



University of Jeddah

College of Computer Science and Engineering

Department of Computer Science and Artificial Intelligence

Software Project Management| CCSW-313



Mall navigation program

Prepared for: Course project for Software project Management - CCSW 313

Prepared by:

- Razan Abdullah Alghanmi | 2111007
- Shahad Ahmad Kulaibi | 2114565
- Jana Saleh Bakhalqi | 2111011
- Maria Mohammed Jawah | 2111958

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Business Case for Mall navigation program

Prepared by : Razan Alghanmi , Shahad Kuliabi, Maria Jawah , Jana Bakhulqi

Date : 27/4/2023

1- Introduction/Background

Malls are the most common place tourists visit, even local citizens go there every once in a while. However, many of them spend hours above their staying time because they don't know where a specific store is, losing their car in the mall's parking, and finding a preferred restaurant or bathrooms. Sometimes, people go to malls only for one store, and they spend a lot of time trying to find that store which maybe isn't available in the first place in that mall. Also, a mall is big place in which parents can easily lose their children or a family member. The mall navigation application solves all listed problems by providing a digital map that contains all information that users can use such as determining whether a store is available in the mall and its directions, parked car directions, finding the nearest mosque or bathroom, tracking a family member or children with the same app or via a watch that can be purchased individually, and finding a preferred restaurant and its directions.

2- Business Objective

The mall navigation application solves all problems that shoppers face, by providing a digital map that contains all information that users can use such as determining whether a store is available in the mall and its directions, parked car directions, finding the nearest mosque or bathroom, tracking a family member or children with the same app or via a watch that can be purchased individually, and finding a preferred restaurant and its directions.

our main goal is developing an application that makes its users mall visiting experience more efficient and pleasant.

3- Current Situation and Problem/Opportunity Statement

These days, shopping centers and malls are expanding constantly. When customers don't know the region well, don't always have access to the internet, or use an unreliable location navigator, it is more difficult for them to pinpoint where the store is. The floor plans and maps in certain shopping centers can be extremely complicated. Even within the mall, customers may become disoriented, and those with poor spatial awareness may struggle to read a map and locate the store they're looking for. In addition to the large parking lot, it could be difficult for the consumer to recall where they parked. Some of them may even know where their automobile is, but they may still not know how to get there.

4- Critical Assumptions and Constraints

The program must be of high security and be a reliable source for customers and that there are no harmful viruses or infringement of their personal information without permission. Also, the program must perform continuous updating of shops and restaurants and adding new developments, whether it is a new store, restaurant, bathrooms, etc.

It must pay for itself within a period of eight months by decreasing the development costs and creating profits. The program must be developed and be tested with a maximum of 100,000 people using the program at once.

5- Analysis of Options and Recommendation

Solution 1 (Do the application) :

If the company decides to do the application that will result in a big cost for the company.

Gaining a clear insight into the cost of application and what the spending delivers to the business is critical. So that it will introduce us to new and happy customers with the new changes that will make their shopping more efficient.

Solution 2 (Do nothing) :

If the company decides to not do the application, that means that the company will not suffer from huge costs and time, but on the other hand they will lose their potential users because of the inefficiency that they had to deal with while shopping at the mall. Also, the users would search for another application that will make their shopping experience better which means that the other companies will have a better competitive advantage.

Recommended Alternative of the Course of Action:

The stakeholders believe that doing the application is best. Although that would cost the company money, there would be many benefits. These benefits can come in many forms such as increased revenue and improved user loyalty. Gaining users would also be financially beneficial because more users means more income. That might occur through various forms, including advertising and sponsorship. Users will get access to several features that will improve their mall experience. In addition, they will also have the choice to upgrade to the premium package to access more features.

6- Preliminary Project Requirements

There are several requirements that the application must include:

- The application shall be accessible to visitors via the app store.
- The visitors shall have the option to select the language that the application will use, different languages like (French, Spanish, Swedish, Japanese, English).
- The visitor's profile shall be available on the mobile application, such as the visitors name, phone number, and city.
- The application shall show the visitors events available in the mall. The application shall show visitors available places, number of existing pieces, and discounts.
- The application shall display the nearest store based on the visitor's search.
- The visitor shall be able to view the parked car location and its path.
- The application shall list all nearby malls based on the visitor's location.
- The application shall generate detailed report of the visit.
- The visitors shall be able to edit or update their profiles.
- The application shall provide statistics on the number of people within the mall.
- The application shall enable visitors to view the opening and closing hours of the mall.
- The application shall inform visitors on nearby restrooms and mosques based on their location at the mall.
- The visitor shall be able to scan store items codes to view their information.
- The application shall allow visitors to rate their experience using the provided services and give feedbacks.

7- Budget Estimate and Financial Analysis

To create a budget estimate for the application, several factors must be considered such as development costs, hosting costs, maintenance costs, and marketing costs. Development costs include hiring developers, designers, and project managers to build the application, as well as purchasing software licenses and development tools. Hosting costs involve the cost of hosting the application on a server or cloud platform, which will depend on the size of the application and the number of users it can handle. Maintenance costs include fixing bugs, updating the application, and providing customer support. Finally, marketing costs involve promoting the application through advertising, social media, and other channels. An estimate of costs for the project is \$200,000. This project estimate is based on the manager working 30 hours per week for about eleven months and other staff working about 50 hours per week for about eleven months. A project manager would earn \$50 per hour. Other team members in the project would earn an hourly rate of \$70 per hour. Since software and services from suppliers are needed in this project, \$88,200 will be included in the initial cost estimate to purchase them. \$50,000 will be spent on maintenance and updates of new malls, features, etc. Exhibit A describes the costs and benefits, NPV, ROI, and the year where payback happens. The NPV is \$312,200 and the ROI based on a six-year application is 57% which is optimizing.

8- Schedule Estimate

The managers expect that the project will be completed within eleven months. In addition, they assume that the application will have a useful lifetime of at least four years.

9- Potential Risks

This project has a few risks. The biggest concern is security, the application must be very secure to protect sensitive and personal information of the users. Technical issues may arise during the development process. The app may not be compatible with all mobile devices. Also, the accuracy of the data provided by the mall's map and directory may affect the app's performance.

10- Exhibits

Exhibit A: A Financial Analysis for Mall Navigation Application Project

Financial Analysis for Mall Navigation Application							
Created by: Razan Alghanmi		Date: 29/04/2023					
Note: Change the inputs, shown in green below (i.e. interest rate, number of years, costs, and benefits). Be sure to double-check the formulas based on the inputs.							
Discount rate		11.00%					
Assume the project is completed in Year 0				Year			
	0	1	2	3	4	5	Total
Costs	200,000	100,000	150,000	250,000	300,000	500,000	
Discount factor	1.00	0.90	0.81	0.73	0.66	0.59	
Discounted costs	200,000	90,000	121,500	182,500	198,000	295,000	592,000
Benefits	1	170,000	220,000	360,000	470,000	700,000	
Discount factor	1.00	0.90	0.81	0.73	0.66	0.59	
Discounted benefits	1	153000	178,200	262,800	310,200	413,000	904,200
Discounted benefits - costs	(199,999)	63,000	56,700	80,300	112,200	118,000	312,200 ← NPV
Cumulative benefits - costs	(199,999)	63,000	119,700	200,000	312,200	430,200	
ROI →	↑	53% Payback in Year 1		↑			
Assumptions							
Costs	# Hours						
PM (700 hours, 50 SAR / hour)							
35,000	35,000						
Staff (960 hours, 80 SAR / hour)	76,800						
Outsourced Software and Services	88,200						
Total Project Costs (all applied in year 0)	200,000						
Benefits							
# Consultants	500,000						
Hours Saved	50						
SAR / hour Profit	20						
Benefits from Saving Time	250,000						
Benefits from 1% Increase in Profits	50,000						
Total Annual Projected Benefits	300,000						

Dis rate	11%						
project1	year 0	year 1	year 2	year 3	year 4	year 5	total
Ben	\$1.00	\$170,000.00	\$220,000.00	\$360,000.00	\$470,000.00	\$700,000.00	\$1,920,001.00
cost	\$200,000.00	\$100,000.00	\$150,000.00	\$250,000.00	\$300,000.00	\$500,000.00	\$1,500,000.00
cash flow	-\$199,999.00	\$70,000.00	\$70,000.00	\$110,000.00	\$170,000.00	\$200,000.00	\$420,001.00
npv	\$ 2,947,164.28						

Stakeholder Register for Mall Navigation Application

Prepared by: Jana Bakhaluqi Date: 28/4/2023

Name	Role	Internal/External	Position	Contact information
Razan Alghanmi	Project Manager	Internal	Manager	razanalghanmi@gmail.com
Jana Bakhaluqi	Developer	Internal	IT department	janabakhaluqi@gmail.com
Shahad Kulaibi	Business Analyst	External	Consultant	shahadkulaibi@gmail.com
Maria Jawah	Marketing Specialist	Internal	IT department	mariajawah@gmail.com
Sarah Ahmed	Advisor	External	Client Representative	saraahmed@gmail.com
Layan Abdullah	Sponsor	Internal	CEO	layanabdullah@gmail.com

Stakeholder Management Strategy for Mall Navigation Application

Prepared by: Mariah Jawah Date: 28/4/2023

Name	Level of Interest	Level of Influence	Potential Management Strategies
Razan Alghanmi	High	High	Razan is a project manager who is responsible for ensuring that the project is completed on time and within budget.
Jana Bakhaluqi	High	High	Jana is a developer who wants to ensure that the application is technically sound and scalable.
Shahad Kulaibi	Low	High	Shahad is a business analyst who helps the organization reach their goals by analyzing data, assessing systems and processes, creating solutions, and creating long-term plans.

Maria Jawah	High	High	Mariah is a marketing specialist who wants to ensure that the application is marketed effectively to attract more users.
Sarah Ahmed	High	High	Sarah is a user who wants the application to be user-friendly and intuitive. She will give inputs and opinions to make the application better from the user's perspective.
Layan Abdullah	High	High	A sponsor for the project that provides financial or other resources to support and enable the project's success. may provide funding, expertise, or access to resources that are critical to the project's success.

Project Charter

9

Prepared by: Shahad Kulaibi

Date: 28/4/2023

Project title: Mall navigation program project

Project start date: 1/4/2024

Projected finished date: 1/3/2025

Budget information: The company has set aside \$200,000 for this project. Most of the costs will be spent on internal labor.

Project manager: Razan Alghanmi, +966 548217911,
razanalghanmi1@gmail.com

Project objectives:

- Develop a user-friendly mobile application for both iOS and Android platforms.
- Integrate the app with the mall's map and directory to provide accurate and up-to-date information.
- Provide real-time information about store locations, promotions, and events.
- Enable customers to search for stores, restaurants, and other facilities by category, name, or location.
- Include features such as indoor navigation, parking information, and customer feedback.

Main project success criterion:

The project should pay for itself within A year and a half of completion.

Approach:

- Determine the important features that the program must provide based on input from the targeted audience.
- Search for software that provides all basic program functions such as security, managing user inputs, and location tracking.
- Develop the project using an iterative approach such as the agile approach. By using this, a lot of important feedback and comments from the users can be obtained.
- Determine the kinds of data that the program might collect and organize from the user, and the security practices that the program might follow.
- Integration of the app with the mall's map and directory.

Roles And Responsibilities

Prepared by: Jana Bakhaluqi Date: 28/4/2023

Name	Role	Position	Contact information
Razan Alghanmi	Project Manager	Manager	razanalghanmi@gmail.com
Jana Bakhaluqi	Developer	IT department	janabakhaluqi@gmail.com
Shahad Kulaibi	Business Analyst	Consultant	shahadkulaibi@gmail.com
Maria Jawah	Marketing Specialist	Marketing	mariajawah@gmail.com
Sarah Ahmed	Advisor	Client Representative	saraahmed@gmail.com
Layan Abdullah	Sponsor	CEO	layanabdullah@gmail.com

Sign-off:

Razan Alghanmi , Jana Bakhluqi , Shahad Kulaibi , Maria Jawah, Sarah Ahmed,Layan Abdullah

Comments:

"Changes should be simple to implement according to the application's requirements .
Additionally ,it must to be as responsive and resource-efficient as possible."

Mall Navigation Application Kick-off Meeting

Prepared by: Razan Alghanmi

Date: 28/4/2023

Meeting Date: 1/5/2023

Project Name: Mall Navigation Application

Meeting Objective: The objective of the kickoff meeting for the mall navigation application is to introduce the project team, stakeholders, and project goals. The meeting will also establish a shared understanding of the project scope, timeline, and budget. In addition, the meeting will identify potential risks and challenges and establish a plan for stakeholder communication and engagement throughout the project. Finally, the meeting will establish a collaborative and positive working environment to ensure the success of the project.

Agenda:

1. Welcome and Introductions
2. Review of Project Goals and Objectives
3. Project Scope and Timeline
4. Risk Management
5. Budget and Resource Allocation
6. Communication Channels and Protocols
7. Roles and Responsibilities
8. Key Milestones and Deliverables
9. Project Metrics and Success Criteria
10. Next Steps and Action Items
11. Adjournment

Action Item	Assigned To	Due Date
Introduce project team members and stakeholders	Razan Alghanmi	3/5/2023
Review project goals and objectives	Layan Abdullah	3/5/2023
Discuss project scope and timeline	Layan Abdullah	3/5/2023
Identify potential risks and mitigation strategies	Jana Bakhluqi	4/5/2023

Review project budget and resource allocation	Shahad Kulaibi	4/5/2023
Establish communication channels and protocols	Jana Bakhaluqi	5/5/2023
Define roles and responsibilities of project team members Identify key milestones and deliverables	Razan Alghanmi	6/5/2023
Agree on project metrics and success criteria	Sarah Ahmed	7/5/2023
Discuss next steps and action items for each team member.	Mariah Jawah	7/5/2023

Date and time of next meeting: 10/5/2023 at 10:00 am.

Project Title: Mall Navigation Application

Prepared by: Razan Alghanmi, Shahad Kuliabi, Maria Jawah, Jana Bakhulqi

Date: 10/5/2023

Project Justification:

Malls can be overwhelming, especially for first-time visitors. Shoppers often struggle to find the stores they are looking for, and may spend hours wandering around the mall without making any purchases. This can be frustrating for shoppers and can lead to a decrease in sales for the mall. The mall navigation application will solve this problem by providing shoppers with a user-friendly interface that will help them navigate through the mall easily. By providing shoppers with a map of the mall, store locations, and product categories, the application will make it easier for shoppers to find what they are looking for. Additionally, by allowing shoppers to search for specific stores and products, the application will save them time and effort. Furthermore, by providing shoppers with information on promotions and discounts, the application will encourage them to make purchases and increase sales for the mall. Overall, the mall navigation application will improve the shopping experience for shoppers and increase sales for the mall.

Product Characteristics and Requirements:

1. User-friendly interface
2. Accurate and up-to-date map of the mall
3. Store locations and product categories clearly marked
4. Search function for specific stores and products
5. Information on promotions and discounts
6. Ability to save favorite stores or products
7. Option to receive notifications on promotions or sales
8. Integration with mall loyalty programs
9. Compatible with iOS and Android devices
10. GPS tracking to show user's location within the mall
11. Regular updates to ensure accuracy of map and store information
12. Integration with mall directory and store databases
13. Secure login for user accounts
14. Ability to handle high traffic and user volume during peak shopping times
15. Option for users to provide feedback or report issues with the application
16. Compliance with data privacy regulations.

Summary of Project Deliverables

Project management-related deliverables:

1. **Project Charter:** This document outlines the purpose, goals, scope, and stakeholders of the mall navigation application project.
2. **Project Plan:** This document includes a detailed project timeline, milestones, resource allocation, budget, and risk management plan.
3. **Requirements Specification:** This document outlines the functional and non-functional requirements of the mall navigation application, including user interface, map accuracy, store information, search function, promotions, notifications, loyalty program integration, and security.
4. **Design Documents:** These documents detail the technical design of the application, including architecture, data models, user interface design, and integration with third-party systems.
5. **Development Plan:** This document outlines the development approach, tools, and methodologies to be used during the development phase.
6. **Testing Plan:** This document outlines the testing approach, test cases, and test scenarios to ensure the application meets the requirements and is free of defects.
7. **Deployment Plan:** This document outlines the deployment approach, including installation, configuration, and rollout to end-users.
8. **User Manual:** This document provides instructions on how to use the application and its features.
9. **Maintenance Plan:** This document outlines the ongoing maintenance and support requirements for the application, including bug fixes, updates, and enhancements.
10. **Project Closure Report:** This document summarizes the project outcomes, lessons learned, and recommendations for future projects.

Product-related deliverables:

1. **Product Requirements Document:** This document outlines the functional and non-functional requirements of the mall navigation application, including user interface, map accuracy, store information, search function, promotions, notifications, loyalty program integration, and security.
2. **User Interface Design:** This document includes wireframes, mockups, and prototypes of the application's user interface design.
3. **Map Data:** This deliverable includes accurate and up-to-date map data for the mall, including store locations and floor plans.
4. **Store Information Database:** This deliverable includes a database of store information, including store names, descriptions, hours of operation, and contact information.
5. **Search Algorithm:** This deliverable includes an algorithm for searching and filtering stores based on user input.
6. **Promotions and Notifications System:** This deliverable includes a system for displaying promotions and sending notifications to users based on their location and preferences.
7. **Loyalty Program Integration:** This deliverable includes integration with the mall's loyalty program to allow users to earn and redeem rewards.
8. **Security Measures:** This deliverable includes measures to ensure the security and privacy of user data, including encryption and access controls.
9. **Mobile Application:** This deliverable includes the mobile application itself, available for download on iOS and Android devices.
10. **Technical Documentation:** This deliverable includes technical documentation for developers and system administrators, including API documentation, database schema, and deployment instructions.

Project Success Criteria:

The success of a mall navigation application can be measured by various factors. Firstly, the application should have a high adoption rate among mall visitors, with at least 50% of visitors using the application within the first six months of launch. Secondly, the application should provide accurate and reliable information about store locations, hours of operation, and promotions, with no more than 5% of reported errors or inaccuracies. User satisfaction is also crucial, with at least 80% of users rating the application as "good" or "excellent" in user satisfaction surveys. The application should contribute to an increase in mall sales, with at least a 10% increase in sales from stores featured in promotions or notifications sent through the application. Moreover, it should increase engagement with the mall's loyalty program, with at least a 20% increase in loyalty program sign-ups and redemptions through the application. Security and privacy of user data should be ensured, with no reported security breaches or data leaks. Technical performance is also important, with no more than 1% of users experiencing crashes or other technical issues. The application should be scalable to accommodate increasing numbers of users and stores without compromising performance or accuracy. It should also be cost-effective to develop and maintain, with a return on investment (ROI) of at least 2:1 within the first year of launch. Finally, the application should be innovative and unique, offering features and functionality not available in other mall navigation applications.

Work Breakdown Structure Template for Mall navigation program

Prepared by: Razan Alghanmi

Date: 23/5/2023

1. Initiation

- 1.1 Perform market research and identify user needs
- 1.2 Define the scope of the application
- 1.3 Identify the stakeholders and project sponsor
- 1.4 Conduct preliminary risk assessment
- 1.5 Develop project charter

2. Planning

- 2.1 Conduct detailed requirement gathering exercise for the application
 - 2.1.1 Define the functional and non-functional requirements
 - 2.1.2 Define the use cases and scenarios
 - 2.1.3 Define the technical requirements
- 2.2 Develop Project management plan
 - 2.2.1 Define the project timeline
 - 2.2.2 Define the budget
 - 2.2.3 Define the resource requirements
 - 2.2.4 Define the human resources plan
- 2.3 Develop wireframes and user interface designs
- 2.4 Develop a product roadmap
- 2.5 Perform risk assessment and develop a risk management plan
- 2.6 Obtain necessary approvals for project plan and design

3. Execution

3.1 Development

- 3.1.1 Develop the app backend infrastructure
- 3.1.2 Develop the app frontend functionality
- 3.1.3 Develop backend application architecture
- 3.1.4 Develop authentication and authorization system
- 3.1.5 Develop store and product data integration
- 3.1.6 Develop search functionality
- 3.1.7 Develop indoor navigation system
- 3.1.8 Develop shopping cart and checkout process
- 3.1.9 Develop user account management system
- 3.1.10 Conduct user testing on the application
- 3.1.11 Perform quality assurance testing

4. Control

4.1 Testing

- 4.1.1 Monitor project progress and communicate status to stakeholders
- 4.1.2 Monitor and control project risk
- 4.1.3 Address any unplanned issues or changes
- 4.1.4 Perform change control process
- 4.1.5 Monitor project scope and adjust as necessary
- 4.1.6 Ensure quality control standards are met
- 4.1.7 Monitor budget and resource usage

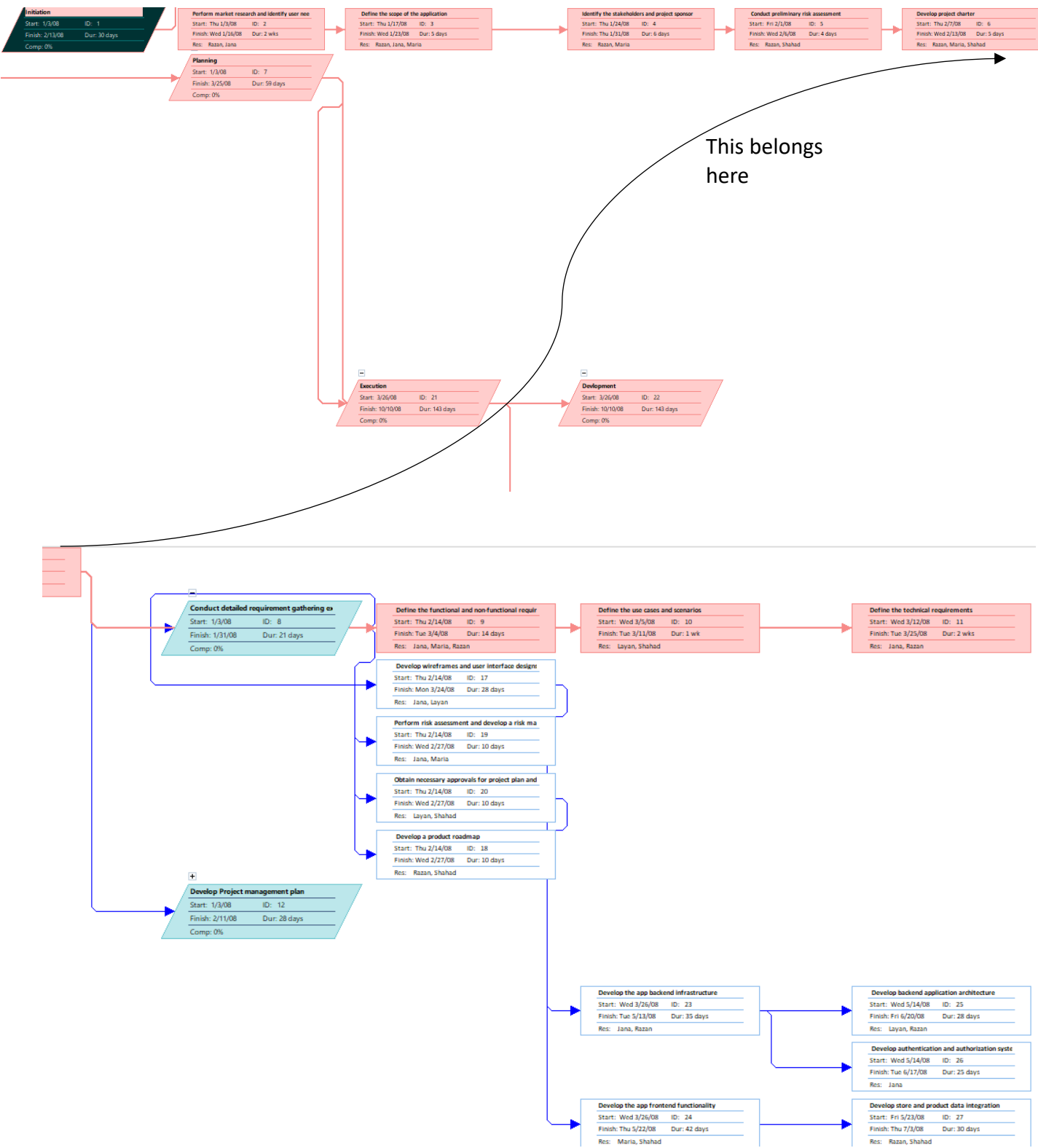
5. Closing

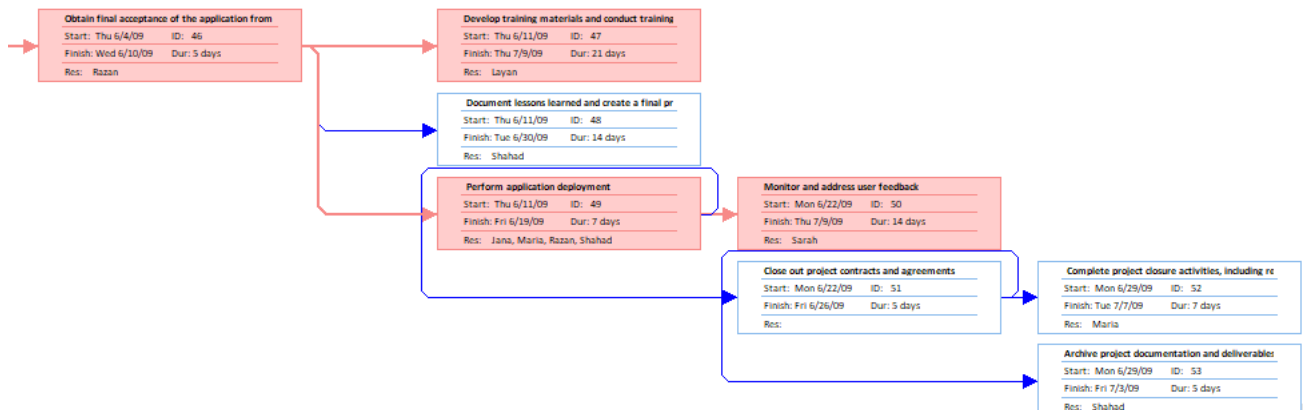
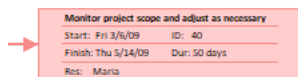
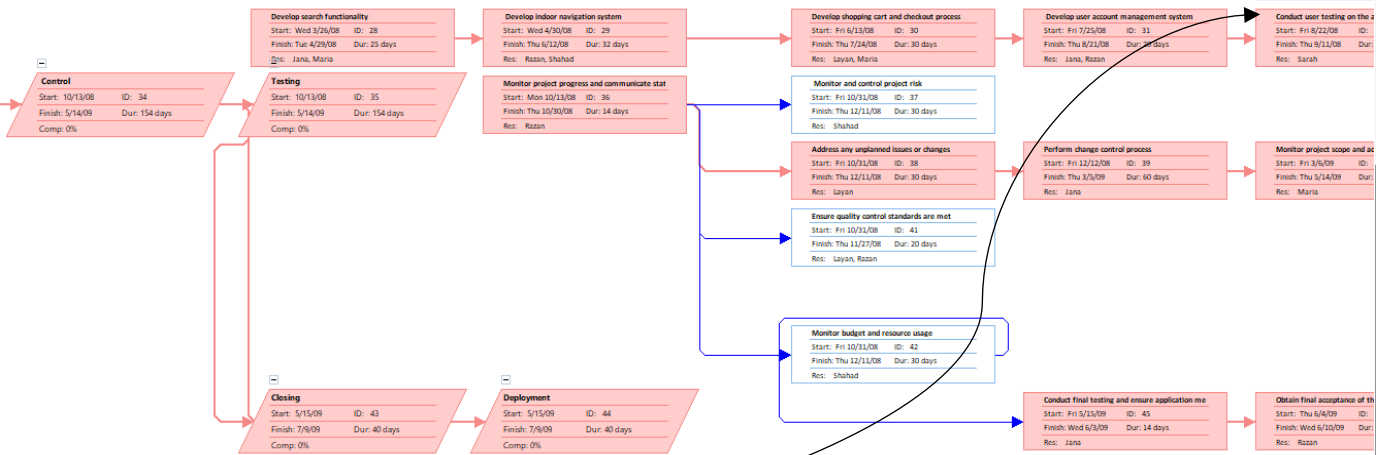
5.1 Deployment

- 5.1.1 Conduct final testing and ensure application meets all requirements
- 5.1.2 Obtain final acceptance of the application from stakeholders
- 5.1.3 Develop training materials and conduct training sessions
- 5.1.4 Document lessons learned and create a final project report
- 5.1.5 Perform application deployment
- 5.1.6 Monitor and address user feedback
- 5.1.7 Close out project contracts and agreements
- 5.1.8 Complete project closure activities, including releasing resources
- 5.1.9 Archive project documentation and deliverables

Network Diagram

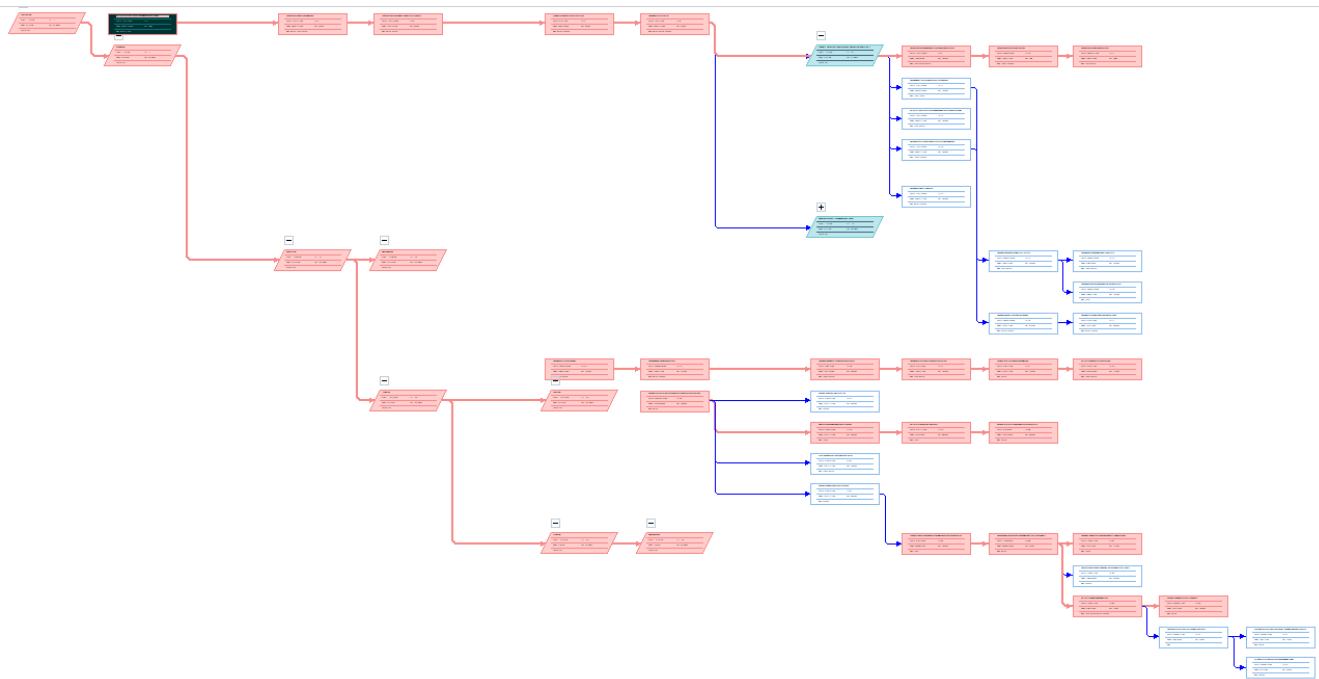
Prepared by: Razan Alghanmi, Shahad Kuliabi, Maria Jawah, Jana Bakhulqi





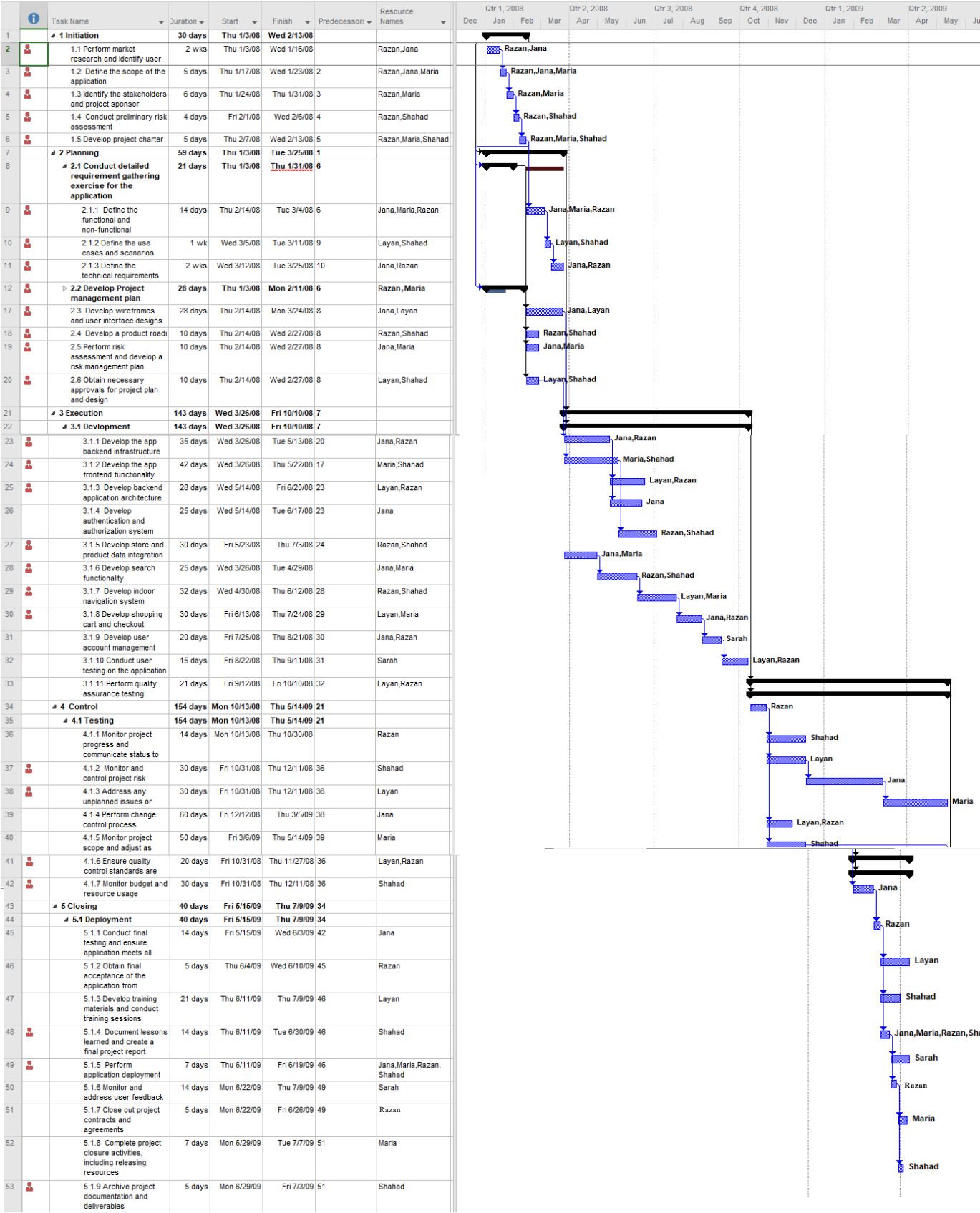
Network Digram Overview

Prepared by: Razan Alghanmi, Shahad Kuliabi, Maria Jawah, Jana Bakhulqi



Gantt Chart:

Prepared by: Razan Alghanmi, Shahad Kuliabi, Maria Jawah, Jana Bakhulqi



Suggestions:

Prepared by: Razan Alghanmi, Shahad Kuliabi, Maria Jawah, Jana Bakhulqi

Based on the successful completion of the mall navigation application project, a few suggestions can be made for future improvement. Firstly, there is a need for enhanced accuracy of location detection through integration with a location-aware technology like GPS. Moreover, integration with the mall infrastructure to track real-time information, including store promotions and sales, would significantly enhance the user's experience.

Additionally, including a feature to navigate using elevators, escalators, and restrooms and making the application available in multiple languages would improve accessibility to a broader customer base, especially for non-native language speakers. Lastly, it would be helpful to have a feature to capture user feedback in real-time and include analytics to analyze usage patterns, preferences, and search insight to improve customer service and user experience. By incorporating these suggestions in future versions of the application, it will result in a more user-friendly and beneficial experience while also improving mall operations.

Conclusion:

Prepared by: Razan Alghanmi, Shahad Kuliabi, Maria Jawah, Jana Bakhulqi

In conclusion, the mall navigation application project is an innovative solution that helps visitors to navigate through the mall with ease. Throughout the project's life cycle, many aspects have been considered, including project scope, objectives, risk, budget, quality management, and procurement. These aspects have made the project successful, enabling it to be completed on time and within budget.