

IT 320 Course Project
Semester-1, 1447H
Section 76361



Software Product Release
برواز

Phase 3: Sprint 1
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Chapter 1: Introduction

In recent years, there has been a growing demand for personalized experiences across various industries. Customers increasingly expect services and products that reflect their individuality, style, and preferences, rather than generic, template-based solutions. According to global market reports, personalization has become a key expectation, with a majority of consumers valuing tailored experiences that meet their unique needs [1]. While these trends apply broadly across industries, they are particularly relevant to the events and photography sector, where clients seek distinctive setups that capture the essence of their celebrations and preserve them as lasting memories.

The events and photography industry plays a vital role in people's lives, both locally and globally. From graduations and engagements to birthdays and cultural gatherings, these occasions mark significant milestones that families and individuals cherish. In many cultures, especially within our local community, photography is not just about taking pictures, it is about storytelling, identity, and preserving traditions. However, the current market often fails to meet the rising expectations of customers. Many studios provide pre-designed, standardized setups that may not fully satisfy the client's vision, leading to frustration, extra expenses, or compromises in the final outcome. As Simon Carr, design director at DesignUps, puts it: "Clients want more of everything, so why make them go to multiple shops when they can get it all in one place?"[2] This reflects the core idea of our project, which aims to give clients access to all design elements and decorations they need for their event in a single, seamless experience. This gap highlights the need for an innovative, client-centered approach.

Technology provides an effective solution to this challenge. Digital platforms can enable greater interaction, flexibility, and control for clients while also streamlining the work of service providers. For the events industry, this means creating tools that allow users to design, preview, and book customized studio setups without unnecessary delays or miscommunication. Such solutions not only improve client satisfaction but also enhance efficiency, reduce planning errors, and increase competitiveness for studios that adopt them. This project builds on this idea by exploring how a technological platform can reshape personalization in the events and photography sector.

This document is organized to follow the main phases of the project. Chapter 1 presents the proposal document, outlining the background, problem, solution, product vision, roadmap, objectives, and scope of the work. Chapters 2 and 3 focus on domain analysis and requirements engineering, where the problem is examined in detail and user needs are translated into clear system requirements. Chapter 4 then describes the system design and interface, highlighting the platform's architecture and the way users will interact with it.

Chapters 5 and 6 cover the database implementation, features, full development, and testing, followed by the conclusion and recommendations for future improvements.

1.1 The Problem

People often want a custom studio design for important life events (such as graduation, engagement, or success celebrations) that reflects their personal taste and is fully prepared by the event date [3]. However, the current situation poses several challenges for customers. First, there is a lack of flexibility: most studios offer only a few fixed, pre-designed sets, which limits the client's ability to express their uniqueness. Second, there is a waste of time and effort: clients may need to visit multiple studios or negotiate with photographers and decorators to get something close to their vision. Third, there is uncertainty about the final result: often the client cannot visualize how the studio will look before the day of the event, which leads to disappointment or last-minute changes. For example, a girl who wants to reserve a photo studio for her graduation photos cannot find any studio that allows her to choose the background color, lighting style, and decorations that match her personality. In the end, she must accept a standard studio design that does not express who she is, nor does it match what she had imagined. Therefore, the main problems this project aims to tackle are the absence of customization and the lack of previewing before booking. Many studios still only have limited set designs; customers cannot choose background, lighting, or decor that matches their personal aesthetic. As a result, many clients feel unhappy because the final setup on the event day does not align with their expectations, and they only realize the mismatch when they arrive [4].

1.2 The Solution

As a solution, this project proposes to develop an online platform called **BIRWAZ** that enables customers to virtually design their studio ahead of time. The platform offers user-friendly tools to modify the design such as backgrounds, decorations, and lighting, while also allowing customers to browse ready-made designs and preview the final appearance before making a reservation. This approach ensures that the studio is fully prepared on the event day exactly as envisioned. The solution offers several benefits: it increases customer satisfaction by providing a fully personalized experience that matches individual expectations, saves time and effort by enabling all design decisions to be made online without repeated studio visits, and reduces misunderstandings or mistakes, since preview functionality helps eliminate gaps between what the customer expects and what the studio ultimately delivers [5].

1.3 The Product

1.3.1 Product Vision:

For an Individuals planning their private events and celebrations.

Who Want to design, customize, and preview their event décor before booking.

The **BIRWAZ** is a website.

That Provides a full digital experience to personalize and visualize decorations.

Unlike Soul Space.

Our product Allows full customization with a realistic preview to ensure the event matches the client's vision exactly.

1.3.2 Product Roadmap:

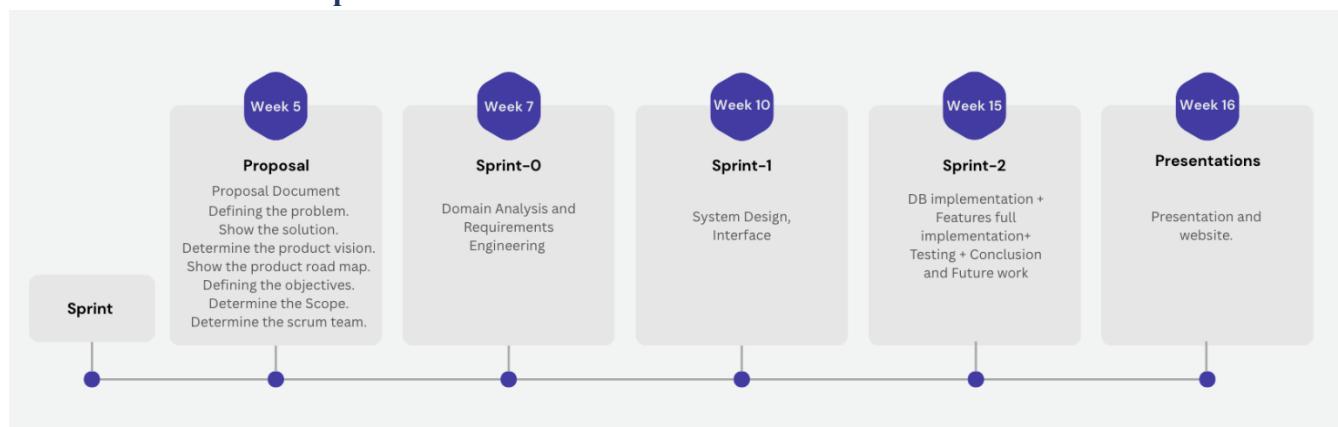


Figure 1-1

1.3.3 Objectives:

Product (customer focus-value):

- Provide a user-friendly website that allows anyone to create and reserve a studio for important events such as birthdays, weddings, and graduations.
- Customers can create an account, log in, and log out.
- schedule appointments online and pay when you arrive at the studio
- Receive reminders and notifications about the appointment time.
- Customers are assured that the actual studio arrangement matches the one they have selected on the website.
- The customer has the option to search through the available designs on the website and select from them.
- Before making a booking, customers can view a complete preview of their finished design to ensure they are satisfied.
- Allow customers to change or edit their chosen studio details, such as colors, decorating styles, or lighting.
- Customers can delete their booking if they no longer want it.

Project (solution focus-plan):

- Gather and analyze user requirements through interviews or questionnaires to ensure the platform meets real customer needs.
- Design user interfaces that support user customization and interaction.
- Create a database linked to the "BIRWAZ" platform to hold user information, bookings, and design details.
- Test the website to ensure usability and reliability.

Learning (student focus):

- Learn how to use agile methodology to create a real-world online platform.
- Learn how databases (such as MySQL) store and manage user information, bookings, and customization details.
- Learn about current web technologies on the front-end (HTML, CSS, JavaScript) and back-end (PHP/Node.js).
- Work with new tools and platforms, for example, MySQL for database management, Jira, and GitHub for collaborative development.
- Learn how to test our website.

1.3.4 Scope:

This project is to develop a web-based platform that enables users to design and book a personalized studio for their special occasions. The target audience is residents of Riyadh, aged 18 and above, who wish to save time and effort while ensuring a customized setup for their events.

Through the platform, clients can design the studio according to their preferences and then book their session online. Payment will not be processed online, instead, it will be completed on-site when the client arrives at the studio for the actual photo session. It will support English language only. The project is limited to a web prototype and does not include mobile applications or online payment integration at this stage.

1.4 Scrum Team:

Scrum Team	
Product Owner:	Sarah Alruwayte
Developers:	Nora Alkhudair , Malak Basloom , Sarah Alruwayte , Atheer Budie
Scrum Master (SM):	Ghaida Alfayez
Stakeholders:	Ghaida Alfayez

Table 1

2 Chapter 2: Domain Analysis

2.1 Background:

To develop an effective platform like BIRWAZ, several theoretical concepts and technological foundations are essential:

- 2D Visualization and Rendering: For the crucial preview functionality, BIRWAZ will employ modern 2D visualization and rendering technologies. This will involve using a graphics library or framework that allows for the dynamic creation and manipulation of visual elements within the web browser. These technologies will enable the platform to generate a clear and accurate 2D representation of the studio design, including background colors, decorations, and item placements. This provides customers with a reliable preview of their customized setup before booking, ensuring the final result aligns with their expectations.
- Notification Systems: To ensure seamless communication and timely updates, the platform will integrate robust email notification systems. Services like Amazon SES (Simple Email Service), a scalable cloud-based email sending service, or dedicated notification APIs such as Notification API or One Signal, will be utilized. These systems will automatically send reminders, book confirmations, and design updates to customers, enhancing user engagement and operational efficiency.

Domain Knowledge

To successfully design and develop BIRWAZ, it is crucial to understand the broader context of the events and photography market, particularly concerning customer behavior and technological trends. Key domain knowledge areas include:

- Personalization Trends in Events and Photography: The events and photography sector is experiencing a significant shift towards personalized experiences. Customers no longer accept generic offerings but demand unique setups that reflect their individual style and the significance of their occasions. Understanding this demand is central to BIRWAZ's value proposition.
- Customer Behavior and Expectations: Customers seeking studio services for events often face limitations in customization, leading to dissatisfaction. They desire control over design elements (background, decoration, lighting) and the ability to visualize the final outcome before commitment. The current market often involves wasted time and effort due to limited options and a lack of transparency regarding the final product. BIRWAZ aims to directly address these pain points.
- Technological Integration in Service Industries: Digital transformation is rapidly changing how services are consumed and managed. The increasing popularity of online booking platforms, virtual design tools, and real-time previews is reshaping customer expectations. BIRWAZ must be built using modern web technologies to ensure seamless, intuitive, and mobile-friendly user experience, including responsive design and fast load times.
- Studio Operations and Management: Understanding the operational aspects of photography studios is vital. This includes managing booking schedules, preparing studio setups, and handling customer interactions. BIRWAZ's design must streamline these processes for studio owners while providing maximum flexibility for customers.

Additional Definitions for the BIRWAZ Project:

- Template/Pre-designed Studio: This refers to a professionally designed and curated studio template created by the BIRWAZ team. This feature provides a quick starting point for customers seeking inspiration or preferring not to start from scratch. A customer can select one of these ready-made templates as a foundation and then has the complete freedom to modify and customize it by adding or changing elements to match their personal vision, or they can use it as-is if it meets their needs.
- Background: This is the visual element located behind the person or object being photographed in the studio. On the BIRWAZ platform, the background is not just a single-colored wall but a key part of the artistic composition that the customer can fully control. The platform allows customers to choose different colors, patterns, and materials for the background to match the theme of their occasion (such as graduation or birthday) and reflect their personal style, ensuring the final photos are unique and expressive.
- Customization: This is a feature on the BIRWAZ platform that allows customers to add and customize various decorative elements in their studio design, such as decoration styles and lighting. They can also delete any item they do not want, ensuring the final design accurately reflects their vision.
- Types of Photography: The BIRWAZ project aims to cater to a variety of important personal occasions that require professional photography in a customized studio. These occasions include graduation parties, engagements, birthdays, and other events that individuals wish to document in a unique style that reflects their identity.
- Booking and Payment System: The booking process is designed to be flexible and convenient. After the customer finishes designing their desired studio on the platform, they can select a suitable time and book their session online. As for the payment, it will not be processed through the platform at this stage. Instead, payment will be completed on-site when the customer arrives at the studio for the photo session. This approach gives the customer peace of mind and allows them to confirm that everything matches their design before completing the payment, thereby enhancing trust and satisfaction.

2.2 Literature Review:

Vivid Studio (Riyadh)[6]

A professional photography studio in Riyadh offering portrait, fashion, product photography, and hourly rental of studio space equipped with lighting and backgrounds.

Strengths:

- Wide range of services: product photography, fashion, studio bookings, diverse packages.
- Flexible hourly booking for studio space.
- Static website showcasing services, pricing, and booking details.
- Multiple payment options are available directly on the website.
- Bilingual website (Arabic and English) to serve a wider user base.
- Built-in search functionality to ease navigation.
- Section for customer reviews.

Weaknesses:

- No preview of studio design before booking.
- No interactive customization tools.
- No integrated calendar for scheduling (relying on WhatsApp for confirmation).

Soul Space (Riyadh)[7]

A creative rental space in Riyadh is used for workshops, photo sessions, and creative work, with online booking through the website.

Strengths:

- Flexible creative space, not limited to photography.
- Online booking with rescheduling option.
- Multiple payment methods supported.
- Section for customer reviews.

Weaknesses:

- Pricing and extra equipment costs not always clearly shown upfront.
- No preview or customization of studio design.
- Some parts of the website remain in English, limiting accessibility for Arabic-speaking users.
- No search function for easier navigation.

	Vivid	Soul	Birwaz
Customization studio decor			✓
Online Payment	✓	✓	
Booking Cancellation Option	✓		✓
Arabic Language Support	✓		
Add group activities in studio		✓	

Table 2

What Differentiates BIRWAZ:

What sets BIRWAZ apart from competitors is its interactive customization and live preview tool ,which allows customers to design their studio by selecting backgrounds, lighting, and decorations before completing the booking. Unlike Vivid Studio and Soul Space ,which only offer fixed packages without previews ,BIRWAZ guarantees that customers can visualize their final setup clearly before confirming their booking.

3 Chapter 3: Requirements Engineering

3.1 Requirements Elicitation and Analysis:

In this section, we describe the methods used to gather and analyze the requirements for our customizable photo studio booking platform. The process involved two primary methods: user interviews and questionnaires, complemented by an analysis of existing competitor systems. The objective was to capture user needs, preferences, and challenges in order to guide the design of the platform and ensure it meets real user expectations.

By combining qualitative data from interviews with quantitative insights from questionnaires, we were able to identify recurring themes and key requirements. These findings will directly inform both the functional and non-functional specifications of the system.

3.1.1 Interview:

Here, we will focus on the interviews conducted with potential users to gather qualitative data. We will present the interview questions, summarize the participants' information, and analyze the results to understand their requirements and preferences for the platform.

We conducted 4 interviews with individuals who represent the target audience of our system. These interviews were designed to provide detailed insights into how users currently approach booking photo studios, the challenges they face, and the features they expect in a customizable studio design platform. The interviewees included young adults who frequently document personal milestones such as graduations, family events, or private photo sessions. A summary of the participants' information can be found in **Appendix**.

The key findings from these interviews revealed that most participants consider documenting special moments highly important, as professional photography allows them to preserve memories in a high-quality and lasting way. However, they emphasized that the current process of finding a suitable studio is time-consuming, often taking from two days to a full week. A recurring issue was the lack of clear previews and transparency on existing platforms, which makes it difficult to assess whether a studio truly matches their expectations.

Interviewees expressed a strong interest in the idea of designing their own studio, with preferences ranging from full freedom to build a design from scratch to simpler templates that can be easily modified. Desired customization options included choosing themes, backgrounds, colors, props, and unique decorative elements (e.g., balloons, candles, or congratulatory signs). This highlighted the need for flexible levels of customization to suit different user types.

Regarding communication, preferences varied: while some participants favored email for its organization, others preferred real-time notifications via SMS, WhatsApp, or in-app alerts to ensure they do not miss important booking updates.

Overall, the interviews underscored the importance of personalization, transparency, and flexibility in photo studio booking. Users demonstrated a strong demand for a platform that enables them to visualize their designs before booking, supports both quick templates and complete customization, and provides reliable notifications. Full interview transcripts and detailed responses are provided in **Appendix (5-1, 5-2, 5-3, 5-4)**.

Interviewee Name	Age	Gender	Nationality
Reema	21	Female	Saudi
Jood	19	Female	Saudi
Asma	24	Female	Saudi
Afnan	22	Female	Saudi

Table 3

3.1.2 Questionaries:

The analysis is based on a survey of respondents, all of whom reside in Riyadh (see Appendix 5-5). The target audience is heavily skewed towards young adults, falling into the age 18-24 bracket (see Appendix 5-6). A significant portion of these respondents have prior experience booking a photo studio session (see Appendix 5-7), indicating familiarity with the service. Feedback on these previous experiences was mixed, with satisfaction regarding the "atmosphere and photography team," but also noted issues like "lighting problems" and "poor time management" that resulted in delays (see Appendix 5-8). When evaluating what matters most for a photo session booking, the highest priority is given to Photo quality, followed closely by studio design. Price is also a major consideration for of respondents, while availability is the least critical factor (see Appendix 5-9). Regarding the concept of designing their own studio, the primary motivation is the desire for personalization and control, with equal shares of respondents valuing "Having photos that express my personality" and "Full control over design details" (see Appendix 5-10). Crucially, a strong majority requires the ability to preview the final studio design before confirming a booking (see Appendix 5-11). To enhance the overall studio booking experience, the highest demand is for improvements in the platform's efficiency and interface. Both an Easy-to-use interface and a fast-booking process are equally requested by most of users. Additionally, requested an appointment reminder notification (see Appendix5-12). These findings highlight that platform usability and a seamless process are essential for customer satisfaction.

Summary of Findings:

The requirements elicitation process, which combined questionnaires, interviews, and competitor analysis, provided valuable insights into user needs and expectations for a customizable photo studio booking platform. From the questionnaire results, the most important factors identified were photo quality and studio design, followed by price. Respondents emphasized the need for personalization and control, particularly through the ability to design and preview the studio setup before confirming a booking. Additionally, usability of the platform was highlighted as a critical success factor, with strong demand for a simple interface, fast booking process, and appointment reminder notifications.

The interviews reinforced these findings by providing deeper qualitative insights. Participants expressed frustration with the current lack of transparency and previews on existing platforms, which often forces them to spend several days searching for a suitable studio. They valued both full customization options (e.g., themes, backgrounds, props, colors, decorations) and ready-made templates for faster setup. Notification preferences varied.

In conclusion, the findings highlight three major themes that will shape the system's requirements:

1. Personalization and Customization – Allowing users to create studios that reflect their style and event needs, supported by both flexible templates and full customization.
2. Transparency and Preview Features – Ensuring users can view their designs clearly before booking to increase trust and reduce uncertainty.
3. Usability and Efficiency – Delivering a seamless, user-friendly platform with fast booking, reliable notifications, and intuitive navigation.

These insights will serve as the foundation for defining the functional and non-functional requirements of the platform, ensuring it aligns closely with user expectations and addresses current market gaps.

3.2 System Users:

- All users can access the website to design and book customized studios for their celebrations and events.
- There are no specific educational requirements, as long as users are adults and capable of making responsible booking decisions.
- Users should have a basic understanding of technical concepts to navigate and use the website effectively.
- Users are primarily residents of Riyadh, over 18 years old.
- The website is available to all users without restrictions based on nationality.
- The website supports English language only, ensuring a consistent user experience.

3.3 Use Case Diagram:



Figure 3-1

3.4 Product Backlog:

PBI	Size	Type	Acceptance Criteria
As a user, I want to sign up so that I can access the website and its features.	3	Feature	<ul style="list-style-type: none"> If I go to the Sign-Up page, enter a valid name, a unique email, a valid password, and confirm the password correctly, then my account should be created. If I go to the Sign-Up page and enter an email that is already registered and click Create Account, then sign up should fail with an error message indicating that the email is already in use. If I go to the Sign-Up page and enter an invalid email format and click Create Account, then sign up should fail with an error message stating Enter a valid email address. If I go to the Sign-Up page and enter a password that does not meet complexity rules (e.g., fewer than 8 characters) and click Create Account, then sign up should fail with a message stating the password requirements.
As a user, I want to securely log in so that I can use the website's personalized features.	2	Feature	<ul style="list-style-type: none"> If I go to the Log In page, enter my username and the correct password, and click on Log In, then the system should successfully authenticate me and provide access to my account and associated data. If I go to the Log In page, enter my username but an incorrect password, and click on Log In, then the system should reject the attempt and display an error

			<p>message indicating that the username or password is incorrect.</p> <ul style="list-style-type: none"> If I go to the Log In page, enter an incorrect username and the correct password, and click on Log In, then the system should reject the attempt and display an error message indicating that the username or password is incorrect.
As a user, I want to safely log out so that I can securely end my session on the website.	2	Feature	<ul style="list-style-type: none"> If I click Log Out from any page while I am logged in, then my session should be terminated, and I should be redirected to the Log In page.
As a customer, I want to delete my reservation so that I can adjust my schedule if my plans change.	3	Feature	<ul style="list-style-type: none"> When I go to the “View Reservations” page and click on “Cancel Reservation” for a specific booking, the system should prompt me for confirmation. After I confirm, the selected reservation should be deleted. Any reminder messages related to the cancelled reservation should be stopped automatically.
As a customer, I want to view all my upcoming reservations so that I can easily track and manage my reservations.	5	Feature	<ul style="list-style-type: none"> When I go to the “view reservations” page, I should see a list of all my bookings If I click on a specific booking, I should be able to view its full details, including design preview, date/time. I can clearly view all the elements I selected (background, decorations, lighting, and layout) exactly as I chose them.

			<ul style="list-style-type: none"> The page should load my bookings within 3–5 seconds under normal network conditions. If I have no upcoming reservations, a friendly message should appear (You don't have any upcoming bookings yet.)
As a customer, I want to search through the available designs on the website so that I can select one that matches my style.	3	Feature	<ul style="list-style-type: none"> When I am on the design selection page, I can enter a search term (e.g., “graduation”, “minimalist”) to find relevant designs. The system displays a list of available designs matching my search term, each with a clear thumbnail image, name, and brief description. If no designs match my search term, a message indicating “No designs found” is displayed. I can easily clear or modify the applied filters. When I click on “Select Design” or “Use This Template”, I am taken to the booking page where I can choose the date and time that suit me to complete my reservation.
As a customer, I want to create my own studio design by selecting and arranging individual items so that I can customize the studio according to my	5	Feature	<ul style="list-style-type: none"> When I am on the design page, I should see an option labelled “Design My Own Studio” alongside the ready-made templates. When I click on “Design My Own Studio”, I should be redirected to a

<p>personal style and preferences.</p>		<p>blank studio canvas where I can start building my design from scratch.</p> <ul style="list-style-type: none"> • On the blank studio page, I should see a menu or panel containing categorized items. • I can browse or search through these items to find what I want to add. • When I click on an item, it should appear inside the studio layout, • I can remove or replace any item I've added whenever I want. • I can preview my full studio design at any time to see how the final setup looks. • When I click "Book", the system should redirect me to the booking options page. <ul style="list-style-type: none"> • If I try to leave the page without booking, a confirmation popup should appear asking if I want to discard my design.
<p>As a customer, I want to book a reservation with my customized studio design so that the studio will be ready at my chosen time.</p>	<p>5</p>	<p>Feature</p> <ul style="list-style-type: none"> • When I open the booking page, I can see the list of available dates and times. • I can select only the available dates and times; unavailable slots cannot be chosen. • After selecting a date and time I can see the price, then I can choose to confirm (OK) or cancel the booking. • If I cancel, the booking is not completed, and no confirmation is shown. • If I confirm, the booking is successfully saved.

			<ul style="list-style-type: none"> After confirmation, I receive a message notifying me that the booking is confirmed. After confirmation, I am redirected to my reservation page. On the reservation page, I can see the date and time of my booked appointment, the studio design details and the studio location to attend my appointment.
As a customer, I want to receive email reminders about my reservation and appointment so that I don't miss my booking.	5	Feature	<ul style="list-style-type: none"> If I successfully make a reservation, then the system should send me a reminder email at least 24 hours before the booking time. If I cancel my reservation, then the system should stop any scheduled reminder emails for that booking.
As a customer, I want to change or update the studio items I've chosen or edit my booking date so that I can make the necessary adjustments to my design and schedule.	3	Features	<ul style="list-style-type: none"> When I go to the view reservations page and click "Edit Design", then the system should load my previously selected studio items (background, decorations, lighting) into the customization interface. If I make changes (e.g., update background color, add/remove decorations, adjust lighting) and click "Save Changes", then the updated design should replace the old one and be linked to my booking. If I go to my booking details and click "Edit Date", then the system should show available slots in the calendar.

			<ul style="list-style-type: none"> If I select a new available date and confirm, then the booking date should be updated successfully and a confirmation message should appear. If I try to select an unavailable slot, the system should prevent me with a message “This slot is not available, please choose another one.”
As an administrator, I want to view all reservations so that I can prepare the studio in advance.	3	Feature	<ul style="list-style-type: none"> When I log in as an administrator, I can access a dedicated “Bookings Management” page. On this page, I can see a comprehensive list of all current and upcoming bookings. Each booking entry clearly displays essential details such as the booking date and time, customer name, and the selected studio design (template or customized). I can view the specific customization details for each booking, including chosen backgrounds, added items, and lighting preferences. The bookings list and details load efficiently, ideally within 3 to 5 seconds, to allow for quick review and preparation.
Usability: As a user, I want the website to be simple and intuitive so that I can learn how to use it and	1	Feature	<ul style="list-style-type: none"> If I interact with the website, then all navigation, labels, and actions should be clear, intuitive, and easy to understand.

complete my first booking within 10 minutes.			
Availability: As a customer, I want the website to be available at least 98% of the time so that I can design and book my studio whenever I need to.	5	Feature	<ul style="list-style-type: none"> If I try to access the website during normal operating hours, then the system should respond and load the homepage successfully at least 98% of the time.
Performance: As a customer, I want the website to load pages and confirm my reservation in less than five seconds so that I can complete my booking without delays or crashes.	2	Feature	<ul style="list-style-type: none"> If I open any page, then the page should fully load within 5 seconds under normal network conditions on supported browsers.

Table 4

4 Chapter 4: System Design and Development

4.1 System Architecture

The system architecture of an application directly affects its overall performance, scalability, and maintainability. In this section, we describe the system architecture chosen for our project, “**BIRWAZ**.” The system architecture serves as the foundational blueprint for the entire platform, defining how different components interact and communicate to deliver a seamless customization and booking experience for users.

After conducting extensive research and evaluating several architectural patterns, we selected the **Client–Server Architecture** as the most suitable model for the **BIRWAZ** web application. This model logically divides the system into two main components: the **Client Side** and the **Server Side**, which communicate via HTTP requests to exchange data.

The **Client Side** represents the user interface that users interact with directly through their web browsers. It is implemented using modern web technologies such as **HTML, CSS, and JavaScript**, ensuring responsiveness, accessibility, and an engaging user experience. This side allows users to create accounts, log in, browse ready-made designs, and most importantly, design their own customized photo studios by selecting decorations, backgrounds, and lighting options. It also provides a realistic **2D visual preview** of the final setup before confirming a booking, ensuring transparency and satisfaction.

The **Server Side** acts as the central logic and data manager of the system. It is developed using **PHP** (or **Node.js**) and connected to a **MySQL** database that securely stores user data, booking information, and studio design details. The server handles user authentication, processes booking requests, manages session data, and ensures that all information displayed to users—such as available booking slots and saved designs—is accurate and up to date. It also supports the automated **email notification system** that reminds users of their appointments, improving reliability and engagement.

The **Database Layer** (**MySQL**) plays a critical role in ensuring data integrity and consistency. It stores all persistent data related to users, designs, and reservations in a structured format, allowing quick retrieval and updates. This centralization simplifies data management and enhances both security and scalability as the system grows.

We chose the **Client–Server Architecture** for several reasons that align closely with the specific requirements of the **BIRWAZ** platform:

1. Separation of Concerns:

This architecture clearly separates the presentation layer (client side) from the business logic and data management layer (server side). This makes it easier to maintain and update one layer without affecting the other, which is important for BIRWAZ since new customization features or UI improvements may be added later without altering the backend.

2. Centralized Data Management:

All essential data, such as user accounts, bookings, and design preferences, are stored and processed on the server. This ensures data consistency and simplifies management—critical for a booking system like BIRWAZ, where inaccurate or duplicated data could cause scheduling conflicts or lost reservations.

3. Scalability:

The client-server structure allows multiple users to interact with the platform simultaneously, which is vital for BIRWAZ as it targets a growing number of customers designing and booking studios at the same time. The server can be scaled vertically or horizontally to handle increased traffic as the system expands.

4. Security:

By keeping all sensitive data and business logic on the server, the system reduces the risk of unauthorized access. User authentication and data validation occur on the server side, ensuring only legitimate users can manage bookings or modify stored designs.

While designing **BIRWAZ**, we examined several alternative architectures but ultimately rejected them based on how well they met our project's needs:

• MVC (Model–View–Controller):

Although MVC is widely used for web applications, it introduces multiple layers of abstraction and complexity. Since BIRWAZ focuses on a single, visually interactive flow (customize → preview → book), the additional separation in MVC would slow development without offering significant advantages. The simpler Client–Server model provides the same logical separation with less overhead.

• Layered Architecture:

This approach is effective for large enterprise systems with multiple development teams working on independent layers. However, BIRWAZ is a lightweight web prototype developed by a small team. Implementing multiple layers (presentation, business, persistence, etc.) would overcomplicate maintenance and slightly reduce performance, which contradicts our need for real-time user interaction and fast loading previews.

- **Repository Architecture:**

The repository pattern is ideal for systems that require complex data access and multiple data sources. In BIRWAZ, data access is straightforward—mainly user and booking information stored in one MySQL database. Adding a repository layer would add unnecessary abstraction and make the system more complex than required for our scope.

- **Pipe and Filter Architecture:**

This model is typically used in systems that process data in sequential stages, such as data analytics pipelines. Since BIRWAZ is **highly interactive**, requiring constant two-way communication between the client and the server (e.g., for live design updates and previews), the sequential processing nature of Pipe and Filter makes it unsuitable.

After thorough consideration of the project's requirements, user needs, and scalability goals, the **Client–Server Architecture** proved to be the optimal choice for **BIRWAZ**. It offers the right balance between modularity, performance, and maintainability, enabling the platform to deliver a smooth, personalized, and reliable user experience where clients can design, preview, and book their studio setups efficiently and securely.

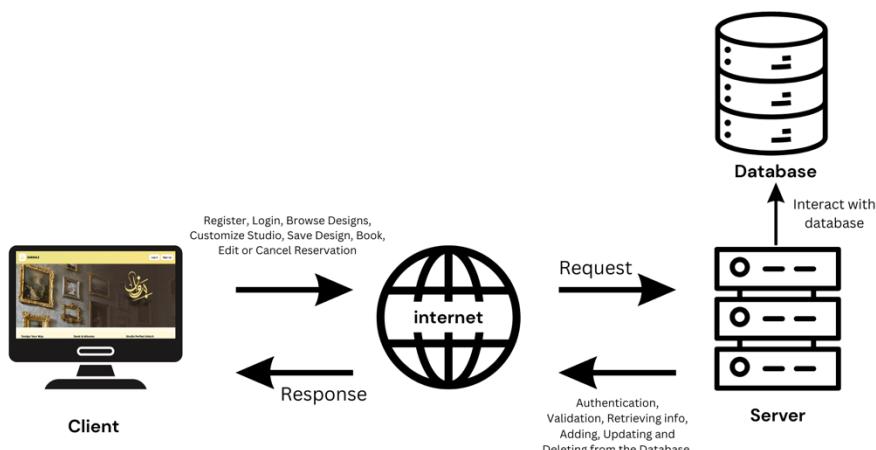


Figure 4-1

4.2 Class Diagram

In this section, we present the Class Diagram of the “BIRWAZ” website.

It provides a detailed representation of the main classes within the system, including their attributes, methods, and relationships. The Class Diagram serves as a visual plan that shows the structure and organization of the code developed during implementation of the object-oriented design of “BIRWAZ”.

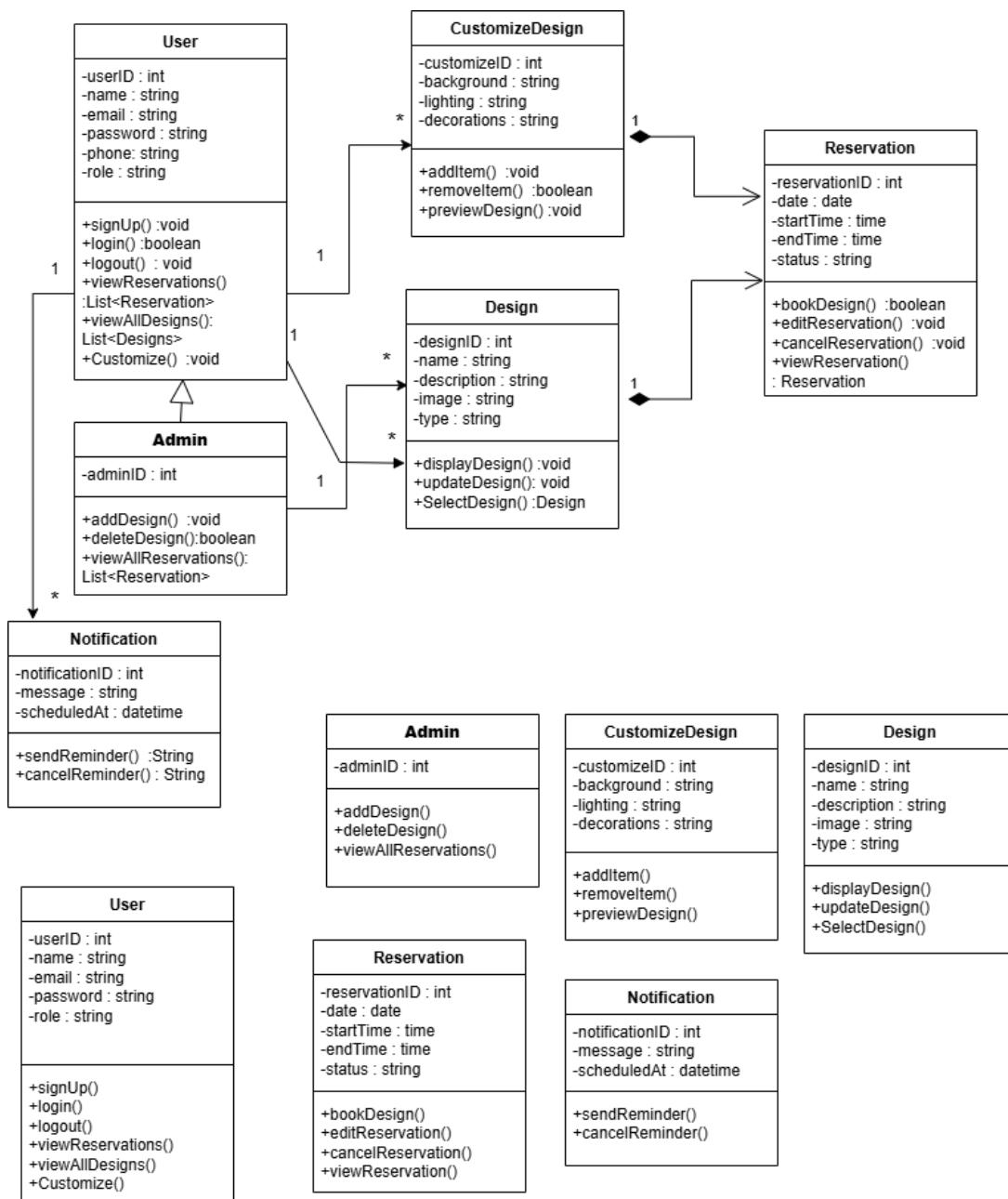


Figure 4-2

4.3 Data Design

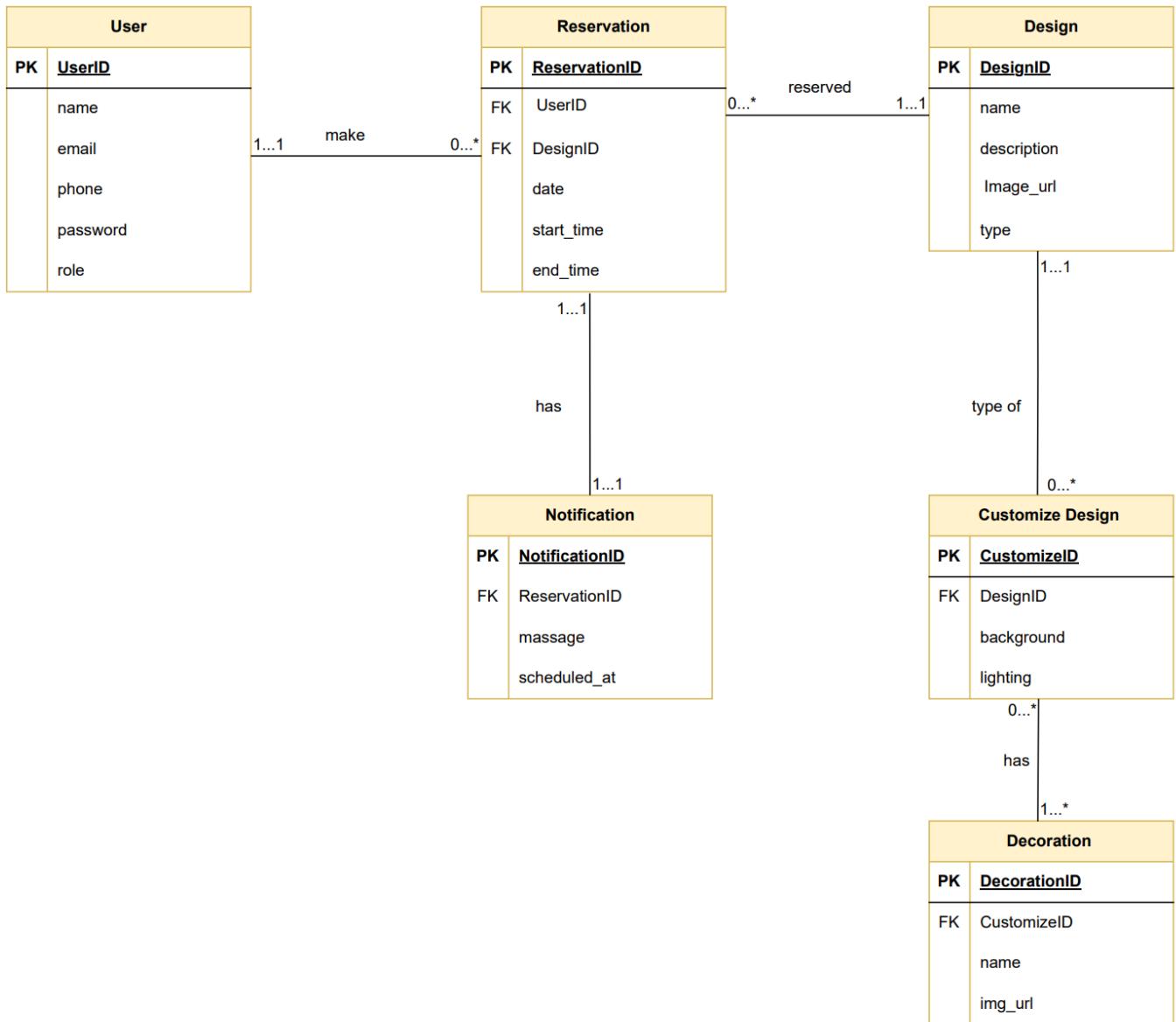


Figure 4-3

relational schema:

User (UserID, name , email , password ,phone ,role)

Primary Key: UserID

Reservation (ReservationID, UserID, DesignID, Date, Start_Time, End_Time)

Primary Key: ReservationID

Foreign Keys:

UserID references User (UserID)

DesignID references Design (DesignID)

Notification (NotificationID, ReservationID, Message, Scheduled_At)

Primary Key: NotificationID

Foreign Keys:

ReservationID references Reservation (ReservationID)

Design (DesignID, Name, Description, Image_URL, Type)

Primary Key: DesignID

CustomizeDesign (CustomizeID, DesignID, background, lighting)

Primary Key: CustomizeID

Foreign Keys:

DesignID references Design (DesignID)

Decoration (DecorationID, CustomizeID, name, img_url)

Primary Key: DecorationID

Foreign Keys:

CustomizeID references Design (CustomizeDesign)

Data Dictionary:

- Data Dictionary showing description of all entities:

Entity Name	Description	Occurrence
User	A User represents any person who uses the BIRWAZ website, either as a regular user or as an admin	A user can make none or several reservations.
Design	A Design represents the photography studio setup or theme that users can view and reserve. It includes name, description, image and type (ready-made or customized).	A design can be reserved multiple times. A design can have several customizeDesign or none.
Reservation	A Reservation refers to a booking made by a user for a specific design on a chosen date and time. It includes reservation details such as date, start time, and end time.	A reservation is made by exactly one user. A reservation belongs to one design. A reservation can have one notification.
Notification	A Notification represents messages sent to users regarding their reservations, such as confirmations, reminders, or updates.	A notification belongs to exactly one reservation.
CustomizeDesign	A CustomizeDesign represents personalization options for a specific design. It stores customization details such as background color, lighting, and other style	A customizeDesign is type of exactly one design.

	preferences chosen by the user.	
--	---------------------------------	--

Table 5

- Data Dictionary showing description of all relationships:

Entity Name	Multiplicity	Relationship	Entity Name	Relationship
User	1..1	makes	Reservation	0..*
Reservation	0..* 1..1	reserves has	Design Notification	1..1 1..1
CustomizeDesign	0..* 0..*	type of has	Design Decoration	1..1 1..*

Table 6

- Data Dictionary showing description of all attributes:

Entity Name	Attribute	Description	Data Type	Length	Nulls	Multi Valued	Default Value	Range	pk
User	UserID	Unique identifier for each user	int	-	N	N	N	N	Y
	name	User's full name	String	40	N	N	N	N	N
	email	User's email	String	255	N	N	N	N	N
	phone	User's phone	String	10	N	N	N	N	N
	password	Encrypted password	String	100	N	N	N	N	N
	role	Access role	String	5	N	N	user , admin		N

Design	DesignID	Unique identifier of a design	int	-	N	N	N	N	Y
	name	Design name	String	40	N	N	N	N	N
	description	Short description	String	255	Y	N	N	N	N
	image_url	Preview image path/URL	String	255	N	N	N	N	N
	type	Design category	String	6	N	N	ready	ready, custom	N
Reservation	ReservationID	Unique identifier of reservation	int	-	N	N	N	N	Y
	date	Reservation date	date	-	N	N	N	N	N
	start_time	Start time of Reservation	time	-	N	N	N	N	N
	end_time	end time of Reservation	time	-	N	N	N	N	N
Notification	NotificationID	Unique identifier of Notification	Int	-	N	N	N	N	Y
	message	Body text of notification	String	255	N	N	N	N	N
	scheduled_at	When to send the notification	date	-	N	N	N	N	N
CustomizeDesign	CustomizeID	Customize Design ID	Int	-	N	N	N	N	Y

	background	Selected background color	String	40	N	N	N	N	N
	lighting	Selected lighting style	String	40	N	N	N	N	N
Decoration	DecorationID	Customize Decoration ID	int	-	N	N	N	N	Y
	name	Decoration name	String	40	N	N	N	N	N
	img_url	Image path for the decoration	String	255	N	N	N	N	N

Table 7

4.4 Component Design

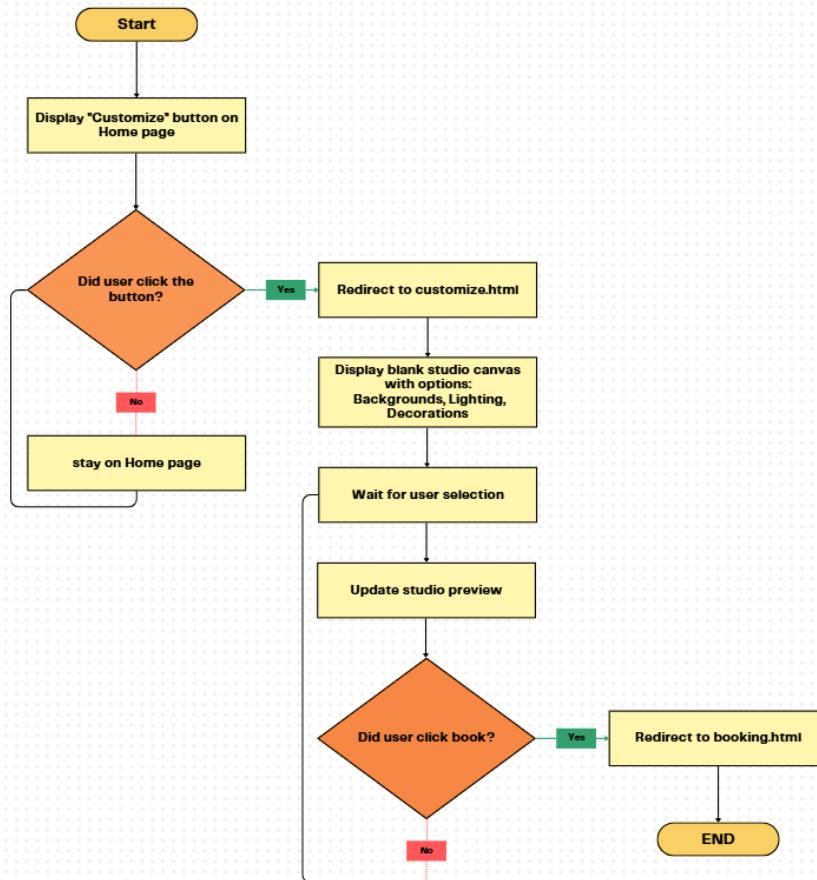
In this section, we present the component design of our system, focusing on the core functionality represented by each user story (Function) which are (Customize Studio, Book Reservation, Edit Reservation). For every user story, we provide a clear definition, preconditions, postconditions, flowchart, and pseudocode to describe the logic and steps required for execution. This approach ensures a structured understanding of the component's behavior and interactions.

User Story (Function)	Info	Pseudo Code
1- As a customer, I want to create my own studio design by selecting and arranging individual items so that I can customize the studio according to my personal style and preferences.	<p>Classification: Function.</p> <p>Definition: Allows the customer to create and personalize their own studio design by selecting and arranging individual items such as background color, lighting, and decorations before booking.</p> <p>Construction:</p> <ul style="list-style-type: none"> -Precondition: The user must be logged in and on the “Home” page. -Postcondition: The user finishes customizing their studio and is redirected to the booking page with their selected design applied. 	BEGIN DISPLAY "Customise" button on the Home page. IF user clicks the button THEN REDIRECT to customize.html ENDIF DISPLAY blank studio canvas WITH customization options: <ul style="list-style-type: none"> - Backgrounds - Lighting - Decorations LOOP: WAIT for user to select or change an item UPDATE the studio preview instantly IF user clicks "Book Your Customized Studio" THEN EXIT LOOP ENDIF END LOOP

REDIRECT the user to the booking page
(booking.html)

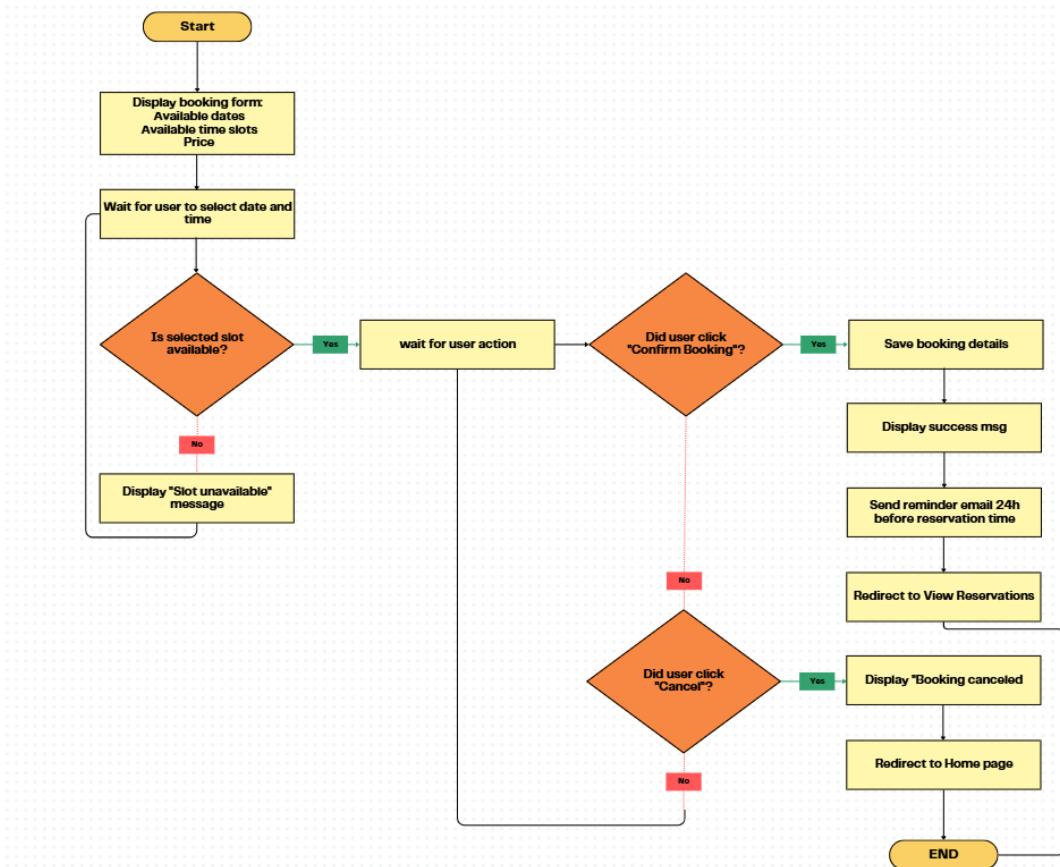
END

Flow Chart



User Story (Function)	Info	Pseudo Code
2-As a customer, I want to book a reservation with my customized studio design so that the studio will be ready at my chosen time.	<p>Classification: Function.</p> <p>Definition: Allows the customer to book a reservation for their customized studio design by selecting the desired date and time slot, confirming the booking, and receiving an screen confirmation.</p> <p>Construction:</p> <p>-Precondition: The user has completed customizing their studio design and has been redirected to the booking page.</p> <p>-Postcondition: The reservation is successfully saved, the user sees a confirmation message, and an automated reminder email is sent 24 hours before the scheduled time.</p>	BEGIN DISPLAY booking form with: <ul style="list-style-type: none"> - Available dates - Available time slots - Price WAIT for user to select a date and time IF selected slot is unavailable THEN DISPLAY "Slot unavailable" message RETURN to booking form ELSE IF user clicks "Confirm Booking" THEN SAVE booking details to system DISPLAY success message: "Your booking is confirmed! You'll receive an email reminder 24h before your appointment." SEND reminder email to user 24 hours before booking time REDIRECT to View Reservations page ELSE IF user clicks "Cancel" THEN DISPLAY message "Booking canceled" REDIRECT to Home page ENDIF ENDIF END

Flow Chart



User Story (Function)	Info	Pseudo Code
3-As a customer, I want to change or update the studio items I've chosen or edit my booking date so that I can make the necessary adjustments to my design and schedule.	<p>Classification: Function.</p> <p>Definition: Allows the customer to view all their booked studio reservations, and if needed, update their selected items or change the reservation date/time.</p> <p>Construction:</p> <p>-Precondition: The user must have at least one confirmed reservation in the system.</p> <p>-Postcondition: The reservation details are updated successfully, and the user receives a confirmation message.</p>	<pre> BEGIN DISPLAY list of user reservations WITH: - Design preview - "Cancel" button - "Edit" button IF user clicks "Edit" THEN LOAD the existing design and booking details DISPLAY customization and date options WAIT for user to make changes IF user clicks "Save Changes" THEN UPDATE reservation details in the system DISPLAY message "Your reservation has been updated successfully" ELSE IF user clicks "Cancel" THEN DISCARD changes KEEP original reservation ENDIF ENDIF END </pre>

Flow Chart

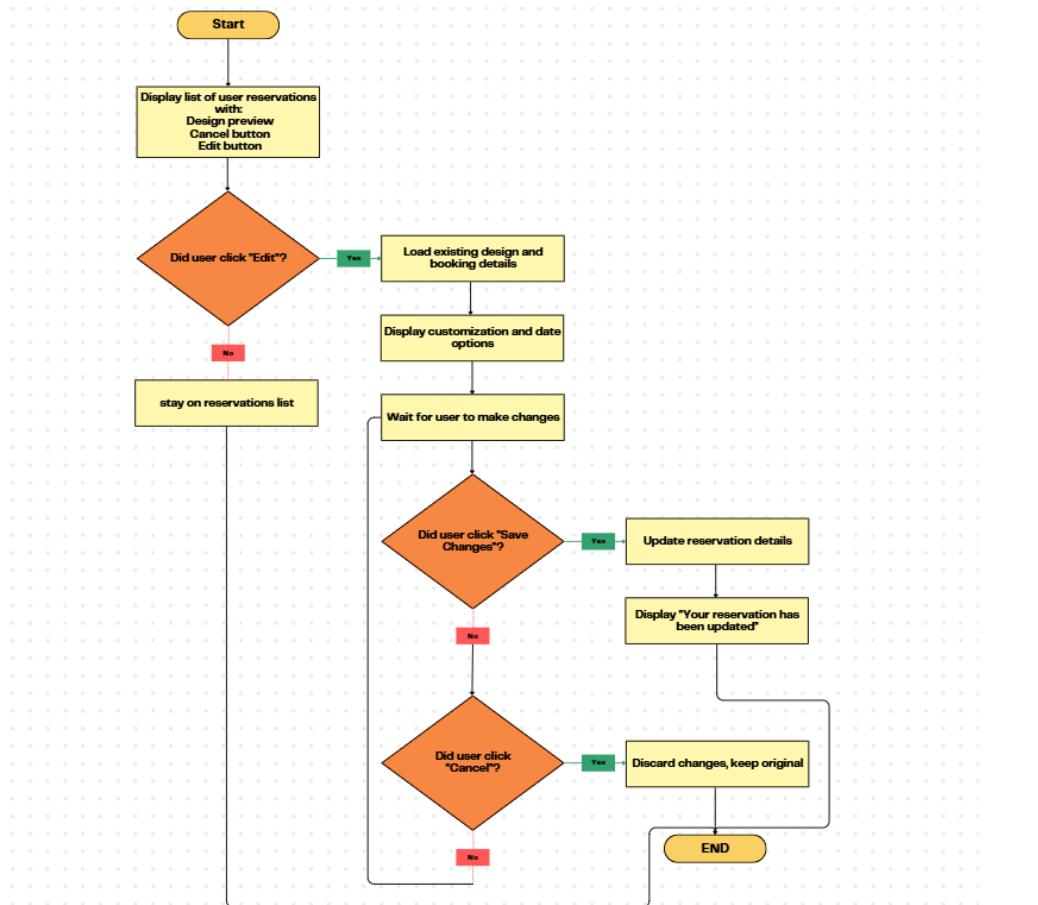


Table 8

4.5 Interface Design

Application structure:

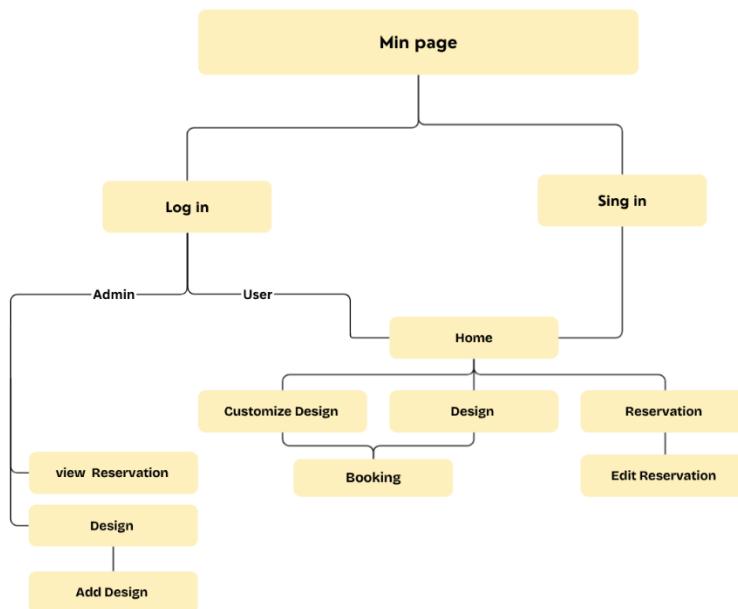


Figure 4-4

UX Guidelines:

1. Consistency and Standards:

The interface maintains a consistent layout, color scheme, and typography across all pages.

2. Error Handling:

Forms include input validation (e.g., email format) to prevent mistakes. When errors occur, users receive clear, instructive messages to correct them easily.

3. Simplicity and clear Design:

Each screen focuses only on essential elements to avoid cognitive overload. Icons, whitespace, and color hierarchy guide the user's attention naturally toward key functions.

4. Flexibility and Efficiency of Use:

Enable streamlined workflows for faster interactions, such as the smooth and quick navigation between pages and the ability to easily manage bookings or customize designs.

5. Visibility of System Status:

The system always keeps users informed about what is happening through appropriate feedback within a reasonable time. This includes displaying clear loading indicators, confirming successful bookings or actions, and showing the current status of their appointments.

4.6 Implementation

Github:

<https://github.com/sarahru4/IT320Birwaz.git>

Jira:

[https://2025-it320-section76361-
atlassian.net/jira/software/projects/IT320/boards/2?atlOrigin=eyJpIjoiZDIzMWU4MjFkMjk0NDNhOW
EwMDQ0MWRmNWY0NDg5NmQiLCJwIjoiaiJ9](https://2025-it320-section76361-atlassian.net/jira/software/projects/IT320/boards/2?atlOrigin=eyJpIjoiZDIzMWU4MjFkMjk0NDNhOWEwMDQ0MWRmNWY0NDg5NmQiLCJwIjoiaiJ9)

5 References:

- [1] S. Carr, "Clients want more of everything, so why make them go to multiple shops when they can get it all in one place?" *DesignUps*, 2025.
- [2] McKinsey & Company, "The value of getting personalization right—or wrong—is multiplying," *McKinsey & Company*, Nov. 12, 2021.
- [3] S. R. M. Padual et al., "The need for individualization: An open innovation perspective," *ScienceDirect*, 2024.
- [4] J. A. Casaca and L. P. Miguel, "The Influence of Personalization on Consumer Satisfaction: Trends and Challenges," *IGI Global*, 2024.
- [5] Y. C. Lee et al., "Effects of visual-preview and information-sidedness," *ScienceDirect*, 2025.
- [6] Vivid Studio, "Vivid Studio". Available: <https://vividstudio-sa.com/>. [Accessed: Oct. 6, 2025].
- [7] SoulSpace SA, "SoulSpace". Available: <https://soulspacesa.com/>. [Accessed: Oct. 6, 2025].

6 Appendix:

6.1 Appendix A: Interview:

Interview Question:

Q1. To what extent do you care about documenting your moments and special occasions in photo studios? (For example: personal photo sessions or special events.)

Q2. How much time do you usually spend searching for a photo studio that matches your taste and preferences?

Q3. What do you think about the idea of designing your own studio based on your occasion?

(For instance, choosing the colors, backgrounds, and decor yourself.)

Q4. What types of customizations would you like us to offer when designing the studio?

(For example: choosing a specific style such as vintage, modern, or bohemian; adding unique décor or props not found in other studios; or adjusting lighting options.)

Q5. How would you prefer to receive notifications related to your booking?

(For example: via email, text messages, WhatsApp, or in-app notifications.)

Interview1:

Interviewee: Reema	Interviewer: Sarah
Location: Riyadh, Reema house Age: 21 Nationality: Saudi Gender: Female	Appointment Date: 1Oct 2025 Start time: 7:30pm End time: 8:00pm
Question:	Answers:
Q1. To what extent do you care about documenting your moments and special occasions in photo studios?	I really care about documenting my moments, especially big occasions like graduation. I love having professional photos that I can look back on later.
Q2. How much time do you usually spend searching for a photo studio that matches your taste and preferences?	Sometimes it takes me more than two days searching on Instagram or Snapchat for a suitable studio, because the photos are often unclear or don't give a good idea of what the studio actually looks like.
Q3. What do you think about the idea of designing your own studio based on your occasion?	I think the idea is excellent! Studios usually have fixed décor that doesn't suit every occasion, so being able to customize the design would be much better.
Q4. What types of customizations would you like us to offer when designing the studio?	I'd like to have ready-made options that I can modify for example, changing only the lighting or background without starting from scratch.
Q5. How would you prefer to receive notifications related to your booking?	I prefer to receive notifications via WhatsApp or text messages, because I check them more often than by email.

Figure 5-1: Interview's Transcription for first Interviewee.

Interview2:

Interviewee: Jood	Interviewer: Nora
Location: Riyadh, Nora's house	Appointment Date: 3Oct 2025
Age: 19	Start time: 9:40 am
Nationality: Saudi	End time: 9:55 am
Gender: Female	
Question:	Answers:
Q1. To what extent do you care about documenting your moments and special occasions in photo studios?	I love documenting my important occasions with private photo sessions, as they are for me a way to preserve special memories in a beautiful and professional way.
Q2. How much time do you usually spend searching for a photo studio that matches your taste and preferences?	It usually takes me from one to five days to find a studio that meets my requirements and matches my taste.
Q3. What do you think about the idea of designing your own studio based on your occasion?	I think it's a wonderful idea, as it gives the person full freedom to choose the design they prefer and that reflects their personal style.
Q4. What types of customizations would you like us to offer when designing the studio?	I would prefer the studio to be completely empty at the beginning, so that I can add each piece or element according to my own taste. This gives me full freedom to choose the backgrounds, colors, decorations, and lighting in a way that fits the occasion and the atmosphere I want.
Q5. How would you prefer to receive notifications related to your booking?	I prefer to receive notifications via email because it is more organized and easier for me to follow up.

Figure 5-2: Interview's Transcription for second Interviewee.

Interview3:

Interviewee: Asma	Interviewer: Atheer
Location: Online meeting via zoom Age: 24 Nationality: Saudi Gender: Female	Appointment Date: 30Sep 2025 Start time: 1:00 pm End time: 1:40 pm
Question:	Answers:
Q1. To what extent do you care about documenting your moments and special occasions in photo studios?	Honestly, I care a lot! I really love photography and feel that professional pictures capture memories in such a beautiful and lasting way, especially for special moments like graduations or personal milestones.
Q2. How much time do you usually spend searching for a photo studio that matches your taste and preferences?	It usually takes some time, maybe from a couple of days to a week. I like to check every detail the décor, colors, backgrounds, and the overall vibe of the place.
Q3. What do you think about the idea of designing your own studio based on your occasion?	I absolutely love that idea! It sounds so special! I'm actually planning a graduation photoshoot for my niece this year, and it would be amazing if I could customize everything myself from the background to the little decorative touches.
Q4. What types of customizations would you like us to offer when designing the studio?	I'd love options like choosing specific colors, adding balloons, flowers, candles, or signs with cute phrases like "Congrats Grad!" or "You did it!". It would also be great to arrange the props, however I like and choose a certain theme, like modern or vintage.
Q5. How would you prefer to receive notifications related to your booking?	I'd prefer email since I check it regularly at work, but I'd also like to get app notifications just to make sure I don't miss any updates.

Figure 5-3: Interview's Transcription for third Interviewee.

Interview4:

Interviewee: Afnan	Interviewer: Malak
Location: Online meeting via zoom Age: 22 Nationality: Yemeni Gender: Female	Appointment Date: 5Oct Start time: 1:15 pm End time: 1:40 pm
Question:	Answers:
Q1. To what extent do you care about documenting your moments and special occasions in photo studios?	I'm not very interested because there aren't any studios that match the style I want or fit the occasion I have. Most studios seem too generic and don't offer the personalized touch I'm looking for.
Q2. How much time do you usually spend searching for a photo studio that matches your taste and preferences?	It usually takes me a long time because I have to search through many studios, compare their styles, and see if they meet my expectations for the specific occasion.
Q3. What do you think about the idea of designing your own studio based on your occasion?	It's a great idea and could be really helpful for many occasions. It would allow me to customize colors, backgrounds, and decorations exactly the way I imagine them, turning my vision into reality.
Q4. What types of customizations would you like us to offer when designing the studio?	You could offer unique features that other studios don't have, like special decoration styles, distinctive props, so each experience feels exclusive.
Q5. How would you prefer to receive notifications related to your booking?	I would prefer to receive them through the app or by SMS, because it's fast, convenient, and ensures I won't miss any updates about my booking.

Figure 5-4: Interview's Transcription for fourth Interviewee.

6.2 Appendix B: Questionnaires:

Questionnaires Question:

1. What is your age?

- 18-24
- 25-34
- 35-44
- 45+

2. Do you live in Riyadh?

- Yes
- No

3. Have you ever booked a photo studio session?

- Yes
- No

4. If your answer is Yes: How was your experience? / If your answer is No: What prevented you from booking before?

5. What matters most to you when booking a photo session?

- Price
- Photo quality
- Studio design
- Appointments Availability

6. What excites you most about designing your own studio before booking?

- Having photos that express my personality
- Full control over design details
- A fun and new experience
- Saving time and effort in booking

7. Do you care about previewing the final studio design before booking?

- Yes, I prefer to see the design beforehand
- No, a description or images are enough

8. What would you like to see on the platform to make the studio booking experience easier and more enjoyable?

- Easy-to-use interface
- Clear design images
- More customization options
- Fast booking process
- Appointment reminder notification

Questionnaires Answers:

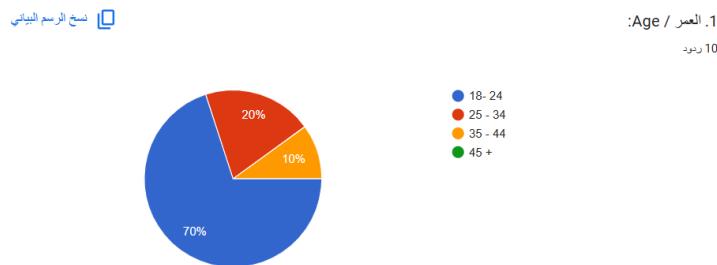


Figure 5-5: The pie chart of the first question

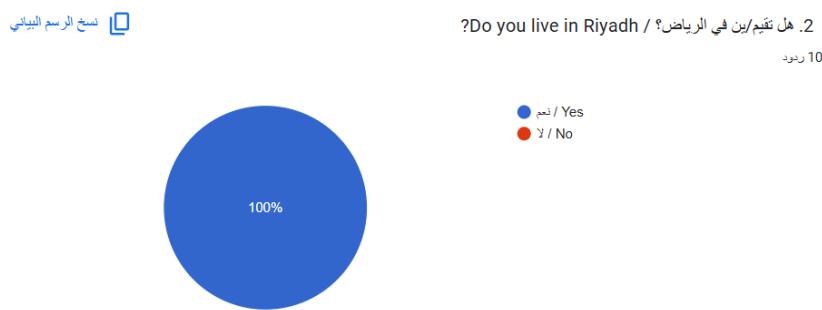


Figure 5-6: The pie chart of the second question



Figure 5-7: The pie chart of the third question

4. (مرتبط بالسؤال السابق):
 إذا كانت إجابتك نعم: كيف كانت تجربتك؟
 إذا كانت إجابتك لا: ما السبب الذي لم يجعلك تحجز من قبل؟

?If your answer is Yes: How was your experience /
 ?If your answer is No: What prevented you from booking before

10 ردود

جيدة ولله الحمد
النتائج لم تكون مرضية بالنسبة لي كانت هناك مشكلات في الإضافة
كانت تجربة جيدة بفضل الله جيدة
سيدي انتظرت في غرفة المكان مكملة وكانت مستحيلة اضطررت اخذ اول صورة عشان اخلاص بنون ما اشوف بالي الخبرات
أحببت الاجراء وفريق التصوير
كانت جيدة بوخاما ولكن لعدم تحريك المواعيد لدى الاستديو اضطررت انتظار لما يقارب نصف ساعة
غير مهم
عذرية لاني فقط كان خاره عن حجز لصور شخصيه
ملاك جا بياني
لم احتاج

Figure 5-8: The answer text of the fourth question

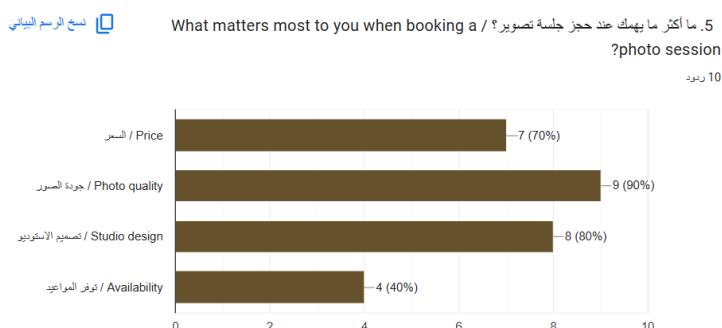


Figure 5-9: The diagram of the fifth question



Figure 5-10: The pie chart of the sixth question

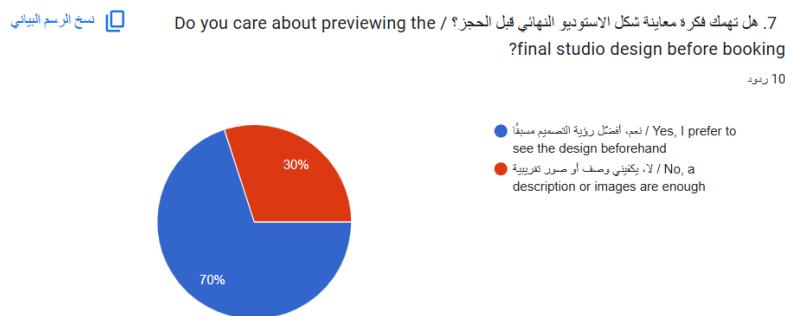


Figure 5-11: The pie chart of the seventh question

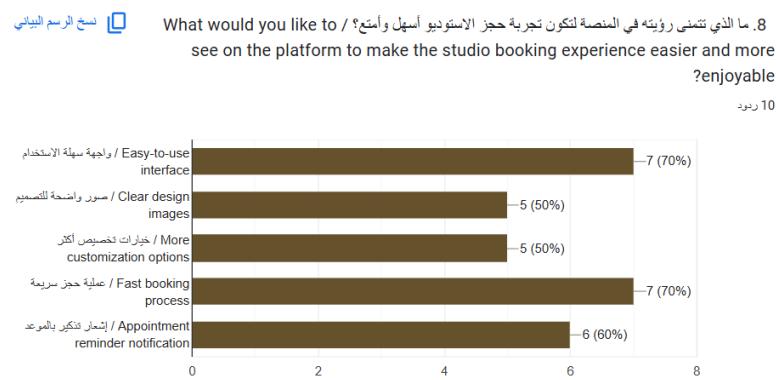
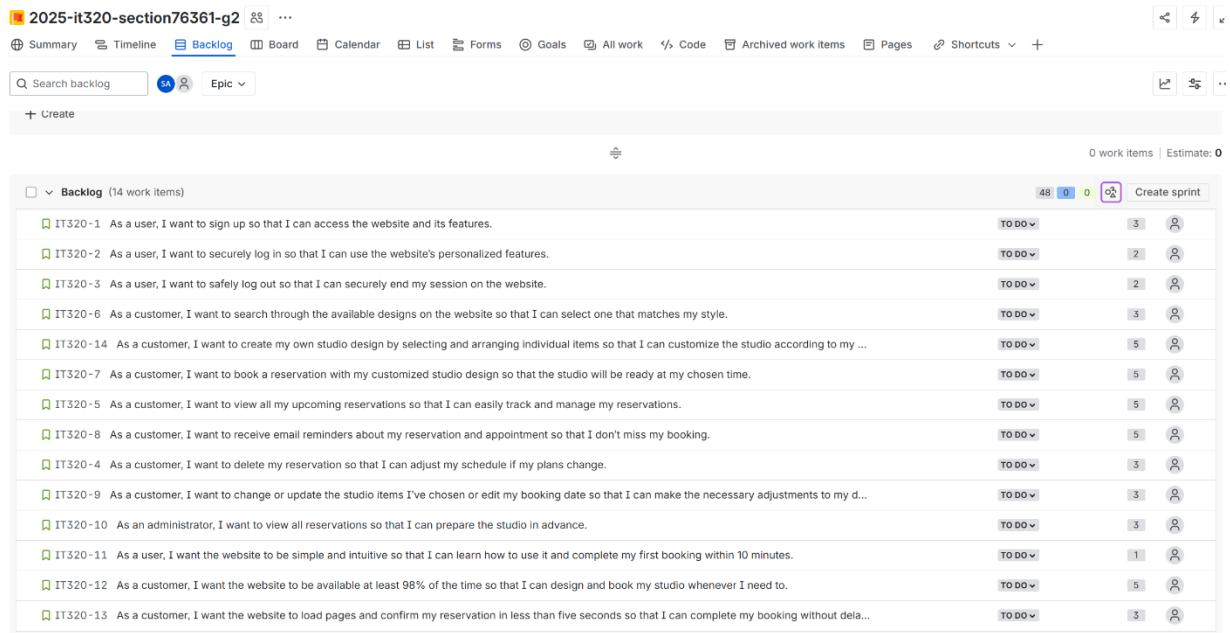


Figure 5-12: The diagram of the eighth question

6.3 Appendix C: Jira Backlog:

This appendix demonstrates how we used Jira, a widely adopted project management tool, in our project workflow. Jira offers a powerful platform for organizing tasks, monitoring progress, and facilitating team collaboration. In this section, we will focus on the Product Backlog, which acts as a dynamic list of prioritized tasks that we plan to complete.



The screenshot shows the Jira Backlog interface for a project named "2025-it320-section76361-g2". The backlog contains 14 work items, all categorized under the "TO DO" status. The work items are listed below:

- IT320-1 As a user, I want to sign up so that I can access the website and its features.
- IT320-2 As a user, I want to securely log in so that I can use the website's personalized features.
- IT320-3 As a user, I want to safely log out so that I can securely end my session on the website.
- IT320-6 As a customer, I want to search through the available designs on the website so that I can select one that matches my style.
- IT320-14 As a customer, I want to create my own studio design by selecting and arranging individual items so that I can customize the studio according to my ...
- IT320-7 As a customer, I want to book a reservation with my customized studio design so that the studio will be ready at my chosen time.
- IT320-5 As a customer, I want to view all my upcoming reservations so that I can easily track and manage my reservations.
- IT320-8 As a customer, I want to receive email reminders about my reservation and appointment so that I don't miss my booking.
- IT320-4 As a customer, I want to delete my reservation so that I can adjust my schedule if my plans change.
- IT320-9 As a customer, I want to change or update the studio items I've chosen or edit my booking date so that I can make the necessary adjustments to my ...
- IT320-10 As an administrator, I want to view all reservations so that I can prepare the studio in advance.
- IT320-11 As a user, I want the website to be simple and intuitive so that I can learn how to use it and complete my first booking within 10 minutes.
- IT320-12 As a customer, I want the website to be available at least 98% of the time so that I can design and book my studio whenever I need to.
- IT320-13 As a customer, I want the website to load pages and confirm my reservation in less than five seconds so that I can complete my booking without dela...

Figure 5-13: Product Backlog of Birwaz website in Jira