HDB PROJECT

Presented By:
FCS2 Group 6

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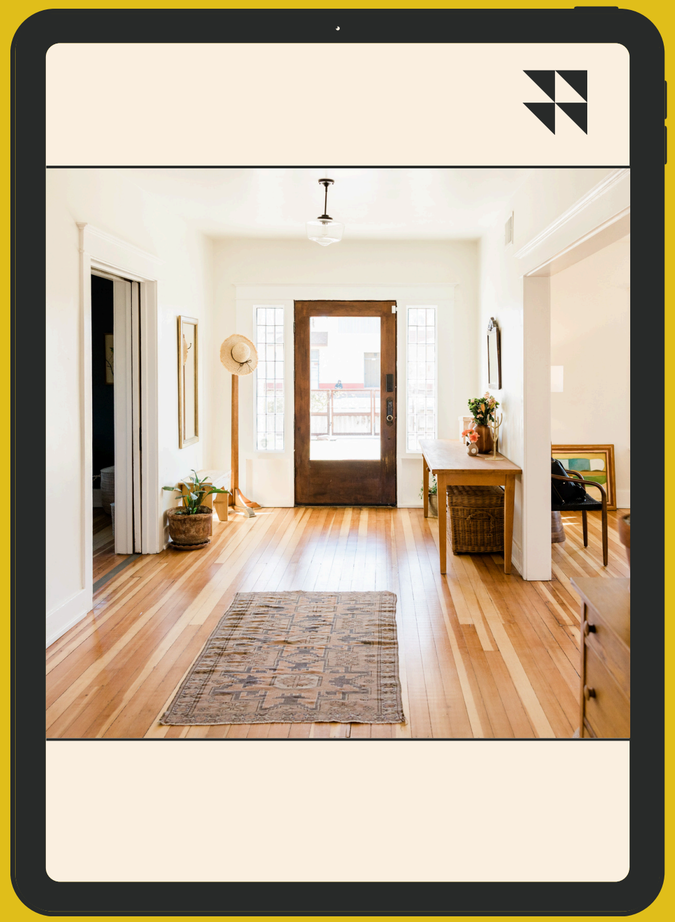
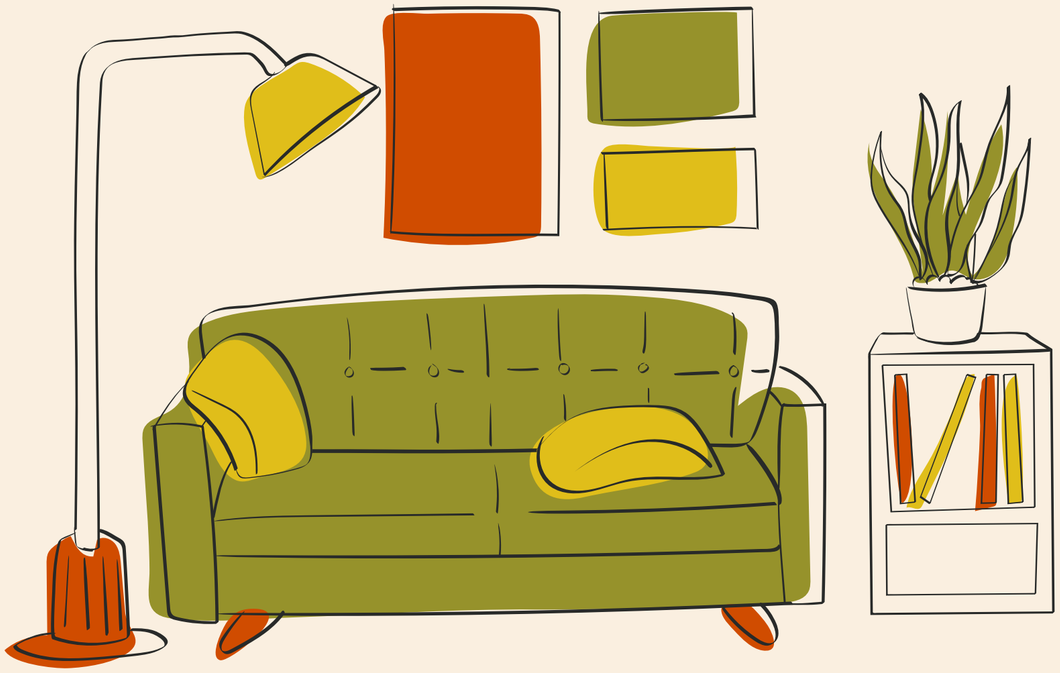


Introduction



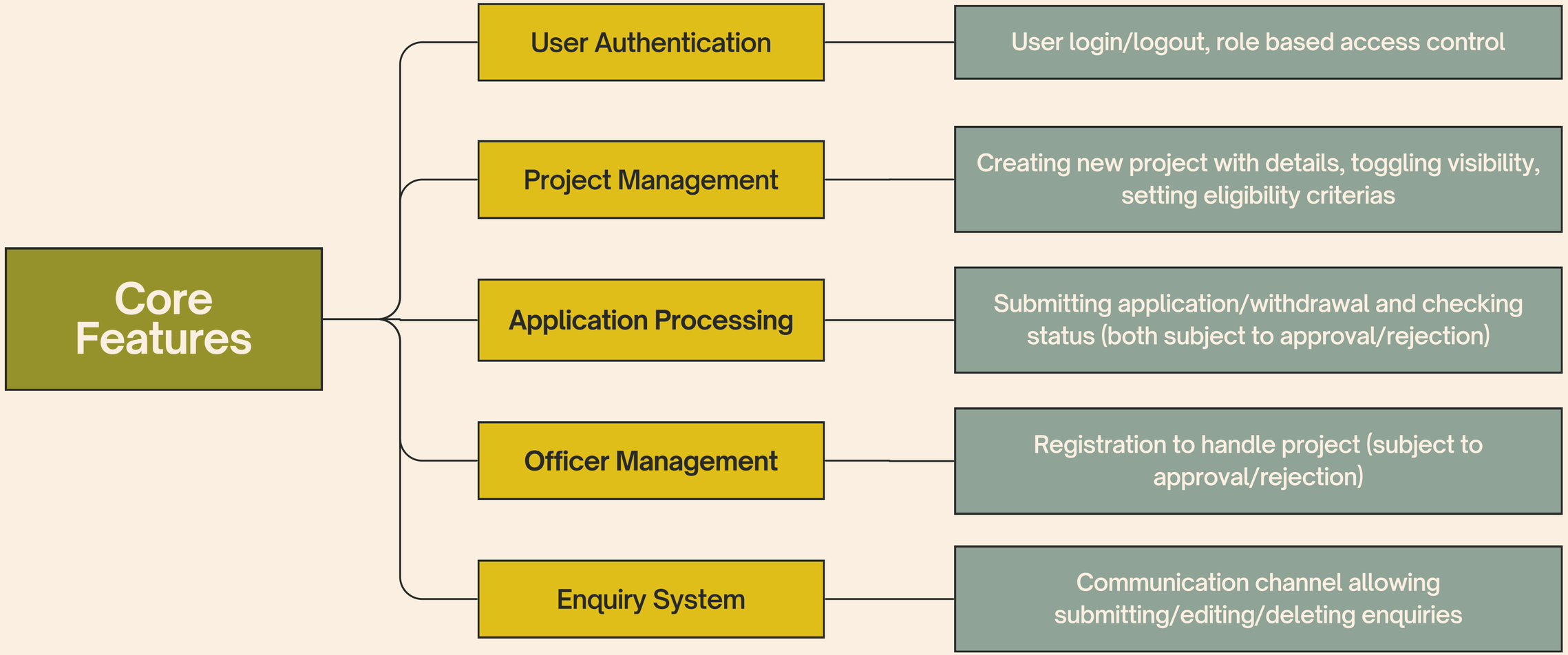
Understanding the Requirements

- BTO system would serve multiple stakeholders with different needs
- identified explicit requirements to implement
- identified user roles and system entities

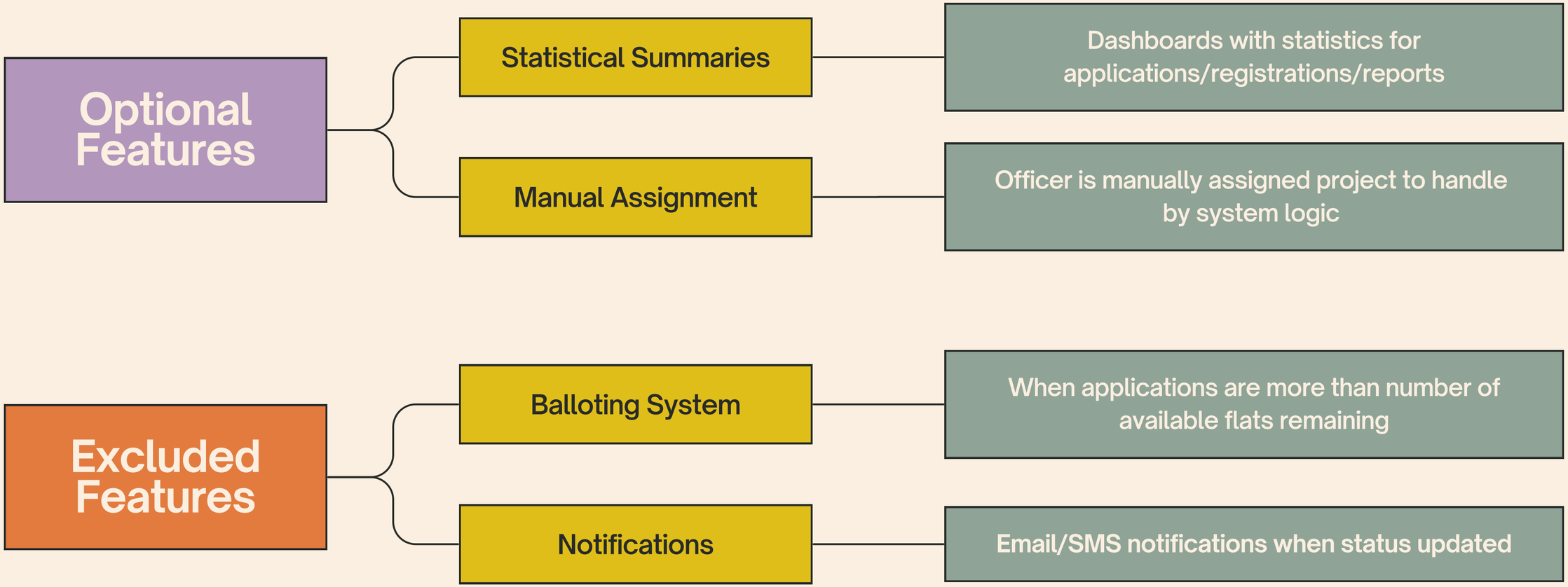
Key Users

- APPLICANT, OFFICER, MANAGER in order of increasing access to system capabilities

Features & Scope



Features & Scope



SYSTEM STRUCTURE

- Planning
- Trade - Offs

Main Actors

Applicant

HDB Officer

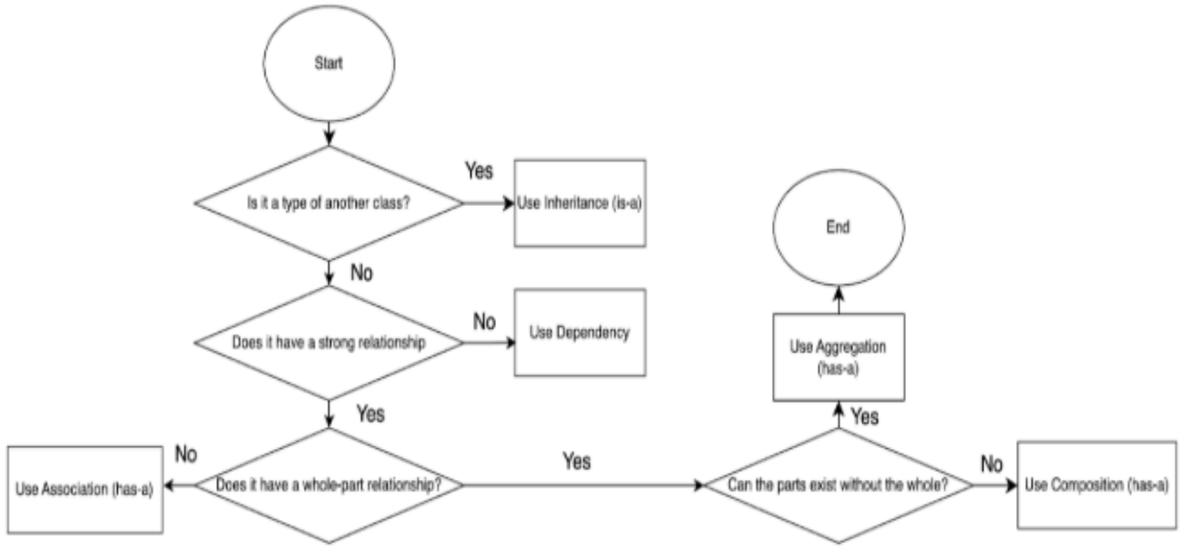
HDB Manager

MVCS Structure

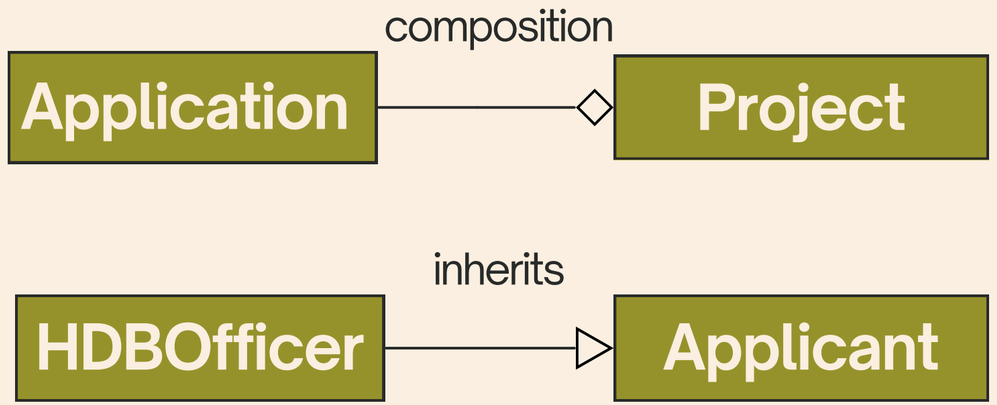
Model	**Defines the domain entities and their relationships.** • Core domain objects (Applicant, Project, Enquiry, Application)
View	**Contains all user interfaces** • Dashboard views for each user type • Specialized views for operations like registration, application and enquiry handling • Login view for authentication
Controller	**Acts as an intermediary between views and services** • User-specific controllers • Cross-cutting controllers • Operation-focused controllers
Service	**Implements core business logic and enforces business rules.** • Services for each domain area • Contains complex operations and validation logic
Repository	**Manages data persistence and retrieval operations.** • Entity-specific repositories • Encapsulates data access concerns

Visual Guides

To facilitate early design decisions, we created flowcharts



It helped us decide whether to use inheritance (is-a), dependency, or association types such as aggregation and composition based on the strength and nature of the relationships.



Visual Guides

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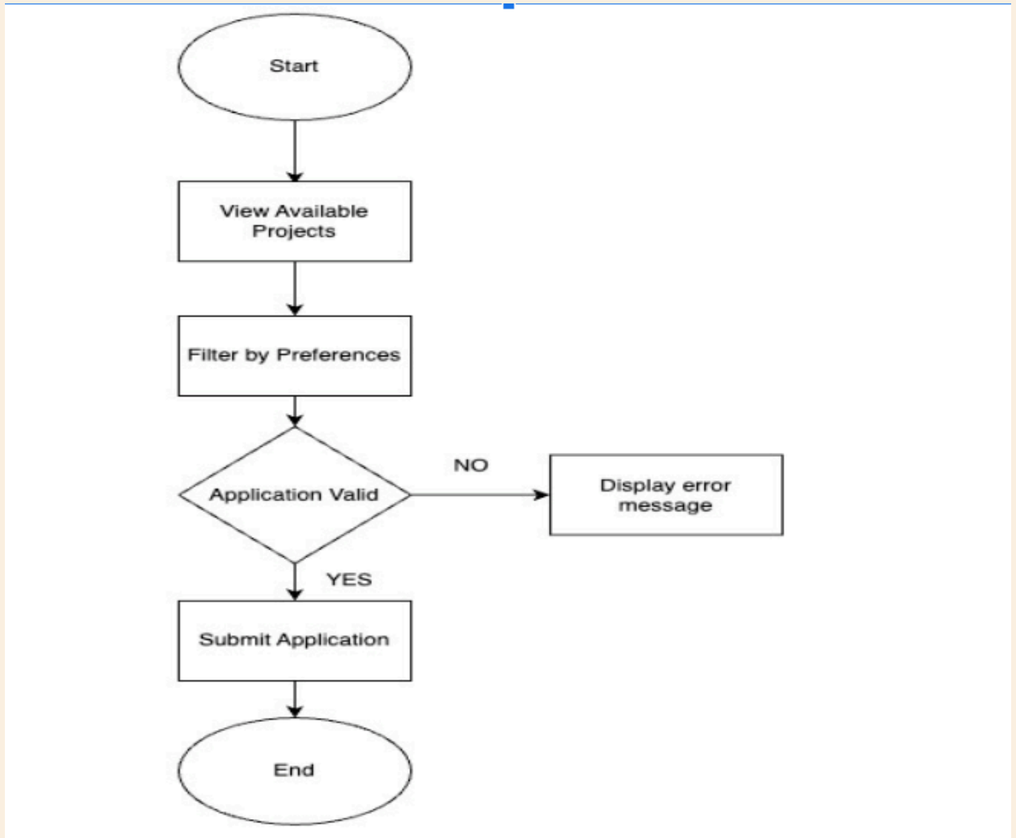


By using flowchart to map out use-cases, we come up with several main program flows

BTO Project Application Flow:
ApplicantProjectView → ApplicantProjectController → ApplicantProjectService → ProjectRepository/ApplicationRepository → Project/Application

HDB Officer Registration for Project Flow:
OfficerRegistrationView → OfficerRegistrationController → OfficerRegistrationService → OfficerRepository/ProjectRepository → HDBOfficer/Project
HDBManagerRegistrationView → HDBManagerRegistrationController → HDBManagerRegistrationService → OfficerRepository → HDBOfficer

Application Approval Flow
HDBManagerApplicationView → HDBManagerApplicationController → HDBManagerApplicationService → ApplicationRepository → Application

Trade - Offs

Centralised vs Distributed logic

Trade-off	Decision
Placing business logic in models make them self-contained but can lead to bloated classes	Decided to move complex logic operations to service classes while retaining basic validation in the models

Trade - Offs

General vs Role specific Controllers

Trade-off	Decision
Using General controller as it can reduce code duplication	Decided to use Tailored controllers for each user role to maintain clarity and isolate logic

Trade - Offs

Repository Patterns

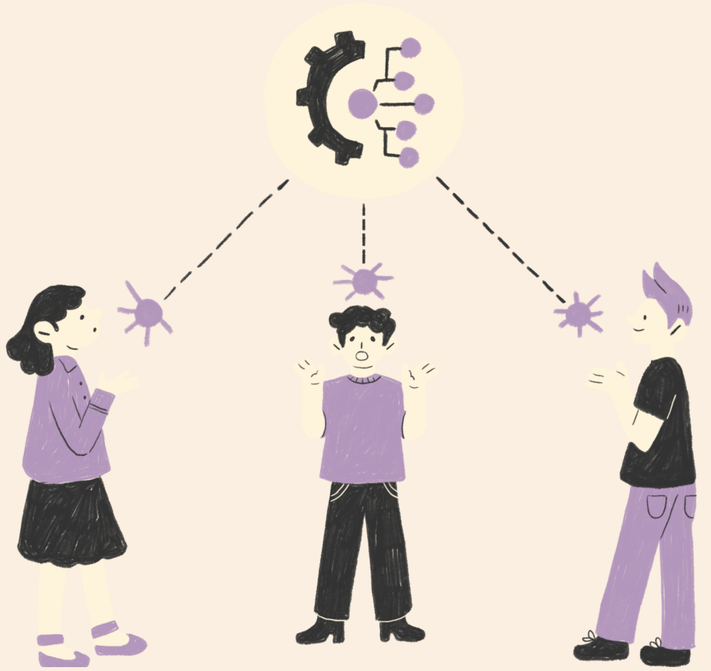
Trade-off	Decision
Adding the repository will add another layer of indirection	Decided to include it to allow database integration and made testing easier

SYSTEM DESIGN

- UML diagrams
- OOD principles

Single Responsibility Principle

⇨ Ensure that each class had one distinct role



Examples

- Separated our classes into distinct layers
- i.e Models, View, Controller, Service, Repository

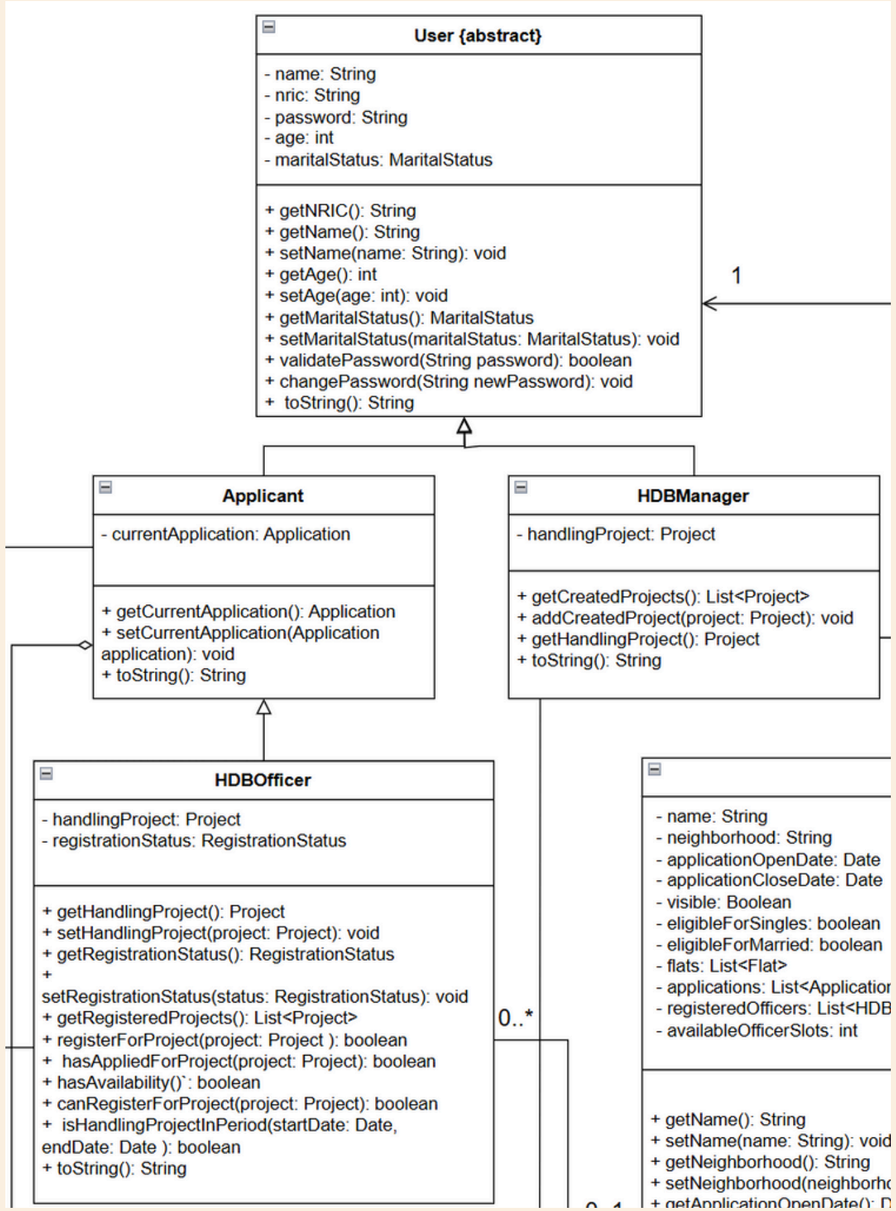
- Separated enquiry-related logic into 3 distinct class
- i.e. ApplicantEnquiryController, HDBOfficerEnquiryController, HDBManagerEnquiryController

Open - Closed Principle

Allow classes to be open for extension but closed for modification

Examples

- Applicant, HDBOfficer and HDBManager subclasses extends from User superclass
- Allows for addition of new user types
- Existing User class logic remains unchanged

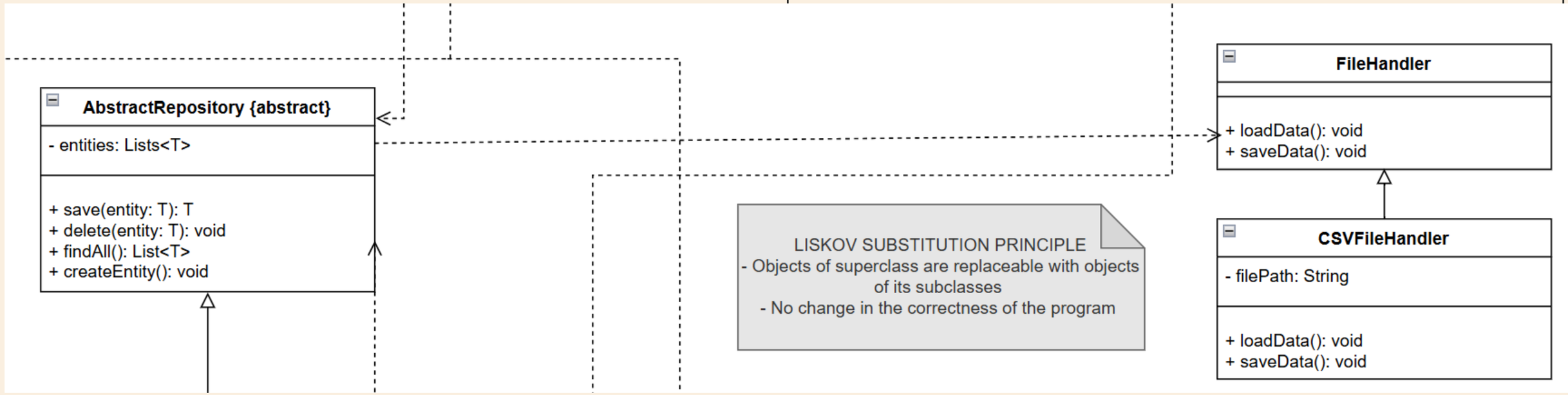


Liskov Substitution Principle

Ensure that objects of superclass are substitutable for subclass without change in correctness

Examples

- CSVFileHandler subclass is substitutable for FIleHandler superclass

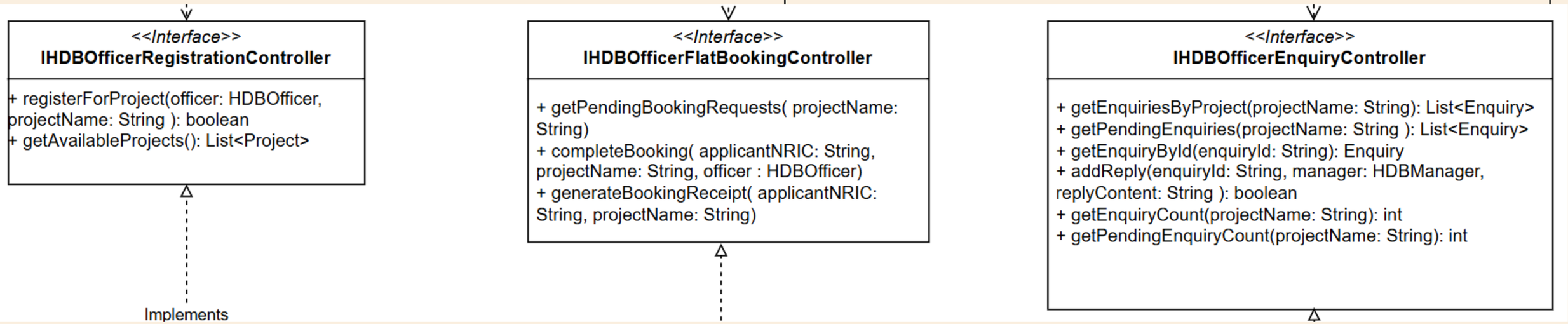


Interface Segregation Principle

Spit into separate interfaces that are role-specific

Examples

- Segregate general HDB Officer interface into IHDBOfficerController, IHDBOfficerFlatController and IHDBOfficerEnquiryController

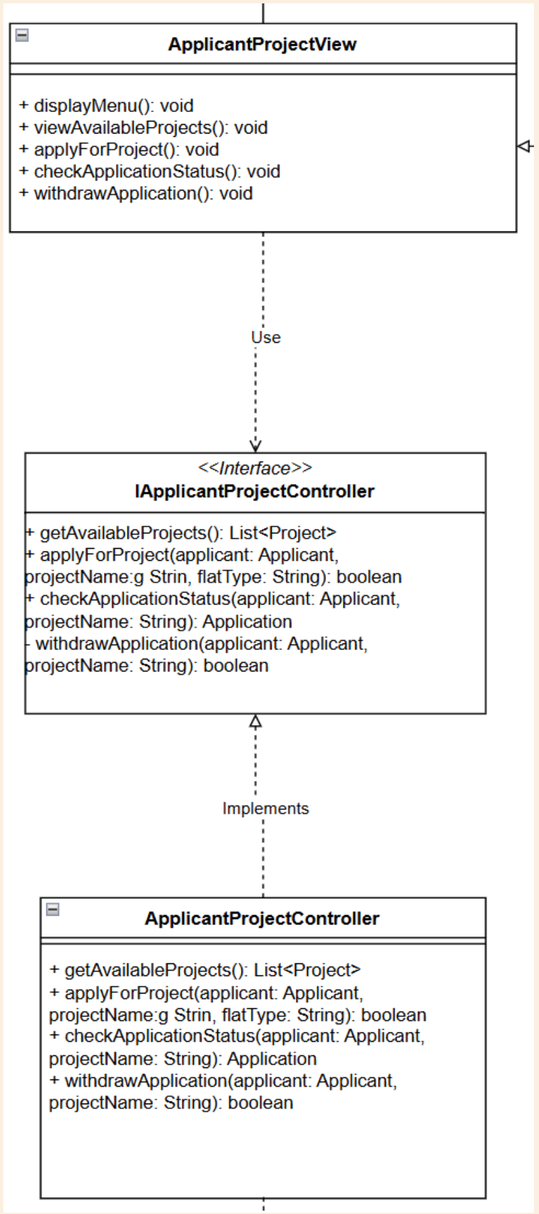


Dependency Injection Principle

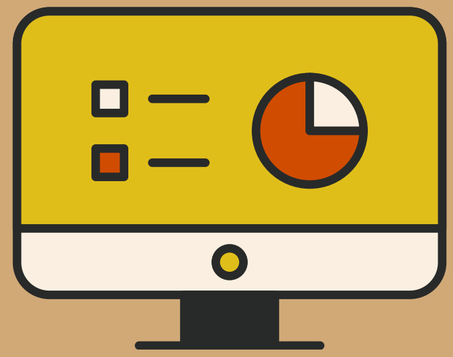
Ensure that high level modules depend on abstractions (interface) rather than low level modules

Examples

- ApplicantProjectView depend on IApplicantProjectController rather than directly depending on ApplicantProjectController



LIVE DEMO



PROJECT REFLECTION

- Success
- Improvements

What went well....

we were able to build a modular and maintainable system that mirrors actual processes in SIngapore's BTO flat booking

- Implemented all core features
- Adopted useful design patterns
- Validated input/flows well
- Robust error handing

Difficulties & improvements

we were able to build a modular and maintainable system that mirrors actual processes in SIngapore's BTO flat booking

Keeping method signatures consistent

Integration of code

Stronger database-backed system

Additional integration/stress testing

Further breaking down of classes

Thank You!