



Department of Information Technology

University of the Punjab

First Deliverable

Project id: BIT-2109

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1.1 Project/Product Feasibility Report

We have carried out the following feasibilities for our project

- Technical
- Operational
- Economic
- Schedule
- Specification

- Information
- Motivational
- Legal and Ethical
- Risk list

1.1.1 Technical Feasibility

The proposed system will be developed in app bases completely and it is required to use app technologies appropriately. Technology to build the overall system is available.

Currently available app technologies **App Tools:**

Android Studio

XAMPP server

Database

MySQL

The system is developed using C#, ASP>Net, JavaScript, Html, CSS and Bootstrap. Core as the main development language. We are assured that our software team currently possesses the required expertise to complete the system and it is clearly defined that the project is successfully and professionally in our grip.

1.1.2 Operational Feasibility

Potential users of the Digital Signage app are already acquainted with digital interfaces, making the training process straightforward. The implementation of the Digital Signage app within existing networks can be seamlessly managed. Addressing security concerns will be a priority, either at the network level or within the application itself, ensuring secure and reliable deployment. The Digital Signage app is designed to streamline data entry processes, reducing the need for manual labor. With automated content management, fewer personnel will be required for data entry and information processing, leading to cost savings. Personal information, stock details, and other relevant data are efficiently managed within the app's database. The Digital Signage app is tailored to enhance user convenience, streamline operations, and optimize the overall digital signage experience for both users and customers.

1.1.3 Economic Feasibility

Assessing the economic feasibility of a digital signage project is pivotal, demanding a detailed examination of upfront and continuous expenses. Utilizing an economic feasibility report, we've conducted a comprehensive cost/benefit analysis for the project, distinctly categorized into cost estimates and benefit estimates. Employing Functional Point Analysis (FPA) as a prominent cost estimation model, we've briefly scrutinized the development or acquisition costs (one-time) and the ongoing maintenance and operation costs. Development costs, calculated by segmenting the project, amount to approximately Rs.

80,000. In the realm of benefit estimation, we distinguish between substantial and insubstantial benefits. Leveraging substantial benefits not only mitigates costs but also augments revenue, enhancing the overall economic viability of the project.

1.1.4 Schedule Feasibility

We've confidently evaluated the schedule feasibility, ensuring successful project completion within the allocated timeframe and available resources. Meticulous scheduling, utilizing a Gantt chart and Critical Path Methodology, includes calculating essential time limits and milestones. With our strategic approach, we are poised to meet all deadlines, ensuring a seamless and punctual digital signage project development process without delays or time slippage.

1.1.5 Specification Feasibility

In terms of Specification Feasibility, we have confidence that our project will fulfill all essential specifications. Our team members have a clear understanding of all defined requirements, and both hardware and software specifications align well with the project's completion. The boundaries of the project scope have been thoroughly assessed and are well-defined.

1.1.6 Information Feasibility

In the information feasibility analysis, we thoroughly examined the adequacy, consistency, and relevance of available information for the project. Conclusively, we determined that the gathered information is sufficient and meets the requirements for application development.

1.1.7 Motivational Feasibility

A successful project captivates viewers, inspires valuable lessons, and fosters team enthusiasm for enhanced learning and achieving project objectives. Team members are motivated by the prospect of accessing additional conveniences, fueling their commitment to project development.

1.1.8 Legal & Ethical Feasibility

The completion of the project is free from any legal or moral concerns, ensuring its absolute legality and non-disruptive nature. It will not pose any issues for others, maintaining a lawful and ethical framework.

1.2 Project/Product Scope

“**Digital Signage**” is an online utility for the people; it has all the major features which are essential for a full-fledged application. Now users can see the details of the product on the

Digital Screen and order the products by using it. It also reduces the number of salesmen. Users can buy, can check the specifications of product, can pay online payment as well as users can change or cancel the product within the time constraints. Digital Signage System will do the following tasks:

- Digital Signage System *aims to maintain and manage the various tasks and processes.*
- *It'll give information about the products and their price (and discount if given) current availability status.*
- The system will allow users to register their account and purchase the products.
- The design of the application will involve videos and pictures and searching for the product and its details like price and discount. • The selected product can be added into the cart • It will provide information about products.
- Customers can view, order and online payment of it.

1.3 Project/Product Costing

Determining the cost of a project is an important step in project management, and various techniques are employed for this purpose. Determining the cost of a project is a crucial step in project management, and various techniques are employed for this purpose.

1.3.1 Project Cost Estimation by Function Point Analysis

Internal Logical File (ILF's)			
Type of Components	DET	RET	Complexity
Admin_Credentials	3	0	Low
User_Credentials	14	0	Low
User Quires	7	0	Low
Products	10	0	Low
Product Details	3	2	Low
Product Features	3	2	Low
Add to cart Details	9	1	Low
Order Details	15	2	Low

Contact Detail	10	0	Low
Carousel	2	0	Low
Facilities	4	0	Low
Features	2	0	Low
Setting	4	0	Low

External Inputs (EI's)

Types of Components	DET	FTR	Complexity
Login	2	0	Low
Logout	1	1	Low
Registration	6	1	Low
Product Detail	2	1	Low
Order Detail	2	1	Low
Order Status	2	1	Low
Review	8	3	Low
Payment Method	3	1	Low
Payment Status	2	1	Low

External Interface File (EIF's)

Types of Components	DET	RET	Complexity
PayPal	3	1	Low
Email Confirmation	2	1	Low

External Output (EO's)

Types of Components	DET	FTR	Complexity
Email Confirmation	2	2	Low
Daily Reports	2	2	Low
Weekly Reports	2	2	Low
Monthly Reports	2	2	Low
External Queries (EQ's)			
Types of Components	DET	FTR	Complexity
List of Products	5	2	Low
List of in stock Products	7	2	Low
List of sold products	7	2	Low
List of Customers	7	1	Low

Computing Function Points:

Type of Component	Complexity of Components			
	Low	Average	High	Total
External Inputs	$9 \times 3 = 27$	$0 \times 4 = 0$	$0 \times 6 = 0$	27
External Outputs	$4 \times 4 = 16$	$0 \times 5 = 0$	$0 \times 7 = 0$	16
External Queries	$4 \times 3 = 12$	$0 \times 4 = 0$	$0 \times 6 = 0$	12
Internal Logical Files	$5 \times 7 = 35$	$0 \times 10 = 0$	$0 \times 15 = 0$	35
External Interface Files	$2 \times 5 = 10$	$0 \times 7 = 0$	$0 \times 10 = 0$	10
Total Unadjusted Function Points (UFPs)				100

2.1.2 Calculation of (Fi)

GSC	Value (0-5)
Data communications	4
Distributed data processing	0

Performance	5
Heavily used configuration	0
Transaction rate	0
On-Line data entry	3
End-user efficiency	1
On-Line update	4
Complex processing	4
Reusability	3
Installation ease	0
Operational ease	5
Multiple sites	0
Facilitate change	4
Total	33

2.1.3 Calculation of Function Point (FP)

To compute function points (FP), the following relationship is used:

$$\begin{aligned}\text{VAF} &= (0.01 \times \text{TDI}) + 0.65 \\ &= (0.01 \times 33) + 0.65 \\ &= 0.98\end{aligned}$$

$$\begin{aligned}\text{AFP count} &= \text{UFP count} \times \text{VAF} \\ &= 100 \times 0.98 \\ &= 98 \text{ FP}\end{aligned}$$

2.1.4 Total Cost of the Project

Suppose cost to solve one FP = Rs. 600

Total Cost	= Cost Per FP * Total FP
	= 600 * 98
	= 58,800PKR

Finally, Total Project Cost and Total Project Effort are calculated given the average productivity parameter for the system.

1.4 CPM - Critical Path Method

1. Specify the Individual Activities

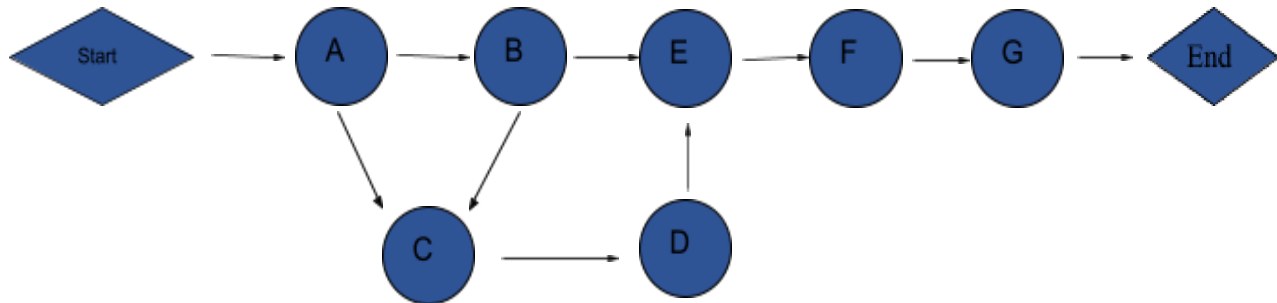
Following are the individual activities involved in the project.

- ❖ Project Proposal
- ❖ Project Planning
- ❖ Requirement Gathering
- ❖ Design, Layout
- ❖ Development
- ❖ Modules ❖ Backend
- ❖ Database Connectivity
- ❖ Integration
- ❖ Testing

2. Determine the Sequence of the Activities

There are many activities that are dependent on the completion of some other activities. The dependencies of activities upon each other are as under.

ID	Activity	Dependencies
A	Requirement Gathering	None



B	Design, Layout, and structure	A
C	Development and Modules	A, B
D	Backend	C
E	Database Connectivity	D
F	Integration	E
G	Testing	F

3.Draw the Network Diagram

4. Estimate Activity Completion Time

The time required to complete each activity can be estimated using experience or the estimates of knowledge persons.

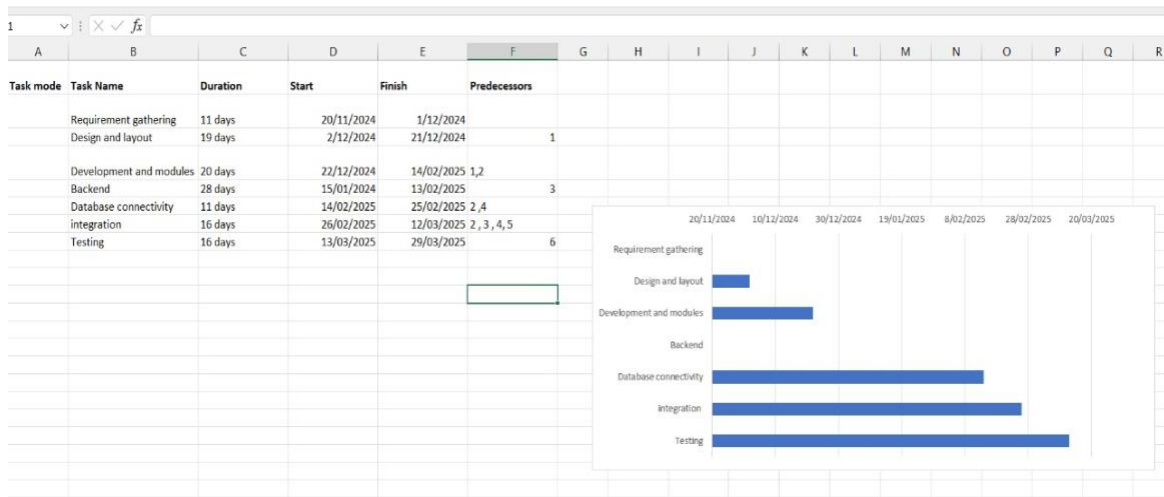
ID	Predecessors	Duration (days)
A	None	14 days
B	A	21 days
C	A, B	28 days
D	C	28 days
E	B, D	7 days
F	B, C, D, E	14 days
G	F	21 days

5. Identify the Critical Path

Activity	Duration	ES	EF	LS	LF	TS	FS
A	14	0	14	0	14	0	0
B	21	14	35	14	35	0	0
C	28	35	63	35	63	0	0
D	28	63	91	63	91	0	0
E	7	91	98	91	98	0	0
F	14	98	112	98	112	0	0
G	21	112	133	112	133	0	0

Critical path is A ->B ->C ->D ->E ->F ->G =133

1.5 Gantt chart



1.6 Introduction to Team members and their skill set.

Name	Roll no	Email Address
Aleeza Aftab	BIT21208	aleezaaftab338@gmail.com
Ayesha Shahbaz	BIT21242	choudharyayesha644@gmail.com

Skills:

Aleeza Aftab:

She is responsible for managing Database activities and she has maximum potential to document the things in standardized format

Ayesha Shahbaz:

She is responsible for utilizing their expertise in marketing and branding to strategize the content and messaging on the digital signage app. and maintaining the digital signage app.

1.7 Tools and Technology with reasoning

● Technology and Languages:

C#

C# is a popular programming language. It offers a lot of flexibility and power. It is widely used for building windows applications, web applications and even games so, we are going to develop an app, this language is used in development.

ASP.NET

ASP.NET is a server-side scripting technology that allows you to use a full featured programming language such as C# etc. to build applications easily.

JavaScript

JavaScript works on the Client Side. It manipulates the objects within the HTML document. JavaScript is a scripting language that enables you to create dynamically update content, control multimedia, animate images, and pretty much everything else.

Java

Java is used for app development because of its versatility and platform independence. It allows developers to write code once and run it on multiple platforms. It also has a large ecosystem of libraries and frameworks that simplify app development.

Html

HTML is used to create webpage layouts. HTML5 is a standard for structuring and presenting content on the World Wide Web. JavaScript and jQuery enhance the functionality of Webpages by making them interactive. These are lightweight client-side scripting languages.

CSS

CSS is a language that describes the style of an HTML document. CSS describes how HTML elements should be displayed. It is a language used to detail the presentation of a web page's markup language (most commonly HTML or XHTML) – such as colors, fonts, and layout. One of its key benefits is the way it allows the separation of document content (written in HTML or a similar markup language) from document presentation (written in CSS).

Bootstrap

Bootstrap includes several components and options for laying out your project, including wrapping containers, a powerful flex- box-grid system, a flexible media object, and responsive utility classes.

- **Application Tools:**

Visual Studio

Visual Studio Code is a free coding editor that helps you start coding quickly. Use it to code in any programming language, without switching editors. Visual Studio Code has support for many languages, including Python, Java, C++, JavaScript, and more.

Xampp Server

XAMPP is a free and open-source cross-platform. It combines Apache, MySQL, PHP and perl into a single package, making it easy to install and figure. With Xampp, developers can test their apps locally before deploying them to a live server.

- **Database:**

MySQL

MySQL is an **open-source relational database management system**. As with other relational databases, MySQL stores data in tables made up of rows and columns. Users

can define, manipulate, control, and query data using Structured Query Language, more commonly known as SQL.

- **Documentation:**

Microsoft Visio

Microsoft Visio is a diagramming and vector graphics application and is part of the Microsoft Office family. The product was first introduced in 1992, made by the Shape ware Corporation. It was acquired by Microsoft in 2000.

Microsoft word

Microsoft is a graphical word processing program that users can type with. It is made by Microsoft. The purpose of MS Word is to allow the users to type and save documents. Like other word processors, it has helpful tools to make documents. Spelling and Punctuation checking feature in Microsoft word helps us to correct the spellings in our documents. We use Microsoft Word for the documentation of our project.

1.8 Vision Document

The Digital Signage App is designed to revolutionize the in-store experience for both businesses and customers. By leveraging dynamic digital screens in shops, this app aims to provide an interactive platform for businesses to showcase products, promotions, and essential information while enhancing the overall shopping experience for customers.

Key Features:

- Foster meaningful interactions between customers and businesses through interactive digital displays.
- Empower businesses to communicate real-time information, promotions, and updates to customers.
- Increase brand visibility and recognition by creating visually appealing and customized digital content.
- Allow businesses to display dynamic content, including images, videos, and text, ensuring an engaging and up-to-date shopping environment.
- Enable businesses to conveniently update and manage displayed content remotely, ensuring flexibility and efficiency.
- Implement touchscreen features on digital screens, providing customers with an interactive experience to explore product details and promotions.
- Leverage the app to promote products, increase brand visibility, and enhance the overall in-store experience.

- Benefit from real-time information, interactive displays, and an engaging shopping experience.

1.9 Risk List

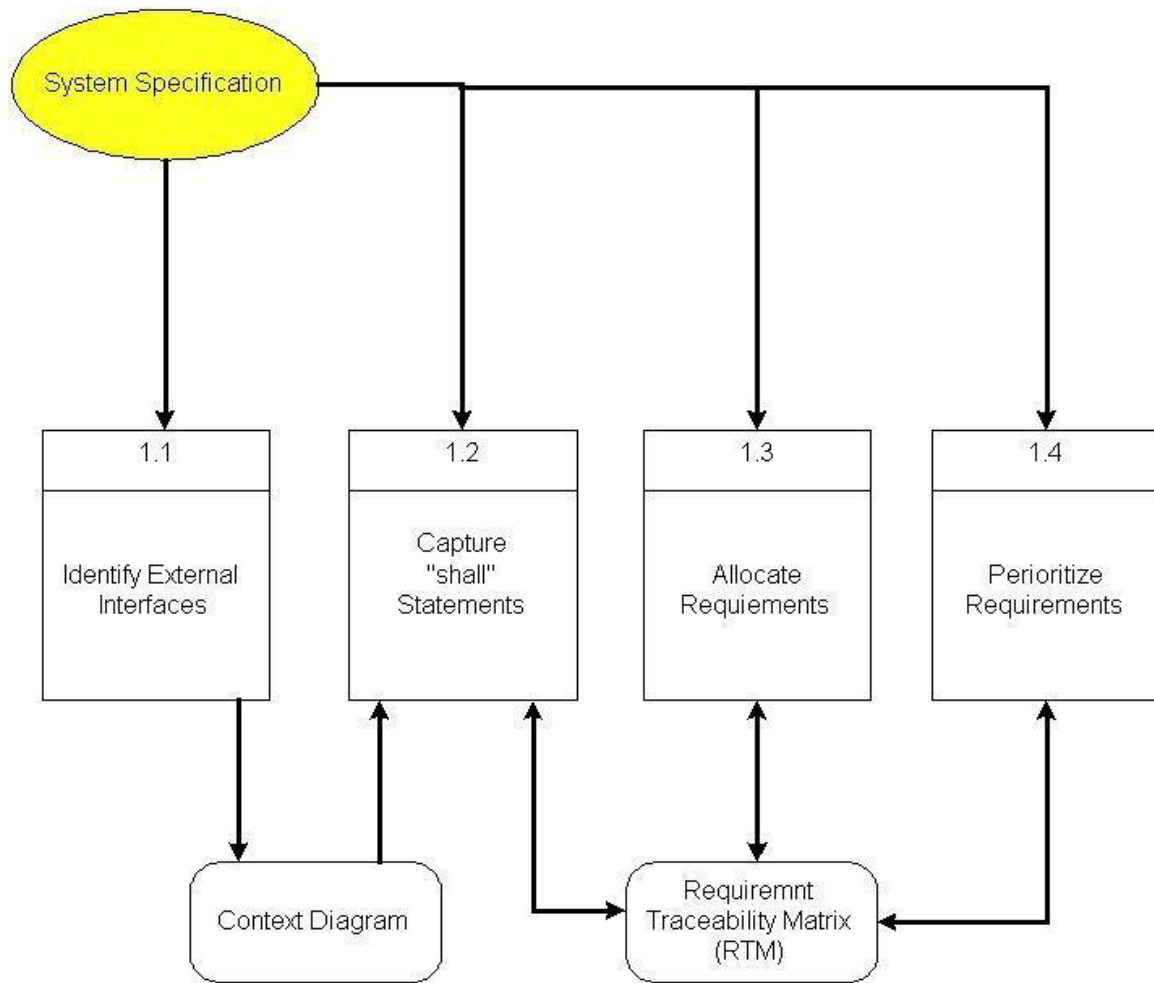
- Poor communication between the development team and client.
- Lack of resources.
- In any case, database connectivity issue.
- Time constraint.
- Any member may leave the group.
- Technology may change during the project.
- Ignorance of non-functional requirements.
- Lack of expertise.
- Unexpected project scope expansions.
- Lack of cooperation from team members. ● Security issues in critical moments.

*****REQUIREMENTS ENGINEERING*****

1 Introduction

Requirements engineering process provides the appropriate mechanism for understanding what the customer wants, analyzing need, assessing feasibility, negotiating a reasonable solution, specifying the solution unambiguously, validating the specification and managing the requirements as they are transformed into an operational system. The task of capturing, structuring, and accurately representing the user's requirements so that they can be correctly embodied in systems which meet those requirements (i.e. are of good quality).

- Requirements elicitation
- Requirements analysis and negotiation
- Requirements specification
- System modeling
- Requirements validation
- Requirements management



Here, requirements specification is to be discussed. Requirements specification would lead to the following four steps:

- Identify external interfaces
- Development of context diagram
- Capture “shall statements
- Allocate requirements
- Prioritize requirements
- Development of requirements traceability matrix

1.1 Systems Specifications

Introduction

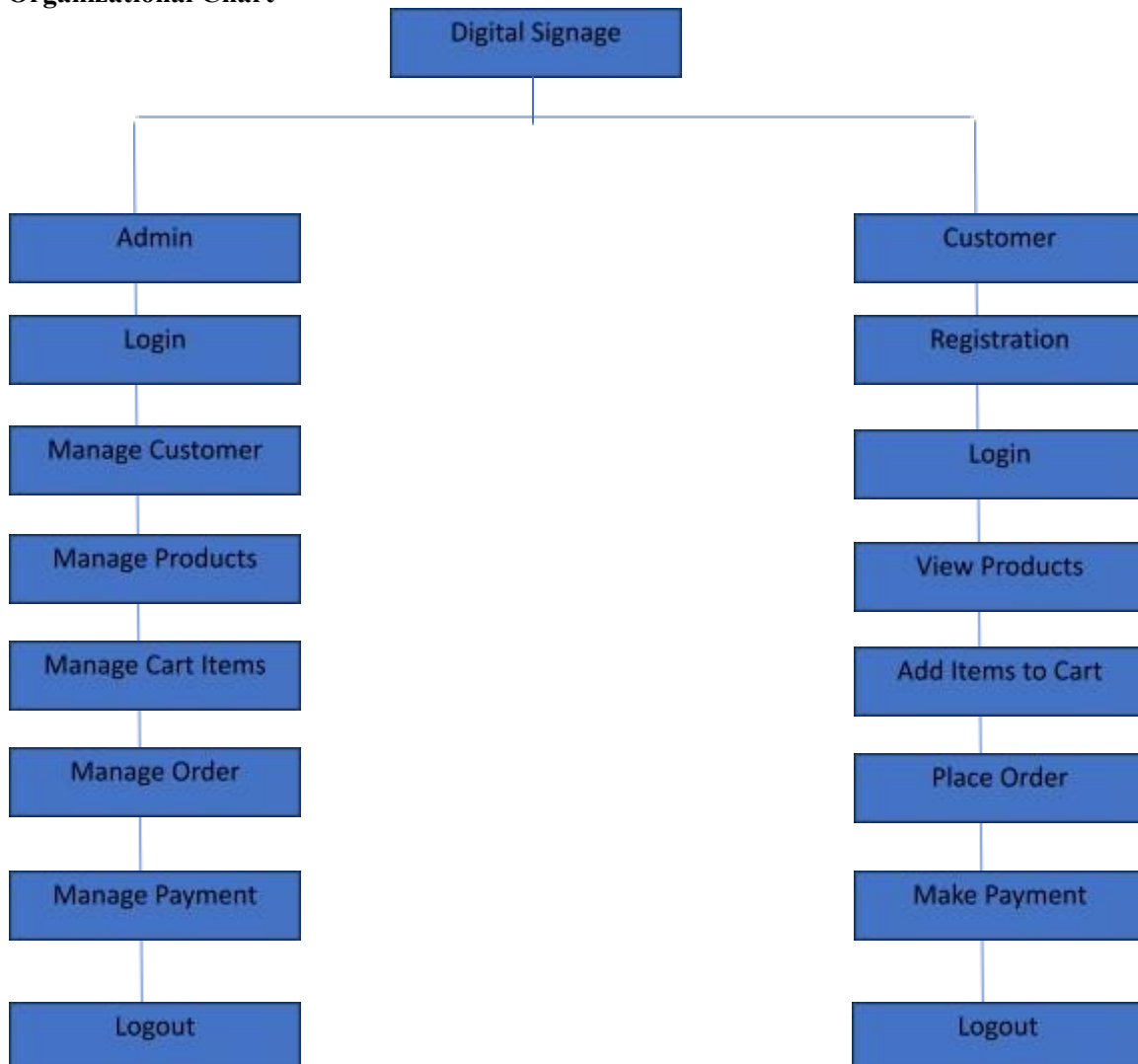
Digital signage is an application for displaying stuff in shops or places. It's a fancy upgrade from the old video signs you used to see in stores. Instead of VHS tapes, it now uses digital files (like on DVDs or USB drives) to show pictures, text, or videos on screens. You connect these files to a player, which puts them on the screen. Unlike before, modern systems allow different content on each screen, enhancing customization. thanks to improvements, you can make each screen show

It's basically a cool way for stores to show off things in a modern and customizable way. Its primary aim is to enhance customer experience by efficiently displaying product information through photos, videos, and features, reducing the need for customers to wait in line to talk to staff. This helps businesses save costs on traditional displays and staff resources while providing valuable information to customers in a strategic manner.

Existing System

Before computers took over, showing off products needed lots of money and salespeople. Now, with "Digital Signage," it's cheaper, requires fewer salespeople, and lets you display pictures, videos, and product details. Putting electronic displays in smart places with helpful info lets customers check out products without waiting to talk to staff.

Organizational Chart



Scope of the System

The system under development will be dealing with Digital signage in different cities across the country and will:

- Allow customers to effortlessly view all products on display screens by themselves.
- Allow customers to see the availability or unavailability of the product.
- Allow customers to see the detailed information(features, price ,etc.)of the products.
- Allow customers to navigate through customized content on different screens.
- Provide customers with a self-paced and informative experience, eliminating the need to wait in line.
- Allow customers to enjoy visually appealing presentations of products, promotions, and features.
- Allow customers to add items in the cart.
- Allow customers to seamlessly place orders and also track their orders.
- Allow different payment methods for customers.

Summary of Requirements (Initial Requirements)

1.Centralized Management:

Implement a central player for seamless connectivity and management of screens.

2.User interface and Experience:

Create a initiative user interface that will enable customers to independently view all products displayed on screens.

3. Real-Time Availability:

Implement a feature displaying real-time product availability status.

4. Detailed Product Information:

Provide customers with comprehensive product details, including features, pricing, etc.

5. Customized Content Navigation:

Allow customers to navigate through tailored content on different screens for an enhanced and personalized experience.

6. Visual Presentation:

Create visually appealing presentations of products, promotions, and features for an engaging customer experience.

7. E-commerce Integration:

Enable customers to add items to their cart within the digital signage system.

8. Order Placement and Tracking:

Implement seamless order placement and tracking functionalities for customer convenience.

9. Payment Flexibility:

Support various payment methods to accommodate different customer preferences.

1.2 Identifying External Entities

The Identification of External Entities is done in two phases.

a. Over Specify Entities from Abstract

On the basis of the Abstract, one might identify the entities from the problem:

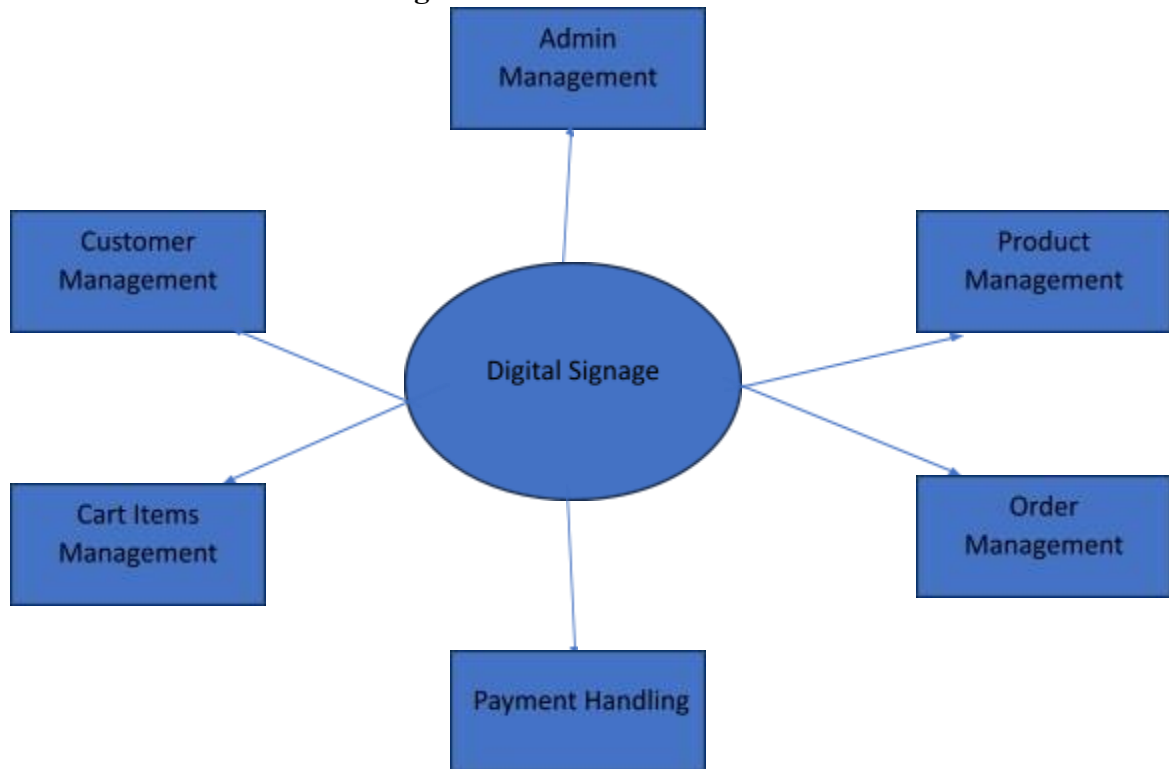
- Registration
- Login
- Admin
- Central Player
- Screens
- Customer Experience
- Product Information
- Photos ● Videos
- Features
- Traditional Displays
- Staff Resources
- Strategic Information
- Independent Product Viewing
- Availability Checking
- Detailed Information Access
- Customized Content Navigation
- Visually Appealing Presentations
- Add Items to Cart
- Order Placement and Tracking
- Payment ● Logout

b. Perform Refinement

The following entities more related to our business logic;

- Admin
- Screens
- Independent Product Viewing
- Detailed Information Access
- Customized Content Navigation
- Visually Appealing Presentations
- Add Items to Cart
- Order Placement and Tracking
- Payment

1.3 Context Level Data Flow Diagram



1.4 Capture "shall" Statements

Para #	External Entity	Initial Requirements
1	System	System “shall” maintain information of all products in database.
2	System	System “shall” display visual presentation of all products.
3	System	System “shall” display availability status of all products.
4	System	System “shall” show detailed information of each product.
5	Admin	Admin “shall” login to the system.
6	Admin	Admin “shall” register the Customer.
7	Admin	Admin “shall” generate reports.

8	Admin	Admin “shall” manage products information.
9	Admin	Admin “shall” manage cart items.
10	Admin	Admin “shall” manage order placement and order tracking.
11	Admin	Admin “shall” manage payments.
12	Admin	Admin “shall” logout from the system.
13	Customer	Customer “shall” register to the system.
14	Customer	Customer “shall” login to the system.
15	Customer	Customer “shall” see detailed information and visual presentation of all products.
16	Customer	Customer “shall” add items to the cart.
17	Customer	Customer “shall” place and track order.
18	Customer	Customer “shall” pay through different payment methods.
19	Customer	Customer “shall” Logout from the system.

1.5 Allocate Requirements

Para #	Initial Requirements	Use Case Name
1.0	Admin, Customer “shall” login to the system.	UC_Login
1.0	Admin “shall” Generate Reports.	UC_Reports
1.0	Admin “shall” Manage products information.	UC_Manage_Product_info
1.0	System “shall” display detailed information of all products along with their features and their prices.	UC_Display_Product_Details
1.0	System “shall” display visual presentation of all products through images and videos.	UC_Display_Product_VisualPresentation
1.0	System “shall” provide facility to place and track order after adding items to the cart.	UC_Place_Order
1.0	Admin “shall” Manages order.	UC_Manage_Order

1.0	Admin “shall” Manages Payment.	UC_Manage_Payment
1.0	Admin and Customer “shall” logout from the system.	UC_Logout
2.0	Customer “shall” See complete information of all products including their features and their prices.	UC_View_Product_Info
2.0	Customer “shall” See visual presentation of all products through product images and product videos.	UC_View_Product_VisualPresentation
2.0	Customer “shall” place order.	UC_Place_Order
2.0	Customer “shall” pay through different payment methods.	UC_Pay_For_Order

1.6 Prioritize Requirements

Para #	Rank	Initial Requirements	Use Case ID	Use Case Name
1.0	Highest	A Customer, Admin and “shall” login to the system.	UC_1	UC_Login
1.0	Medium	System “shall” Register new Customer.	UC_2	UC_Register
1.0	Highest	Admin “shall” Generate Reports.	UC_3	UC_Reports
1.0	Medium	Admin “shall” Manage Products information.	UC_4	UC_Manage_Product_info
1.0	Highest	System “shall” provide an interface for customers to pay through different payment methods.	UC_5	UC_Handling_Payment
1.0	Highest	System “shall” display detailed information of all products along with their features and theirs prices.	UC_6	UC_Display_Product_Details
1.0	Highest	System “shall” display visual presentation of all products through images and videos.	UC_7	UC_Display_Product_VisualPresentation
1.0	Medium	Admin “shall” Manages order.	UC_8	UC_Manage_Order
1.0	Lowest	Admin “shall” view customer order details.	UC_9	UC_View_Order_Details

1.0	Medium	Admin “shall” Manages payments.	UC_10	UC_Manage_Payment
1.0	Medium	Admin and Customer “shall” logout from the system.	UC_11	UC_Logout
2.0	Highest	Customer “shall” See complete information of all products including their features and their prices.	UC_12	UC_View_Product_Info
2.0	Highest	Customer “shall” See visual presentation of all products through product images and product videos.	UC_13	UC_View_Product_VisualPresentation
2.0	Lowest	Customer “shall” View all categories of products.	UC_14	UC_View_Product_Category
2.0	Medium	Customer “shall” View availability status of all products.	UC_15	UC_View_Availability_Status
2.0	Highest	Customer “shall” place and track order after adding items to the cart.	UC_16	UC_Place_Order
2.0	Medium	Customer “shall” cancel order	UC_17	UC_Cancel_Order
2.0	Highest	Customer “shall” pay through different payment methods.	UC_18	UC_Pay_For_Order

1.7 Requirements Trace-ability Matrix

Sr#	Para #	System Specification Text	Build	Use Case Name	Category
1	1.0	Customer “shall” login to the system.	B1	UC_User_Login	Business
2	1.0	System “shall” Save Customer data.	B1	UC_Register	Business

3	1.0	Admin “shall” require detailed information of all products for their display on the screen.	B1	UC_Manage_Product_Info	Business
4	1.0	Customer “shall” View detailed information of all products(photos,videos,features,prices,etc.)	B1	UC_View_Productinfo _Details	Business
5	1.0	Customer “shall” place order	B1	UC_Place_Order	Business
6	1.0	Customer “shall” logout from the system	B1	UC_User_Logout	Business

1.8 High Level Usecase Diagram:

