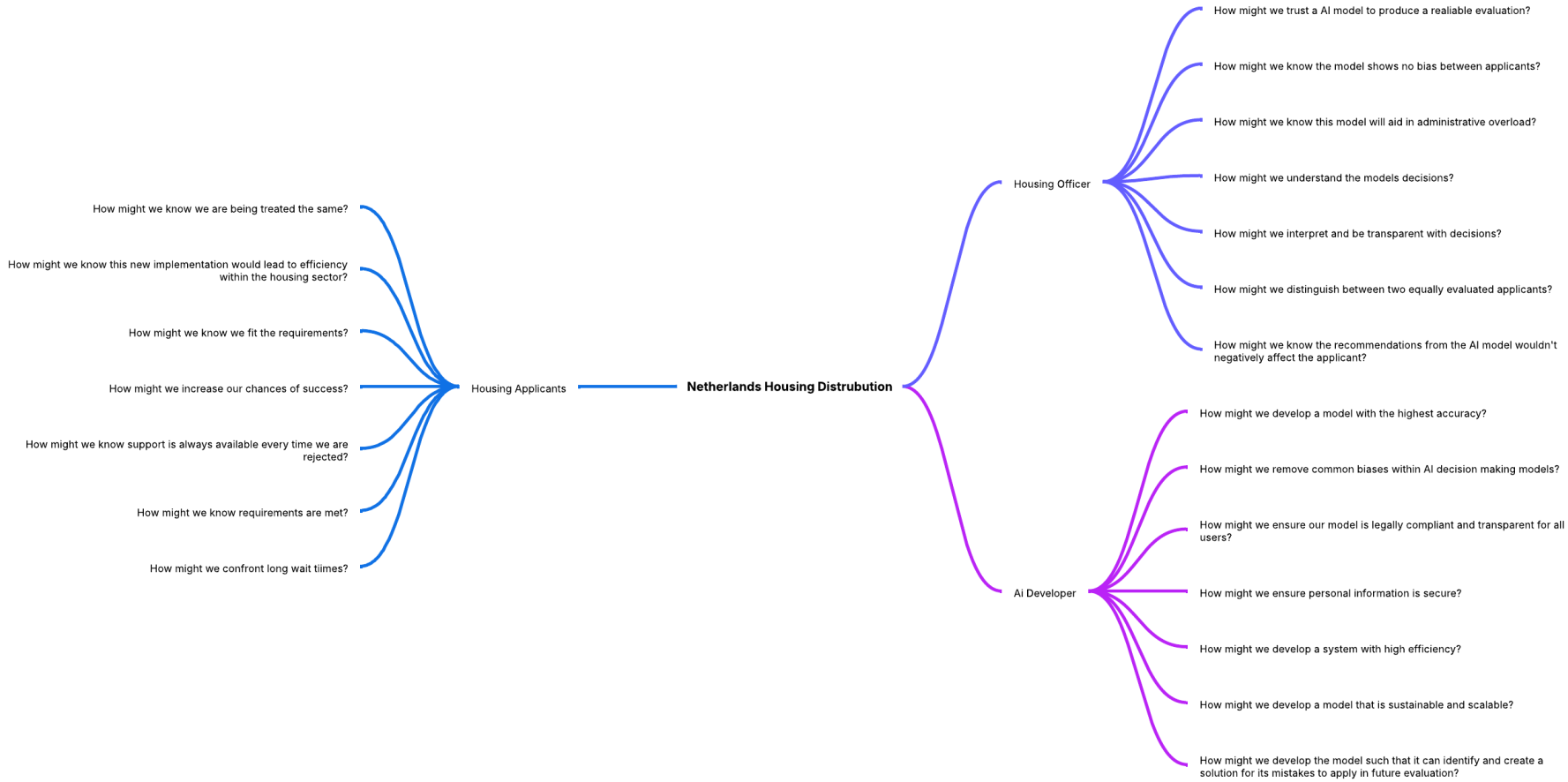
1. Housing Applicants require a clear, fair, responsive and efficient process due to their feeling of uncertainty and overwhelming when confronted with long wait times, confusing eligibility criteria and repetition of events after application rejections. POV Statement: *"As a housing applicant, I need a fair and fast process that helps me understand my eligibility and notified of my application status. This is because of my extenuating circumstances, stressful situations, and not knowing where I will be situated only adds additional stress and uncertainty to my life"*.

2. Housing Officer require a trustworthy, robust and transparent system because they are held accountable for fair allocation however also face administrative overload. POV Statement: "As *a housing officer, I need a system that I can easily learn to use, trust and easily audit, because I am responsible for ensuring fair decisions. Currently, I am spending too much time manually checking or responding to preventable appeals that could be avoided with better transparency throughout the process."*

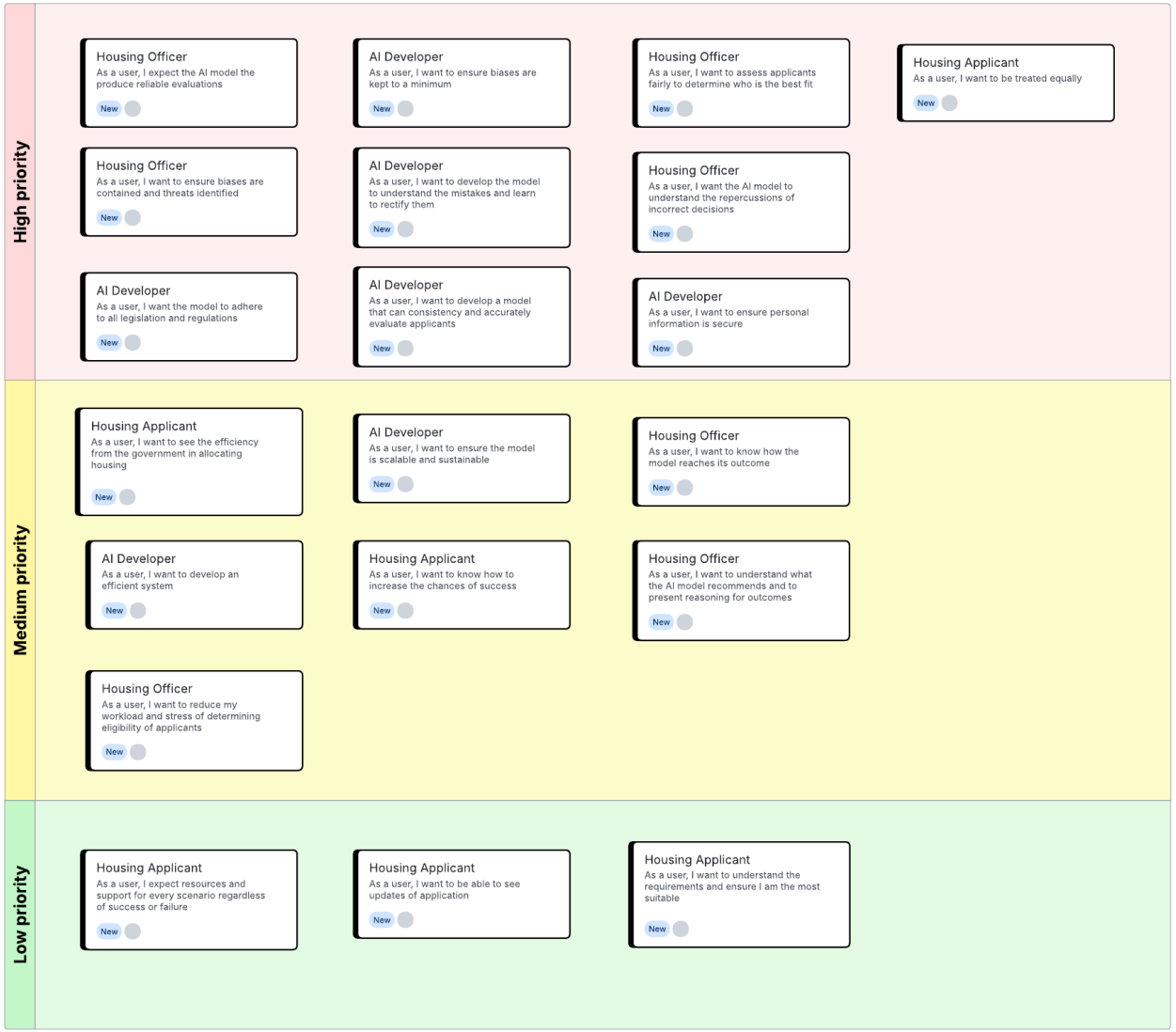
3. AI Developers require well-structured data and ethical clarity because they must deliver transparent, accurate and legally compliant solutions under high scrutiny. POV Statement: *"As a developer, I need access to reliable data and clearly defined ethical boundaries, because I am building a system that directly affects people's lives, and I can't be liable to risk unintended bias or decisions that no one can explain, defend or be held accountable later."*

Ideation and backlog

Based on the POVs, ‘How might we’ are created from the empathy and journey maps in the previous section.



From the Brainstorming of the POV ideations, a backlog is created and sorted based on priority



Prototype Design leading (to interface design)

The user stories are formulated from the journey and empathy maps presented in this document based on the distinctive user types, such as social housing applicants, the Netherlands government officials and AI system developers.

User Stories

Social Housing Applicants:

- As an applicant, I want to submit my application online smoothly so that I don't need to go through the manual process.
- As an applicant, I want to see my application status online so that I do not need to refer to government officers to follow up on my application.
- As an applicant, I want my application to be processed quickly so that I can secure one of the government residences of my choice due to my inability to afford housing.
- As an applicant, I want the government to avoid discrimination in the application process so that I can secure a house from the preferences I have provided in the application.
- As an applicant, I want to be provided with alternative housing options during rejection so that I can efficiently resolve my housing needs without relying on customer service.
- As an applicant, I want to preview how my eligibility compares to others anonymously (e.g., queue position or priority ranking) so that I understand my chances and feel reassured that the system treats everyone fairly.
- As an applicant, I want to save my in-progress application form online automatically so that if I encounter technical problems or interruptions, I can continue later without losing my information.
- As an applicant, I want to receive instant, clear confirmation once my application is successfully submitted through email or SMS so that I have proof of submission and feel confident it is being processed.
- As an applicant, I want the AI system to notify me if there are technical errors (e.g,, upload failures or missing documents) during the eligibility check so that I can fix issues promptly without facing automatic rejections.
- As an applicant, I want a short, plain-language guide at every application stage explaining what is happening and what to expect next so that I feel less overwhelmed by the digital process and AI automation.

Netherlands Government Officials:

- As a government housing official, I want the system to accurately assess applications upon submission so I am not overwhelmed with a large volume of manual reviews.
- As a government housing official, I want the AI system to enable full access to all application data so that I can make a fair decision on the application outcome.

- As a government housing official, I want to enter my input on the decision I have made into the AI system for the application outcome so that this can be sent to the applicant.
- As a government housing official, I want the ability to override all eligibility results generated by this AI-based system once I have made the final decision so that the applicants are not treated unfairly.
- As a government housing official, I want the system to flag applications that may require deeper human review (e.g., unusual appeal patterns or conflicting information) so that I can prioritise my manual workload more efficiently.
- As a government official, I want to access a detailed change log of applicant appeals and decisions made by the AI so that I can understand the applicant's entire history when reconsidering an appeal case.
- As a government housing official, I want the system to suggest standardised reasons for rejection that I can edit or customise so that my communication with applicants remains clear, consistent and fair.
- As a government housing official, I want to receive regular summary reports on system performance (e.g., appeal rates and decision overturns) so that I can monitor if the AI model is supporting fairness and adjust processes if required.
- As a government housing official, I want the system to prompt me with contextual guidance (e.g., relevant eligibility policies) during case reviews so that I can confidently align my decisions with updated government regulations.

AI System Developers:

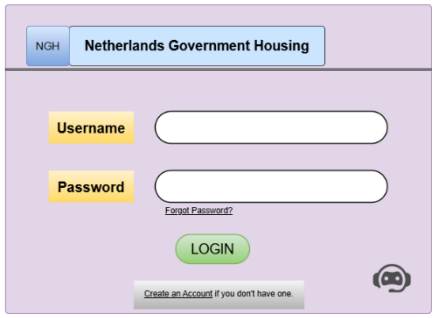
- As a system developer, I want the system to accurately assess applications based on predefined eligibility rules so that I can focus on improving other areas of development rather than constantly fixing system issues.
- As a system developer, I want the system to automate outcomes with alternative housing options if unsuccessful for the applicant after a certain period, ensuring the applicant is informed.
- As a system developer, I want the system to not perform any biassed decision-making when automatically reviewing the application process so that the government officials are not pressured with more workload.
- As a system developer, I want the system to securely store and process all applications so that the government can comply with privacy and data protection laws and build user trust.
- As a system developer, I want the system to flag any applications that are borderline or require further review with a government official so that applicants are not rejected unfairly for housing allocation.
- As a system developer, I want to implement a real-time monitoring dashboard that flags abnormal application patterns (e.g., unusually high rejections for a specific group) so that I can detect possible biases early and recalibrate the model if necessary.
- As a system developer, I want the system to simulate and run eligibility test cases automatically after every code deployment so that I can ensure changes do not accidentally introduce new biases or errors.

- As a system developer, I want to securely log every major AI decision (including the type of criteria used and score assigned) into an audit trail so that government officials can review past decisions to resolve disputes and demonstrate system transparency.
- As a system developer, I want the AI model to include a self-assessment component that periodically evaluates its fairness and flags when retraining is required so that the system can adapt to changes in population data and policy requirements.
- As a system developer, I want to ensure that fallback manual review mechanisms activate if the system detects uncertainty or adversarial attack signs so that critical application decisions are never left to unreliable outputs.
- As a system developer, I want the system to flag any applications that are borderline or requires further reviewing with a government official, so that applicants are not rejected unfairly for housing allocation.

Wireframes

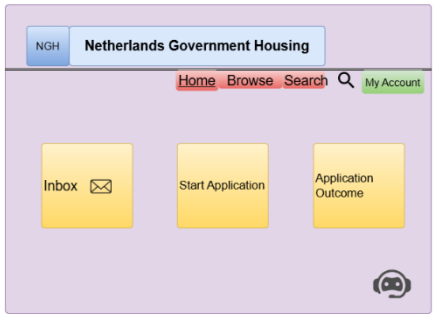
This high-level overview of the AI system is based on the user stories formulated in the above, giving a step-by-step process on how applicants and government officials can navigate on the system. This system is designed to be an intuitive and user-friendly interface for all users, where applicants can interact with the system by inputting application data and government officials can retrieve this data to perform manual reviews if necessary. Staff can be notified of a manual review process via a flagged notification generated by the AI system.

Netherland Government Official Housing Application Process



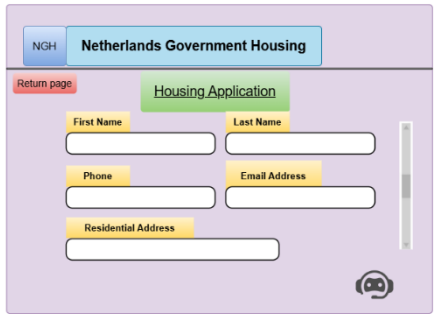
Step 1: Sign-up/Login Page

First the user/applicant will need to access a website that takes them to this login page. This is the page where all applicants can login using their existing credentials or create a new account to start the application process.



Step 2: Application Dashboard Page

This is the user/applicant's dashboard page of the website. It is meant to be user-friendly and intuitive for the applicant to navigate to various tabs of their application; prompting them to either proceed with the application process or follow-up their existing application



Step 3: Application Process Page

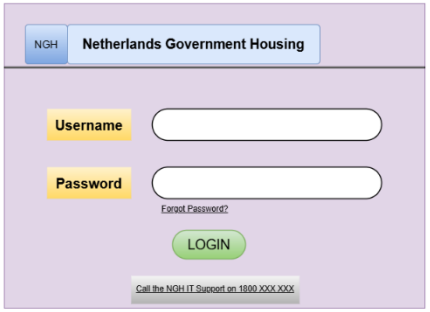
This page shows the user/applicant enter their personal details onto the housing application process. This page only reveals half of the required details needed for the application. Once they reach to the end of the application, a submit button will appear.

Step 4: Application Submission

After application is sent, this triggers the AI system to send an application outcome email to the user.

The system would also store the application data for government officials to utilise for further manual reviewing if required. This is accessible only authorised users, complying to data protection and privacy

Netherland Government Official Information Input Process

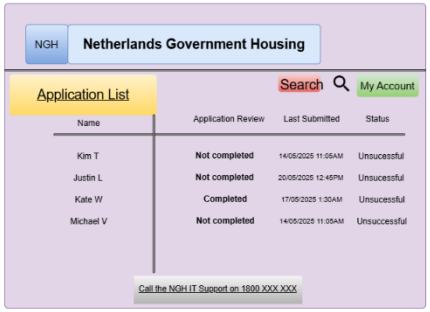


Step 1: Sign-up/Login Page

This user (i.e. government official) uses the AI system where clicking onto the system would trigger the login page. This is the initial process of accessing the AI system.

Step 2: Internal Staff Dashboard Page

This is the government official's dashboard page is meant to be user-friendly and intuitive for the staff to navigate to all applications and initiate the review process, as well as submitting the final outcome.



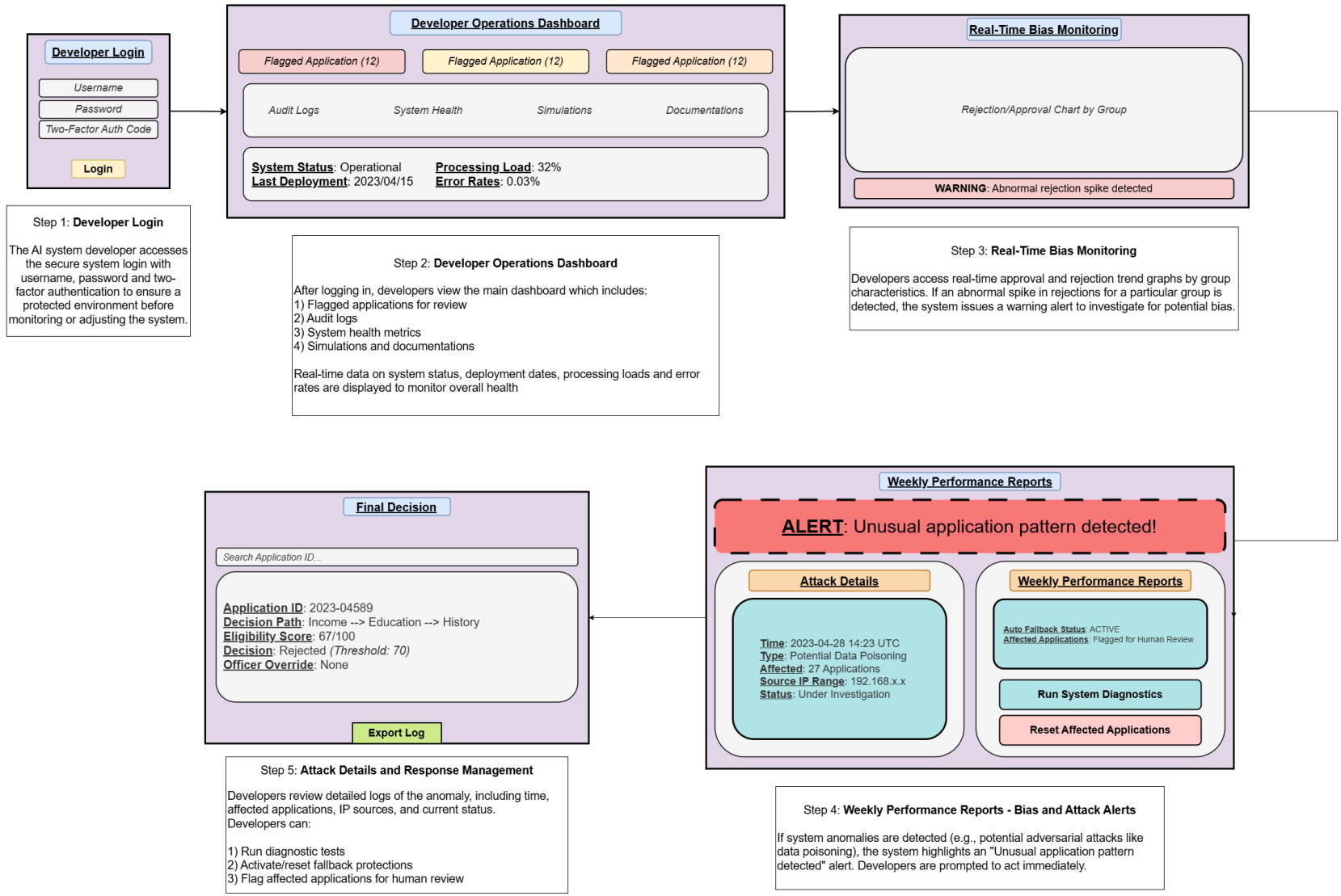
Step 3: Viewing Application Backlog

This page shows the list of unsuccessful applications for the government official to check all users requiring a manual review process.

Step 4: Viewing Application Backlog

This page shows the manual review process for one applicant that the government official will need to work on. Once the official has submitted, the system will trigger an email of the application outcome to the applicant

AI Software Developers Monitoring and Maintenance Process



Step 1: **Developer Login**

The AI system developer accesses the secure system login with username, password and two-factor authentication to ensure a protected environment before monitoring or adjusting the system.

Step 2: **Developer Operations Dashboard**

After logging in, developers view the main dashboard which includes:
1) Flagged applications for review
2) Audit logs
3) System health metrics
4) Simulations and documentations

Real-time data on system status, deployment dates, processing loads and error rates are displayed to monitor overall health

Step 3: **Real-Time Bias Monitoring**

Developers access real-time approval and rejection trend graphs by group characteristics. If an abnormal spike in rejections for a particular group is detected, the system issues a warning alert to investigate for potential bias.

Step 4: **Weekly Performance Reports - Bias and Attack Alerts**

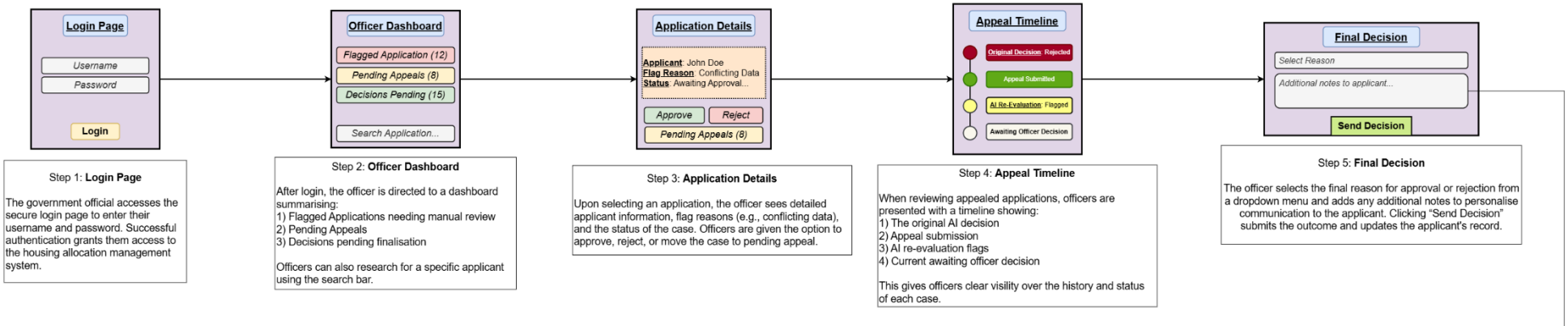
If system anomalies are detected (e.g., potential adversarial attacks like data poisoning), the system highlights an "Unusual application pattern detected" alert. Developers are prompted to act immediately.

Step 5: **Attack Details and Response Management**

Developers review detailed logs of the anomaly, including time, affected applications, IP sources, and current status.
Developers can:

1) Run diagnostic tests
2) Activate/reset fallback protections
3) Flag affected applications for human review

Netherland Government Officials Appeal Management and Decision Review



Step 1: **Login Page**

The government official accesses the secure login page to enter their username and password. Successful authentication grants them access to the housing allocation management system.

Step 2: **Officer Dashboard**

After login, the officer is directed to a dashboard summarising:
1) Flagged Applications needing manual review
2) Pending Appeals
3) Decisions pending finalisation

Officers can also research for a specific applicant using the search bar.

Step 3: **Application Details**

Upon selecting an application, the officer sees detailed applicant information, flag reasons (e.g., conflicting data), and the status of the case. Officers are given the option to approve, reject, or move the case to pending appeal.

Step 4: **Appeal Timeline**

When reviewing appealed applications, officers are presented with a timeline showing:
1) The original AI decision
2) Appeal submission
3) AI re-evaluation flags
4) Current awaiting officer decision

This gives officers clear visility over the history and status of each case.

Step 5: **Final Decision**

The officer selects the final reason for approval or rejection from a dropdown menu and adds any additional notes to personalise communication to the applicant. Clicking "Send Decision" submits the outcome and updates the applicant's record.

Step 6: **Weekly Performance Reports**

Officers can review system-generated reports showing:
1) Appeal Overturn Rates
2) Common reasons for appeal
3) Bias trend alerts

This helps monitor system fairness and inform future adjustments to improve applicant outcomes and efficiency.

Method Execution

Execution of Scrum and DT

This project adopts a hybrid methodology, combining the user-centered, problem-solving approach of Design Thinking (DT) with the iterative and agile framework of Scrum, guided by principles derived from PRINCE2 for overall project governance and control as outlined in the Project Brief. This integrated approach is specifically engineered to address the complexities of developing an AI-driven system for social housing allocation, balancing technical development with a deep understanding of diverse stakeholder needs and ethical considerations.

The rationale for this combination stems directly from the project's nature as defined in Part A and the insights gained during the Empathizing phase of Part B:

Within our hybrid DT and Scrum framework, the Design Thinking phases provide the essential upfront and ongoing user-centric direction for the iterative development cycles (Sprints). While not strictly sequential in practice and often revisited throughout the project, their core intentions, rationales, and focus areas are critical:

- **Empathize Phase:**
    - **Intention:** To develop a deep understanding of the stakeholders' experiences, needs, challenges, and motivations related to the social housing allocation process.
    - **Rationale:** As highlighted by the complexities and pain points revealed in the Empathy Maps and Journey Maps, a profound understanding of the users (Applicants, Officers, Developers) is fundamental to designing an effective and accepted solution. Without genuine empathy, there is a high risk of building a system that is technically sound but fails to address the real human needs and operational realities, potentially exacerbating existing issues like user resistance or ethical concerns.
    - **Focus:** This phase involved activities such as analyzing the provided case study details, making and documenting assumptions where information was incomplete, and creating visualization tools like Empathy Maps and Journey Maps for the key stakeholder groups. The focus was on uncovering explicit statements, thoughts, feelings, pain points, and potential gains from each perspective.

- **Define Phase:**
    - **Intention:** To clearly articulate the core problems and opportunities identified during the Empathize phase as meaningful and actionable problem statements.

- **Rationale:** Moving from observations in the Empathize phase to well-defined problem statements (Point of View - POV statements) is crucial for providing a clear focus for the subsequent ideation and development efforts. It ensures that the team is aligned on what the most critical issues are to address from the user's perspective. This directly feeds into creating a user-centered Product Backlog in Scrum.
- **Focus:** Analyzing the insights gathered from the Empathy Maps and Journey Maps to identify key user needs and the underlying reasons for those needs. This involved synthesizing observations to craft concise and compelling POV statements for each primary stakeholder group, as was completed in the Problem Definition section of the report.

- **Ideate Phase:**
  - **Intention:** To generate a wide range of potential solutions to the defined problem statements.
  - **Rationale:** The Ideate phase encourages divergent thinking, exploring numerous possibilities without immediate judgment. By reframing POVs into "How Might We" (HMW) questions, the team is prompted to brainstorm innovative approaches that might not be immediately obvious. This is vital for moving beyond incremental improvements and considering potentially transformative solutions to complex issues like algorithmic bias or system transparency.
  - **Focus:** Converting the POV statements into HMW questions to widen the solution space. This will involve brainstorming sessions using techniques like mind mapping to generate a large quantity of diverse ideas aimed at addressing the HMWs. The outcome of this phase directly informs the potential solutions that will be further explored, refined, and potentially added to the Product Backlog.

- **Prototype Phase:**
  - **Intention:** To create low-fidelity, tangible representations of selected ideas to test and gather feedback.
  - **Rationale:** Prototyping makes abstract ideas concrete, allowing the team and stakeholders to interact with potential solutions. This is an efficient way to test assumptions about what works and what doesn't early in the process, reducing the risk of building the wrong features. For this project, prototyping user interfaces (wireframes) is particularly important for validating usability and workflows for both applicants and officers.
  - **Focus:** Based on the prioritized ideas from the Ideation phase and the user stories in the Product Backlog, create simple prototypes such as sketches, wireframes, or basic interactive mockups for key parts of the system, such as the applicant

registration flow, the property browsing interface, or the officer's application review screen. These prototypes will be used in the next phase to gather user feedback.

- **Test Phase:**
    - **Intention:** To obtain feedback on the prototypes from stakeholders and refine the solutions based on their input.
    - **Rationale:** Testing with real users is fundamental to validating whether the proposed solutions effectively address their needs and pain points. This feedback loop is critical for identifying flaws, uncovering new insights, and iterating on the design before committing significant development resources. In the context of Scrum, feedback from testing prototypes can lead to revised user stories or new items in the Product Backlog for future Sprints.
    - **Focus:** Presenting prototypes to representatives of Housing Applicants, Government Officers, and potentially Property Management. Gathering their feedback on the usability, clarity, and effectiveness of the proposed design solutions. Analyzing the feedback to inform revisions to the prototypes, user stories, and the prioritized Product Backlog. This phase will occur iteratively throughout the project, often at the end of Sprints when functional increments are available for testing.

PRINCE2 Principles:
As established in the Project Brief, PRINCE2 principles, such as managing by stages, focusing on products, and managing by exception, provide a layer of governance and control. The Project Plan outlines key aspects like tolerances, risks, and quality criteria, which will be monitored and controlled throughout the Scrum Sprints, ensuring the project remains aligned with the Business Case and its objectives.

Scrum:
The project's objective to develop an AI system with multiple components (AI model, databases integration, user interfaces, appeals system) within a defined timeline and budget necessitates an agile framework that supports iterative development, flexibility, and continuous feedback. Scrum's timeboxed Sprints, defined roles (Product Owner, Scrum Master, Development Team), and artifacts (Product Backlog, Sprint Backlog, Product Increment) provide the structure for managing this complexity. The iterative nature of Scrum, with regular Sprint Reviews and Retrospectives, aligns well with the DT process, allowing for continuous learning and adaptation based on feedback from stakeholders and the results of prototyping and testing conducted throughout the project lifecycle.

The method execution will follow an iterative process, with each iteration (Sprint) typically lasting 1-4 weeks (as per standard Scrum practice and adaptable to project needs) and incorporating elements of both Design Thinking and Scrum activities. The intention, rationale, and focus of each iteration will be recorded to demonstrate progress and facilitate tracking, fulfilling the requirements of the marking criteria.

The following is an outline of the intended focus for initial iterations:

- **Sprint 1: Foundation & Applicant Registration (Focus: Empathize, Define, Ideate, Prototype, Build - foundational elements)**
    - **Intention:** To establish the basic technical infrastructure and develop the core functionality for applicant registration.
    - **Rationale:** This directly addresses the initial phase of the Housing Applicant's journey (Registration) and is a foundational requirement for all subsequent interactions with the system. It also allows the team to quickly address potential technical integration challenges identified in Part A.
    - **Focus:** Setting up development environments, integrating the applicant database, designing the user interface for registration based on early prototyping and user feedback, and developing the code for user signup and profile creation.
    - **Deliverables:** Working registration module, connected to the applicant database.
- **Sprint 2: Basic Eligibility Check & Officer Review Interface (Focus: Define, Ideate, Prototype, Build - core system logic)**
    - **Intention:** To implement a preliminary version of the AI-driven eligibility assessment and create the basic interface for Government Officers to view applications and AI outputs.
    - **Rationale:** This tackles the core problem the system is designed to solve – automating eligibility checks – and provides officers with visibility into the process (Phase 1 of Officer Journey Map), addressing their need for a trustworthy system.
    - **Focus:** Developing the initial AI model based on defined eligibility criteria, integrating it with the applicant data, designing and coding the basic Government Officer Dashboard for viewing applications and assessment results.
    - **Deliverables:** Basic AI eligibility check functionality, initial Government Officer Dashboard.
- **Sprint 3: Property Data Integration & Applicant Property Viewing (Focus: Empathize, Define, Build - expanding user functionality)**
    - **Intention:** To integrate the residence database and enable Housing Applicants to browse available properties through their portal.
    - **Rationale:** This addresses a key step in the Housing Applicant's journey (Application for Residence) and utilizes the property data source identified in Part A.

- **Focus:** Developing the module for integrating the residence database, designing and coding the Applicant Portal interface for browsing properties, and ensuring data synchronization between the systems.
- **Deliverables:** Integrated residence database, functional property browsing feature in the Applicant Portal.

Project tracking and progress monitoring:
Project tracking and progress monitoring will be integral to each Sprint and the overall project governance. The team will maintain a digital "diary" through a collaborative tool (as agreed upon in Part A), documenting daily progress, decisions made, impediments encountered, and their resolutions. User stories will be tracked on a digital board, showing their status within the Sprint (e.g., To Do, In Progress, Done).

Project Board interaction and tracking will occur through several mechanisms:

- **Sprint Reviews:** At the end of each Sprint, a Sprint Review meeting will be held where the Development Team demonstrates the completed Product Increment to the Project Board and other key stakeholders (including representatives of Housing Applicants and Government Officers where possible). This allows the board to inspect the working software, provide feedback, and make informed decisions about the project's direction based on tangible progress and user validation.
- **Highlight Reports:** The Project Manager will provide regular (e.g., weekly) Highlight Reports to the Project Board, summarizing the Sprint's progress against the plan, key achievements, any significant issues or risks encountered, and forecasting the next period's work, in line with PRINCE2 principles.
- **Issue and Risk Management:** A shared Issue and Risk Log will be actively maintained and reviewed regularly (at least weekly) by the team and key stakeholders. Any new issues or risks, particularly those highlighted as major risks in the Business Case, will be assessed for their impact on Sprint goals and overall project objectives. Significant issues that threaten Sprint or project tolerances (as defined in the Draft Project Plan) will be immediately escalated to the Project Board through Exception Reports, allowing them to make informed decisions and provide guidance.

By explicitly linking the insights from the Empathize phase (captured in Empathy and Journey Maps and distilled into POVs) to the iterative cycles of Scrum, and by implementing clear mechanisms for tracking progress and engaging the Project Board, the project aims to ensure that the technical development remains firmly grounded in the real needs and experiences of the users, leading to a more effective, equitable, and accepted solution for optimizing social housing distribution, while maintaining control and transparency throughout the project lifecycle.