Project Name: New Super Regional Mall
Prepared By: Queens College Software Engineers (QCSE) – Group 3
Prepared For: Flushing Meadows Midway Inc. (FMMI)

Project Description:

The following is the project description for a Super Regional Shopping Center for Flushing Meadows Midway Inc. This new mall will be in Queens, NY. Our software will be the application shoppers and managers use to access various features of the mall or get info about in-person shopping experiences and restaurants:

1. Special changes like holiday installations (Decorator Pattern)
2. Security announcements and monitoring (Singleton Pattern)
3. Stores status (Observer Pattern)
4. Shopping list/ “watchlist” Implementation for future purchase (Memento Pattern)
5. Shopping cart implementation (Iterator Pattern)
6. Food court restaurants (Factory Pattern)

Group Project Members

Student Name(s):

Team Captain: 1) _Aleksandra Georgievska_____
2) ___Hengtuo Chen_____
3) ___Daniel Dayaram_____
4) ___Tenzin Dabtsa_____
5) ___Kevin Iraheta_____
6) ___Yiqing Li_____

List of Design Patterns(s) with student who will be implementing it:

1) Aleksandra Georgievska ——————► Decorator Pattern
2) Hengtuo Chen ——————► Singleton Pattern
3) Daniel Dayaram ——————► Observer Pattern
4) Tenzin Dabtsa ——————► Memento Pattern
5) Kevin Iraheta ——————► Iterator Pattern
6) Yiqing Li ——————► Factory Pattern

The project is divided as follows:

Typically, one group member oversees requirements/specifications.
Student Name(s): _____Tenzin Dabtsa_____

Requirements/Specification:

Purpose (why the customer requires this project)

FMMI will launch its online services along with the grand opening of the mall. Our online services will provide remote shopping capabilities, prioritizing the customer's time. Online Shopping can be done 24 hours a day with 10% off new customers online. Our page also shows store time and holiday hours.

Business Drivers/Business Model

The online launch for FMMI is aimed to build a digital foothold and build our search engine rankings. Our online reputation is key to promote revenue growth, therefore, we will push for any purchases to leave reviews and provide feedback to enter into our monthly lottery give away. Our revenue projections for the first year online is to meet 20% of our in person sales. We are however expecting our year over year growth to gradually meet our in person sales.

Scope – One Paragraph

FMMI will have its own website accessible on any browser on mobile devices or computers. There is no need for any downloads of any kind as we do not offer a desktop application for our services yet. There is however a mobile application in the works but will not be released until next year.

Definitions and/or Acronyms

1) RV: Retail Value

2) TTS: True to Size

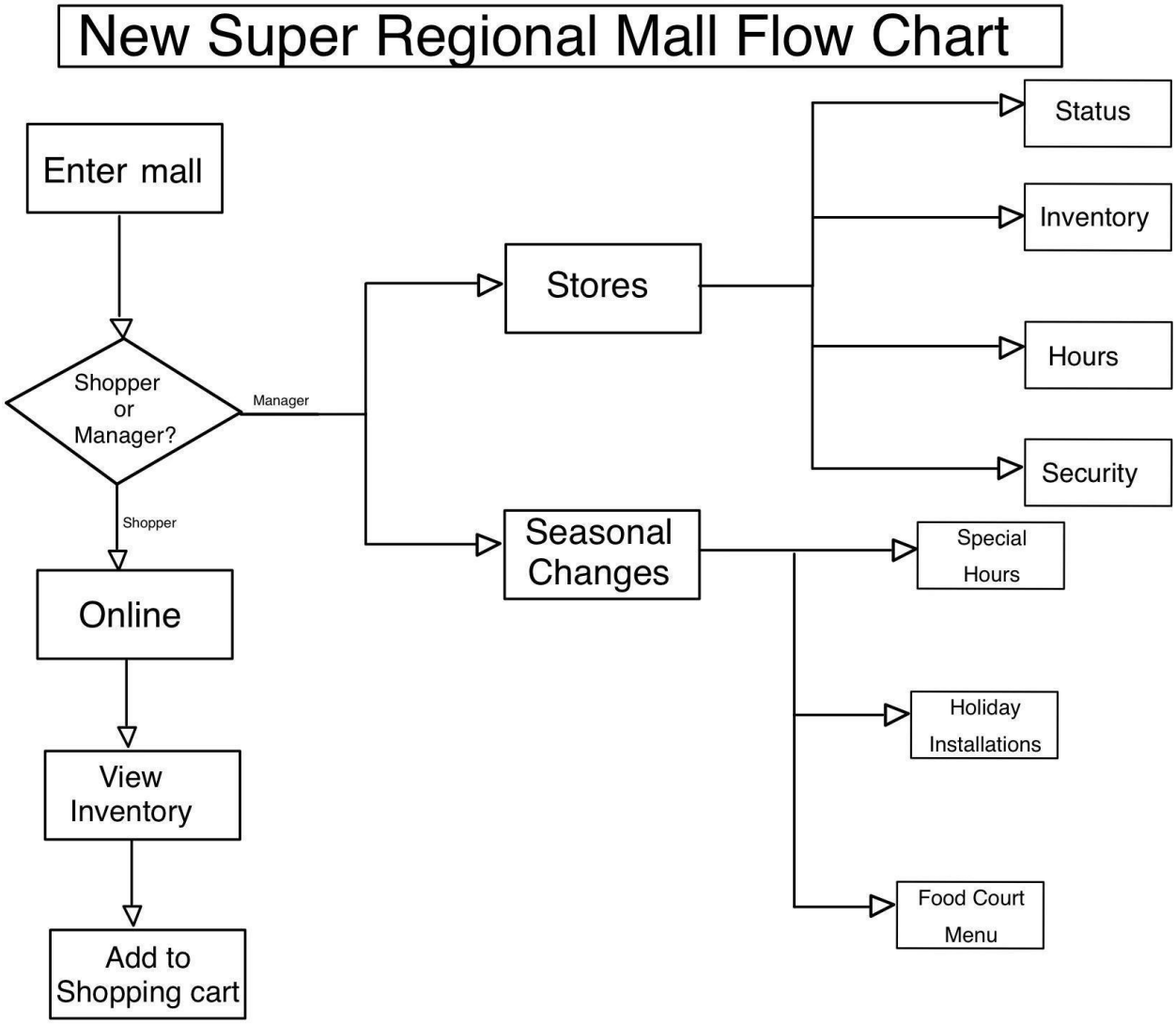
2.4 Platform Requirements Specification hardware/memory/Operating System requirements

Any functional smart computing devices from mobiles to laptops with access to the internet will be able to access our online site. System requirements include any operating system if a web browser is installed. Any memory size or CPU released within the last decade should be sufficient.

Project Diagram

You must include one process flowchart diagram (see figure 1 below) that provides a high-level overview of the whole project.

Process Flowchart Diagram



2.1 Use Cases:

Actor: Shoppers and Managers
Preconditions: The mall is operational with stores, inventory, and staff
Triggers: Shoppers are looking to purchase a product or have a dining experience. Managers need to check inventory, operational hours, and holiday installations and changes
Main Success Scenario: A shopper logs on during the Thanksgiving Weekend and checks to see the discounts and store hours available. They use the available discount to do some online shopping while at work. After they come home from work, they take their family to one of the dining establishments whose hours are extended and take photos with the holiday decorations for their holiday cards.
Alternative Paths: A manager logs on during the non-holiday season and checks the inventory of their store for a customer who is asking about additional sizes. The manager can see from the system that the inventory does not contain the requested sizes and encourages the shopper to order from the online shopping platform.
Termination Outcome: A shopper has completed purchases and enjoyed seasonal experiences. A manager has audited their stores inventory, hours or operation, and seasonal changes in order to effectively manage their staff and merchandise accordingly.

2.2 Acceptance Criteria:

Our designed structure meets the pattern. All the methods we created are able to pass the unit test. The code should be able to pass a simple component test, and give the correct "output"

User Story: As a buyer, I want to be able to check if there are special holiday decorations up so that I can go and see them.

Date	Special Installation?	Expected Message
6/10	No	
4/9	Yes	"Photos with the Easter Bunny are going on now to next Saturday!"
12/20	Yes	"Christmas decorations are up!"
11/20	Yes	"Thanksgiving installations and decorations are up!"

User Story: As a merchant, I want to limit the amount of items a single customer can buy so that others can buy products as well.

Amount in cart	Add item?	Expected Result	Expected Message
0	Yes	Pass	
5	Yes	Pass	
20	Yes	Fail	"Cart is full"

2.3 Assumptions and Constraint:

There are 6 members in the team. Each member will implement a different feature to improve our shoppers shopping experience. Features will also bring more shoppers in by informing them of seasonal specials.

2.5 Context Diagram:

Architecture and Design Philosophy:

Our architecture is *Three-Tier Architecture* with 3 distinct layers:

- web/presentation layer
- application layer
- database layer

1) **Key goals**:
    - Security/Protect user data (credit cards, login accounts and passwords, PII (Personally Identifiable information)
    - Easy user interface
    - Handling of influx in online users during peak shopping seasons like holidays or promotional deals
2) **Other architectural designs considered**:
    a) Event-driven Architecture Pattern
    b) Why we considered it: It would have handled the higher demands placed on our app during peak shopping seasons like holidays or promotions.
    c) Why we did not go with this architecture: We needed more flexibility and security in our design because of the both in person physical mall needs plus the online shopping and inventory management
3) **Scaling**:
    a) Why we went with this architecture: We went with this architecture because it is widely accepted so we could easily hire staff to work on the buildout should we need to scale. It also has built-in security with its separation of layers. Another pro for scaling is we can modify one layer and only have to consider the layers that depend on it, not necessarily all of the layers, so code changes are easier to implement.
    b) Ways we could scale: Should our mall become a franchise, or have other branches open in other cities across the country, we would want to extend our app to handle specialized details about each shopping center which would increase our database load and would require filtering adjustments to our presentation layer. The application layer would also need to be adjusted to talk between the extended database and the new features on the presentation layer.