COMP 3059 – Capstone Project I

Software Requirements Analysis and Design Assignment

This assignment is an overview to gather the software needs with requirements analysis and help to proceed with the design.

The requirements analysis helps to break down functional and non-functional requirements to a basic design view to provide a clear system development process framework. It involves various entities, including business, stakeholders and technology requirements.

The design is the activity following requirements specification and before programming. Software design usually involves problem-solving and planning a software solution.

To work on this assignment you could use the references and a sample template given below. The sample template can be customized to suit the nature of your project.

Reference Readings/Example:
http://www.uacg.bg/filebank/acadstaff/userfiles/publ_bg_397_SDP_activities_and_steps.pdf

www.cse.msu.edu/~chengb/RE-491/Papers/SRSExample-webapp.doc

Source for this template:
www.tricity.wsu.edu/~mckinnon/cpts322/cpts322-srs-v1.doc

1.0 Introduction

This document outlines the requirements and design specifications for Biz Horizon, a platform designed to support service-oriented businesses with essential operations. It provides a development roadmap aimed at meeting both stakeholder expectations and project goals.

1.1 Purpose

This document outlines the high-level software requirements for the system, focusing on its functionality rather than its implementation, for the intended audience.

1.2 Scope

This document is intended for stakeholders, developers, business owners, and project managers involved in the platform's development and deployment.

2.0 System Overview

The Biz Horizon platform is structured to separate data management, user interactions, and system control logic, supporting modularity and scalability. The System Overview for the Biz Horizon Operations Management Platform details the purpose, scope, environment, and specific requirements that guide its design. Biz Horizon is an all-in-one solution specifically crafted for small and medium-sized service-oriented businesses, providing tools to handle core operational tasks like scheduling, order management, payment processing, and reporting. The platform aims to digitize business workflows, enhance customer experience, and deliver data-driven insights to inform business decisions.

This section presents a high-level description of the project's perspective, operational environment, technical constraints, assumptions, and dependencies. It establishes a comprehensive understanding of the system's role within its intended business context.

2.1 Project Perspective

Biz Horizon represents a new, self-contained solution for small businesses that require efficient operational support to remain competitive in today's digital market. Unlike large-scale ERP systems or generic business software, Biz Horizon is specifically tailored to meet the operational needs of small enterprises with minimal resources for complex software implementations. This project was initiated to create a streamlined, affordable, and accessible system for businesses that traditionally rely on manual processes. Biz Horizon's design ensures modularity, allowing small businesses to use a streamlined solution without the complexity of large ERP (Enterprise Resource Planning) systems.

Key Objectives:

Digital Transformation for Small Businesses: Small businesses often face challenges in adopting digital tools due to complexity and cost. Biz Horizon simplifies this process, allowing business owners to digitize essential workflows without needing extensive technical knowledge.

Improving Customer and Staff Interactions: The system bridges gaps in customer engagement by enabling direct access to service schedules, product orders, and payment options. Service staff also benefit from a structured dashboard that centralizes scheduling, customer inquiries, and order management.

Supporting Data-Driven Decisions: Biz Horizon's analytics tools provide business owners with insights on customer preferences, peak hours, and inventory trends. This

data can be crucial in helping businesses make informed decisions regarding staffing, product offerings, and marketing.

By consolidating various operational tasks into one platform, Biz Horizon enables small businesses to maximize efficiency, reduce costs, and improve their overall service quality.

System Development Origins and Scope

The system was developed as a unique, standalone platform. The Biz Horizon platform is not an enhancement or derivative of an existing product line; instead, it was designed from the ground up to address the unique requirements of small service-based businesses, such as hair salons, clinics, repair services, and other customer-facing industries. These businesses typically do not require the full range of features offered by larger business management systems but instead benefit from a streamlined, modular solution.

Key Features and Modules

Business Owner Dashboard: For managing overall operations, tracking sales, reviewing performance, and generating reports.

Service Staff Dashboard: Focused on booking management, customer inquiries, and task coordination.

Customer Interface: A user-friendly platform for browsing, booking, and paying for services, enhancing customer satisfaction and loyalty.

2.2 System Context

The Biz Horizon platform operates within a digital ecosystem where small business owners, service staff, and customers interact seamlessly. The platform's structure supports a diverse set of functionalities organized into modules, each designed to address the needs of a specific user group.

Stakeholder Requirements:

- **Business Owners**: Require comprehensive visibility into sales data, customer feedback, and operational insights. The system provides tools to track and analyze metrics, streamline operations, and support strategic decision-making.
- **Service Staff**: Need efficient tools for managing bookings, accessing customer information, and coordinating daily tasks. The Service Staff Dashboard allows employees to view their schedules, handle bookings, and interact with customers to ensure a seamless service experience.
- **Customers**: Seek a convenient, intuitive way to book services, make payments, and view available offers. The customer-facing interface provides access to service listings, top-rated products, personalized recommendations, and a secure checkout experience.

Components:

- **Backend Server**: The backend processes all data and supports interactions between various modules, ensuring efficient data flow, system stability, and secure transaction handling.
- **Centralized Database**: The system's database houses customer data, product information, transaction records, and operational analytics, providing a unified data repository for all platform functions.

- **Dashboards and Customer Interface**: Dashboards and interfaces enable user interactions for business owners, staff, and customers.
- **API Layer**: Enables communication between system components, supporting modular design and future integration capabilities with external tools (e.g., payment processors, analytics platforms).
- **Strategic Alignment**: The platform aligns with small business needs by prioritizing simplicity, modularity, and scalability. Its cloud-based infrastructure allows businesses to access the platform from any device with an internet connection, supporting remote management and flexible operations. Furthermore, Biz Horizon's design anticipates growth and adaptation, providing small businesses with a scalable solution that can accommodate evolving needs as they expand.

2.3 General Constraints

Several constraints govern the development and implementation of Biz Horizon, ensuring that the platform meets specific business requirements while operating efficiently within its designated environment.

- **Budget Constraints**: Biz Horizon has been built to serve small businesses with limited budgets. To maintain affordability, the platform uses cost-effective, open-source tools where possible. Budget limitations influence the selection of technology, emphasizing practicality and efficiency over premium features.
- **Data Security and Privacy**: As the platform handles sensitive business and customer data, robust security measures are essential. Compliance with local and international data protection laws, such as GDPR, is mandatory to protect user data and maintain trust. Data encryption, secure login mechanisms, and access control protocols are enforced to protect sensitive information.
- **Performance Requirements**: The platform must remain responsive even under peak usage conditions, especially during high-traffic periods or simultaneous bookings. The system is optimized to handle multiple concurrent users, ensuring efficient booking and transaction processing for both customers and service staff.
- **Device and Browser Compatibility**: Biz Horizon must be compatible with commonly used devices and browsers, including desktop computers, tablets, and mobile phones. The system is optimized to function on popular browsers such as Chrome, Firefox, and Safari, ensuring accessibility for a broad user base.
- **Resource Constraints**: Given the target audience of small businesses, the platform's technical requirements are minimized to avoid the need for specialized hardware or software, making it easy for businesses to adopt Biz Horizon without significant infrastructure investments.
- **Modular Scalability**: The system's modular design allows for future scalability, accommodating additional features as business needs evolve. However, it must balance scalability with system simplicity, ensuring new features do not overwhelm users or increase the platform's complexity unnecessarily.

2.4 Assumptions and Dependencies

The Biz Horizon platform's successful implementation relies on certain assumptions and external dependencies, which are essential for ensuring smooth operations and meeting user expectations.

Assumptions

- **Internet Accessibility**: The platform assumes a stable internet connection for all users to support real-time interactions and updates. Consistent connectivity is crucial for features like online booking, payment processing, and data synchronization across devices.
- **User Digital Literacy**: Biz Horizon is designed with the assumption that users have a basic understanding of digital tools, including navigating dashboards, managing orders, and interacting with online interfaces. Simplified user experiences cater to users of varying skill levels, but basic familiarity with technology is presumed.
- **Regular Maintenance and Support**: It is assumed that routine maintenance will be conducted to ensure system performance and reliability. Regular updates, patches, and technical support are integral to maintaining system integrity and accommodating potential feature enhancements.
- **Operating Environment Stability**: The platform depends on consistent backend infrastructure (e.g., servers, hosting services) to support reliable functionality. The stability of the backend environment is assumed to be secure and free from disruptions.
- **Role-Based Access Control**: Each user role has specific permissions to interact with relevant features within the platform, ensuring data security and operational efficiency. It is assumed that users respect these access boundaries to prevent unauthorized actions.

Dependencies

- **Third-Party Payment Integration**: The system relies on external payment gateways for secure transaction processing. The availability, performance, and compliance of these third-party services directly impact the checkout and payment functions. Changes or disruptions in these services may necessitate updates or adjustments within the platform.
- **Cloud Hosting Provider**: Biz Horizon's availability depends on the reliability of the cloud hosting provider to ensure uptime, data storage, and secure access to services. Any hosting service disruptions or changes could affect the platform's accessibility and operational consistency.
- **Regulatory Compliance and Updates**: The platform is designed in compliance with current data protection laws. Changes in legal regulations may require adjustments to the platform's data handling policies, access control, or data storage practices to maintain compliance.
- **System Compatibility with Device and Browser Updates**: The system assumes compatibility with standard devices and popular browsers. However, ongoing updates in browsers or devices could impact platform performance, necessitating periodic testing and updates to ensure compatibility.
- **Third-Party Communication Services**: For notifications and customer communications, Biz Horizon relies on third-party email and messaging services. The availability and stability of these services affect the platform's ability to send timely notifications, confirmations, and updates to users.

3.0 Functional Requirements

This section describes specific features of the software project. If desired, some requirements may be specified in the use-case format and listed in the Use Cases Section.

3.1 Functional Requirement or Feature #1

Customer registration (Customer sign-up):

1.1. ***Introduction:*** This feature allows new customers to create an account on the BizHorizon platform, providing them with access to make bookings, leaves reviews, and view past transactions.

1.2. ***Input:*** Customer details including name, email, phone number, password, and other optional profile information.

1.3. ***Processing:***

- The system validates the input data to ensure it is complete and correct (such as valid email format, and password strength).
- When validated, the system creates a new customer entry in the database.

1.4. Output:

- 1.4.1. A confirmation message will be displayed to the customer, showing successful registration.
- 1.4.2. New customer data is saved in the database, allowing users to log in and access the platform features.

3.2 Functional Requirement or Feature #2

Order Placement (Checkout Process):

- ***Introduction: This*** feature enables customers to place orders for products or services available on the platform. It includes selecting items, confirming the order, and proceeding with the payment.
- ***Input:*** Customer-selected products, services, quantities, delivery or appointment details, and payment information.
- ***Processing:***
    - The system calculates the total cost based on the selected items. Applied discounts if available and start the payment process.
    - It checks inventory for availability and validates payment information with the payment gateway.
- ***Output:***
    - Confirmation of successful order placement and payment.
    - Order details saved in the database for the future.
    - Receipt or order summary shown to the customer and sent via email or SMS.
    - Delivery stages will be emailed or texted to the customer.

3.3 Functional Requirement or Feature #3

Admin Dashboard

***3.1. Introduction*:** Provide an admin dashboard for business owners to manage all aspects of the business including bookings, orders, customer information, product details, and reports. This feature helps business owners access and control critical business information in one place, which enhances operational efficiency.

3.2. Input: The business owner's action may include

- Request to view details of bookings, customer information, orders, or business performance reports. (view)
- Modify information on existing bookings, customer profiles, or product details. (update)
- Remove old and useless data entries. (delete)
- Apply filters to narrow down data by date or status or sort it by specific criteria. (filter or sort)

3.2 Processing: The system processes each action as below:

- View: get the data from the database and present it in the dashboard.
- Update: validates data such as checking for the required fields, and data format and updates the relevant records in the database.
- Delete: confirms the deletion action to prevent accidental removal, then deletes the specified data from the database if confirmed.
- Filter: applies the selected filter criteria to match the user's specification.

3.3 Output:

- A real-time view of management tools and options presented on the dashboard.
- A confirmation message for successful updates or deletions.
- A display of filtered or sorted data based on the business owner's specifications, which allows easier data management.

3.4 Functional Requirement or Feature #4

Product and service catalogue (Product and service Browsing):

- ***Introduction:*** This feature provides customers with access to a complete list of products and services offered by the business. Customers can browse the catalogue, apply filters, and view detailed information about each product or service, including descriptions, prices, and availability status.

- ***Input:*** Customers search criteria or filters:
  - Category (type of service, or product category)
  - Price Range (minimum or maximum price)
  - Availability (in-tock or out-of-stock)
- ***Processing:***

- The system retrieves products or services from the database that match the customer's criteria.
- The system applies sorting if requested by a customer.
- The system formats the result for display and makes sure each item includes key information such as price, availability status and description

Output: A filtered list of products or services displayed with description, price and availability status which matches the customer's search criteria.

3.5 Functional Requirement or Feature #5

- ***Customer reviews and feedback***
- **Introduction:** This feature allows customers to leave reviews of products or services they bought. It helps future customers and owners make informed decisions. Customers select a product or service they bought, rate it, and submit a written review or picture review.
- **Input**: customer's rating, review text or image.
- **Processing:** The system stores the review, relates it to the customer and the product, and makes it visible in the product catalogue.

Output: A review displayed under the product or service, visible to everyone.

3.2 Use Cases

3.2.1 Use Case 1: Customer Registration

- **Actors: customer**
- **Conditions: The customer is on the registration page**
- **Main flow:**

  The customer navigates to the registration page

  Customer enters details including name, email, phone number, password, and optional profile information.

  The customer submits the registration form.

  The system validates the data (e.g. checks email format, password strength and format).

  The system creates new customer entry in the database if validation is successful.

  The system displays a confirmation message, indicating successful registration.

- **Alternative flow option:**
  1. Invalid data is entered. (wrong email format). The system sends an error message, asking the user to correct the information.

3.2.2 Use Case 2: Order Placement

- **Actors:** Customer, gateway payment.

- **Condition:** Customer is logged in and selected the product or service.
- **Main flow:**
    1. Customer selects the products or services and proceeds to the checkout page.
    2. The customer enters order details (e.g. delivery address or appointment date) and payment information.
    3. The system calculates the total cost, applies any discounts, and displays the final amount.
    4. System verifies product availability in inventory.
    5. The system starts the payment process and connects with the payment gateway,
    6. The payment gateway processes the payment and sends confirmation back to the system.
    7. The system saves order details in the database and displays a confirmation message with an order summary.
    8. The system sends a receipt via email or SMS to the customer.
- **Alternative flow:**
    1. **Insufficient Inventory:** If the selected products are not available, the system informs the customer and removes the unavailable items from the order.

Payment Failure: If payment fails, the system displays an error message, and the order is not processed.

3.2.3 Use Case 3: Admin Dashboard

- **Actors:** Business owner
- **Conditions:** The business owner is logged in to the admin dashboard.
- **Main Flow:**
    1. Business owners select an action (e.g. view, update, delete, or filter) in the admin dashboard.
    2. If the action is View: The System gets the relevant data, such as bookings or orders and displays it on the dashboard.
    3. If the action is updated:
        - Business owners modify data (e.g. customer profile or product details)
        - The system validates the data and updates the database if validation is successful.
    4. If the action is deleted:
        - Business owner confirms deletion of specified data.
        - The system removes the data from the database.
    5. If the action is filter or sort:
        - Business owners apply filters or sorting criteria.

- System displays the filtered or sorted data based on the criteria.

6. The system displays a confirmation message for successful updates or deletions.

- **Alternative Flow:**

Invalid Updates: If the updated data cannot be validated (e.g. missing required fields), the system asks the business owner to correct it.

3.2.4 Use Case 4: Product and service catalog

- **Actors:** Customer
- **Condition:** The customer is on the product or service catalogue page.
- **Main flow:**
  1. Customers see the catalogue and may apply a search filter (e.g. category, price, availability)
  2. The system gets products or services matching that search from the database.
  3. The system applies the sorting or filtering if asked by the customer.
  4. System shows a list of products or services with descriptions, prices, and availability status.
- **Alternative flow:**
  1. No matching result: If no products or services match the search criteria, the system displays a message showing no results found.

Use Case 5: Customer reviews and feedback

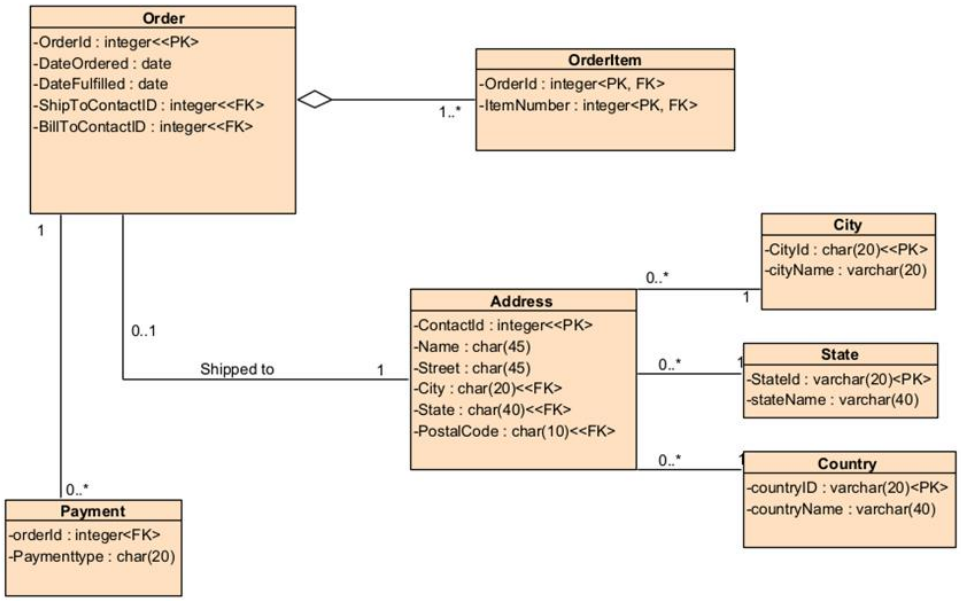
- **Actors: customer**
- **Condition:** the customer has completed the purchase and is logged in.
- **Main Flow:**
  1. Customer navigates to the product or services they purchased.
  2. The customer selects the option to leave a review and enters the rating, review text, or image.
  3. The system validates the review content (e.g. checking empty fields or inappropriate language)
  4. The system saves the review in the database and relates it to the customer and the product or service.
  5. Finally, the system shows the review under the product visible to all customers.
- **Alternative flow:**

Incomplete Review: If the review is not complete or some part is missing like a rating, the system asks the customer to complete all required fields.

3.3 Data Modelling and Analysis

- Normalized Data Model Diagram

Feature2: Order Placement (diagram normalized to third form, 3NF)


Order
-OrderId : integer<<PK>
-DateOrdered : date
-DateFulfilled : date
-ShipToContactID : integer<<FK>
-BillToContactID : integer<<FK>
OrderItem
-OrderId : integer<PK, FK>
-ItemNumber : integer<PK, FK>
1..*
1
0..1
Shipped to
1
City
-CityId : char(20)<<PK>
-cityName : varchar(20)
0..*
1
Address
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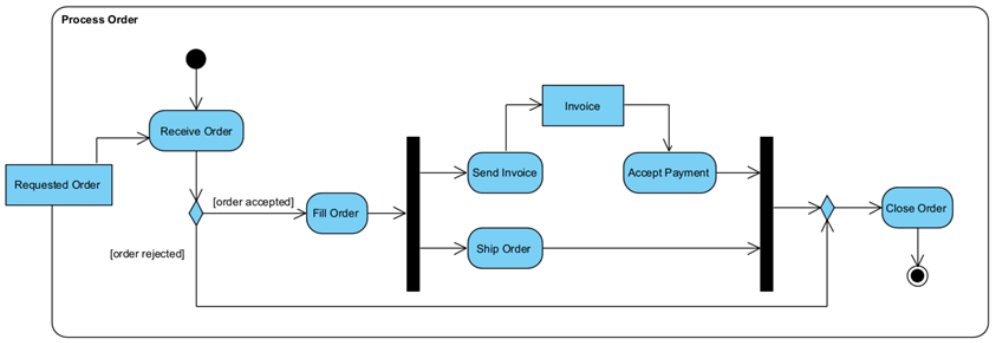
-Name : char(45)
-Street : char(45)
-City : char(20)<<FK>
-State : char(40)<<FK>
-PostalCode : char(10)<<FK>
0..*
State
-StateId : varchar(20)<PK>
-stateName : varchar(40)
0..*
Country
-countryID : varchar(20)<PK>
-countryName : varchar(40)
0..*
Payment
-orderId : integer<FK>
-Paymenttype : char(20)

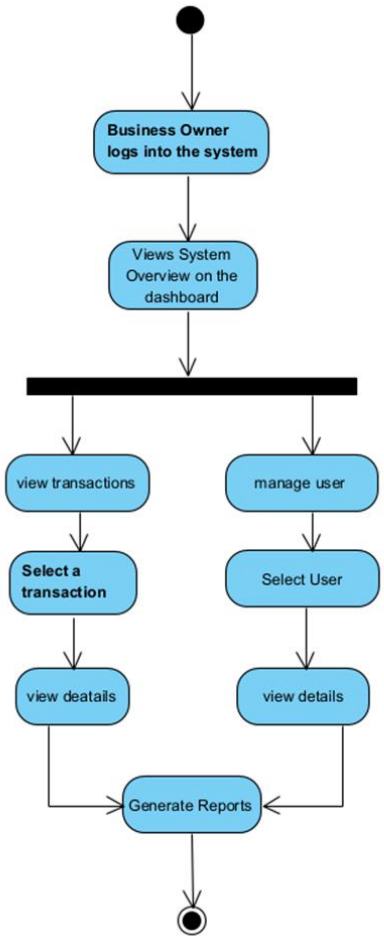
- Activity Diagrams

Feature 2: Order Placement

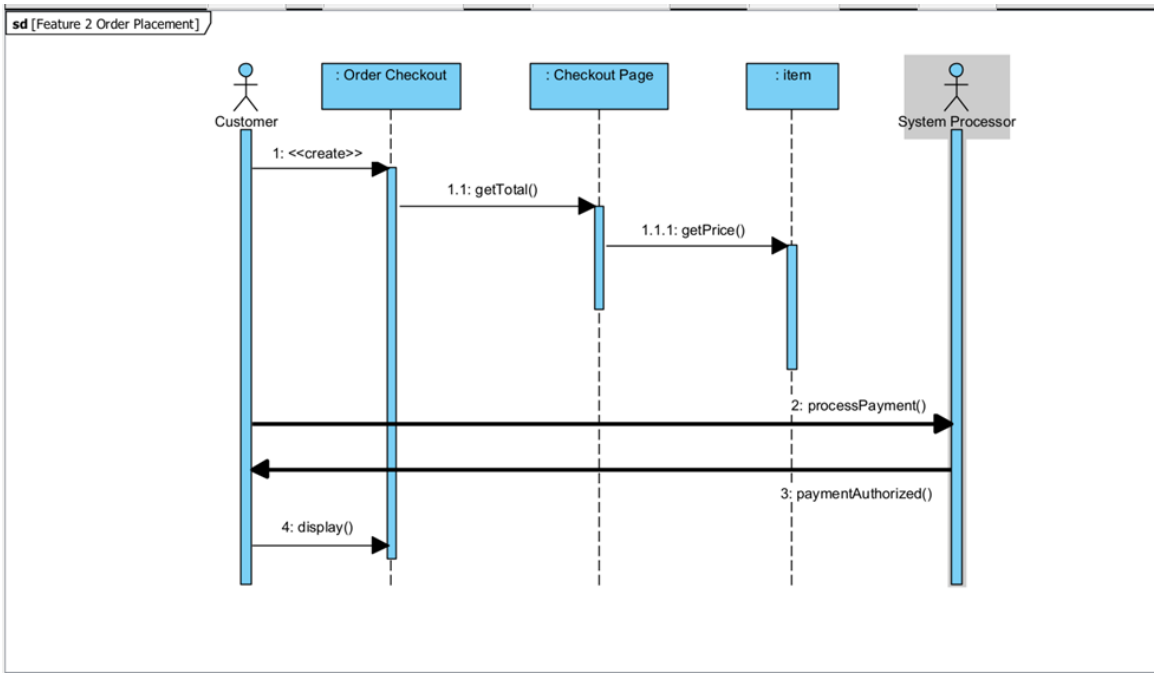
act [Order Processing]



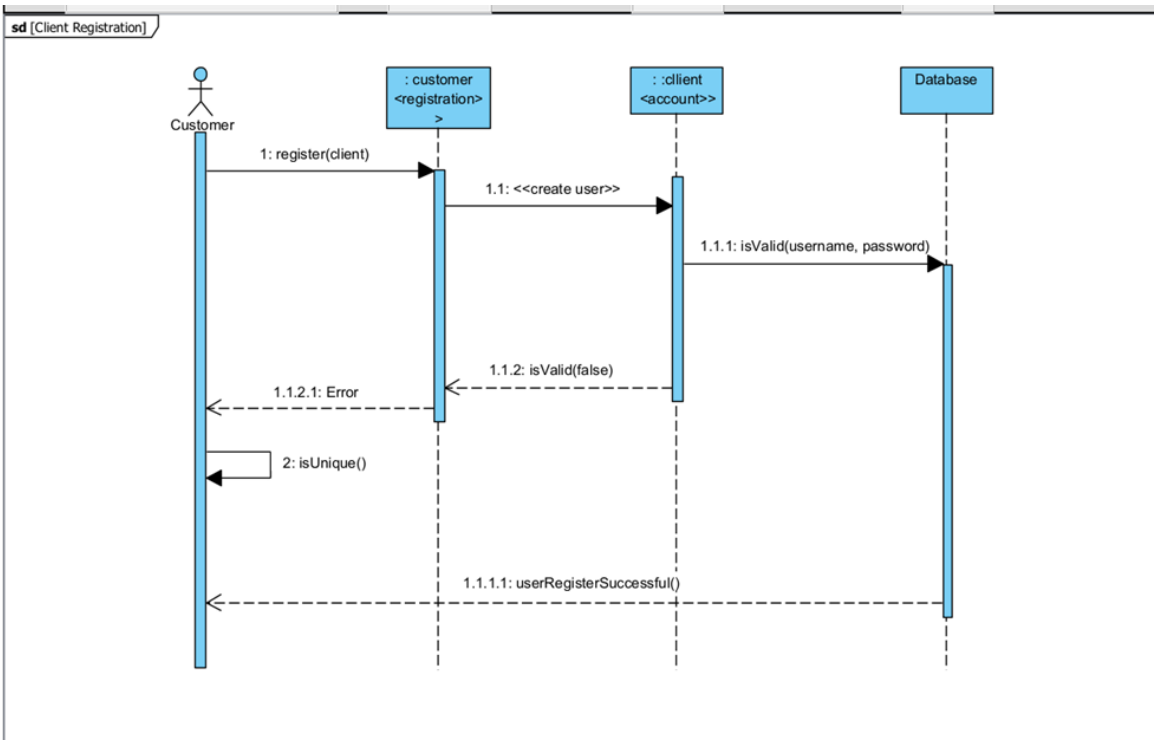
Feature 3: Admin Dashboard



- Sequence Diagrams
  Feature 4: Order Placement

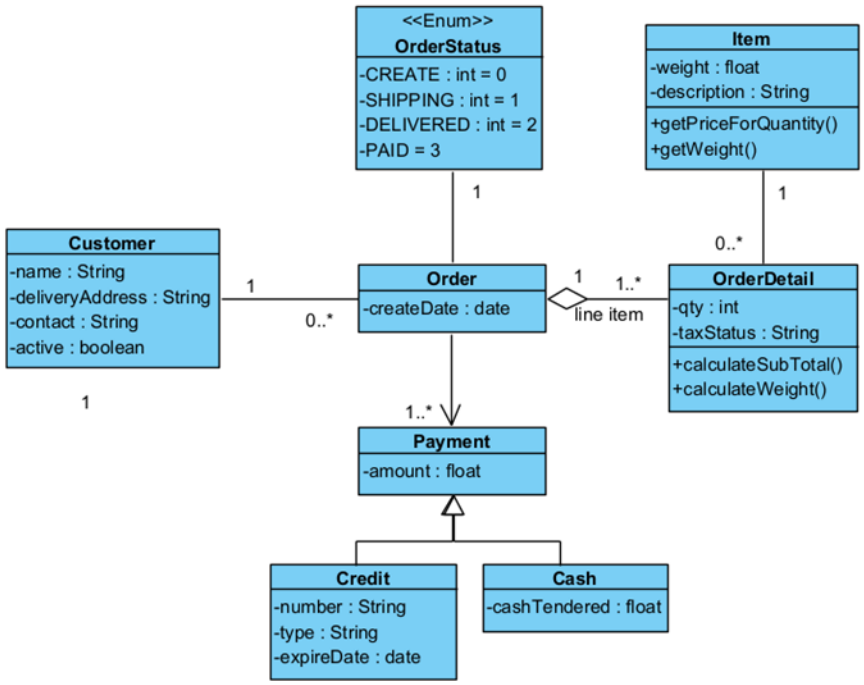


Feature 1: Customer Registration



- UML Class Diagram

Feature 2: Order Placement



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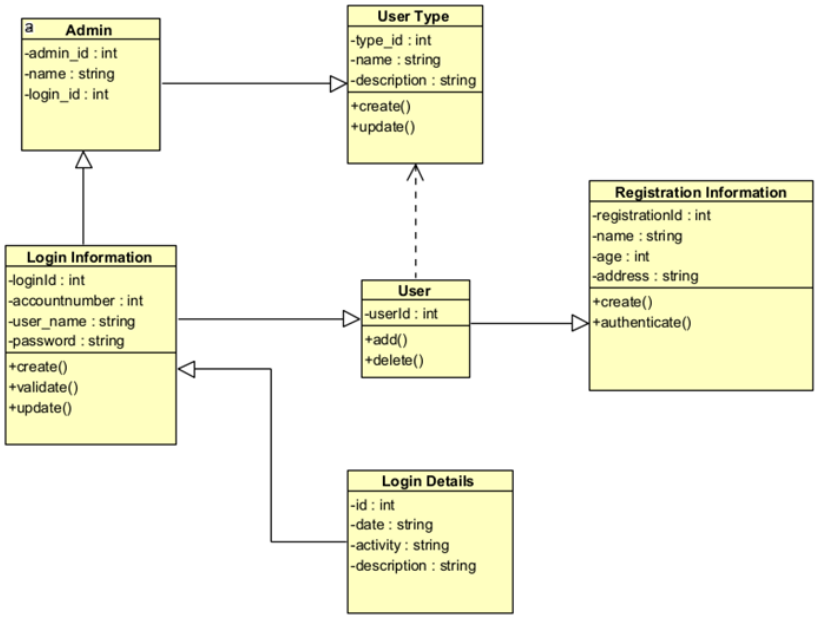
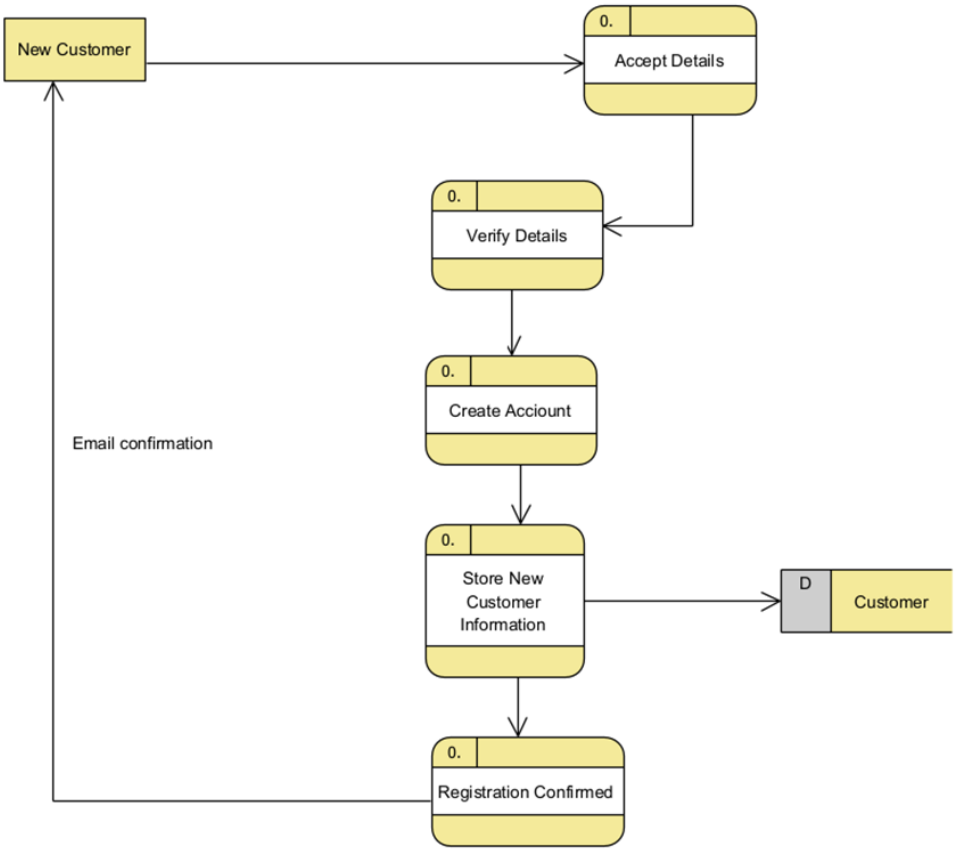


3.4 Process Modelling

- Data Flow Diagram

Feature 1: Customer Registration:



Data Flow Table - Customer Registration

Customer No.	varchar(50)	Not null
email (username)	varchar(50)	Not null
password	Varchar(50)	Not null

4.0 Non-Functional Requirements

Performance:

- The system should process 90% of order transactions within 2 seconds to support efficient order management for small businesses.
- Data retrieval for the Admin Dashboard and Product Catalog should take no more than 3 seconds, ensuring smooth user experience, even during high traffic.

Reliability:

- System uptime should exceed 99%, ensuring that essential features like scheduling, customer management, and catalogue browsing are consistently accessible.

Security:

- Customer data must be encrypted both in transit and at rest, with access restricted to authorized personnel to uphold privacy and protection.
- User passwords should be securely hashed before storage, with sensitive data accessible only to authorized roles.
- For the Customer Reviews feature, display only public information, and securely handle any associated sensitive data.

Maintainability:

- System updates should be modular and completed within 2 hours to minimize downtime, allowing businesses to adapt quickly.
- The platform's architecture should support modular updates for specific features, like Order Placement or the Admin Dashboard, without impacting the entire system.

Portability:

- The platform must be accessible on desktop, tablet, and mobile devices to meet the diverse needs of business owners and their teams.
- Compatibility testing should be conducted across desktops, tablets, and mobile browsers to ensure consistent functionality and user experience across all devices.

5.0 Logical Database Requirements

The Biz Horizon Operations Management Platform will use a database to store, manage, and secure critical business data efficiently. Here's an outline of the key requirements:

5.1 Data Formats and Storage

Structured Data Storage	The database will store various types of information, such as customer details, product and service listings, orders, and transactions, in structured formats. Each data type will have specific attributes like number, text, or date to make storage and retrieval easy and efficient. Customer registration data will be retained to ensure that users can access their profiles without the need to re-register upon subsequent visits.
Normalization	To minimize redundant data and keep it organized, the database will follow a structured design, aiming for Third Normal Form (3NF). This design reduces storage needs and avoids common issues with data duplication.
Scalable Storage	The platform will handle large amounts of data, including historical orders, customer reviews, and analytics. The database should be capable of expanding to store growing data volumes as the business scales.

5.2 Data Retention and Archiving

Retention Policies	Data retention rules will define how long customer information and transaction records are stored. These rules will comply with legal standards, such as GDPR, and business needs, ensuring that data is available for the right amount of time.
Archival Process	Data that isn't actively in use, like old transactions or inactive

	accounts, will be moved to an archive. Archiving older data will help keep the main database fast and efficient while ensuring historical records remain accessible.

5.3 Data Integrity and Consistency

Primary and Foreign Keys	The database will use primary keys for unique record identification and foreign keys to link related data. For example, orders will be linked to customer profiles to ensure data consistency across the system.
Transaction Management	The database will support reliable data updates, especially when multiple users are accessing it. It will use ACID (Atomicity, Consistency, Isolation, Durability) transactions to maintain data accuracy and stability, especially during peak usage.
Data Validation Rules	Rules will check data accuracy, such as verifying email format for customer contacts, ensuring positive values for stock, and validating payment statuses. This makes sure that only correct information is stored.

5.4 Data Security

Encryption	Sensitive information, such as passwords and payment details, will be encrypted to protect against unauthorized access. This encryption helps maintain privacy and trust with users. User passwords will be securely hashed before storage to prevent unauthorized access and ensure data confidentiality.
Role-Based Access	Different users (e.g., admin, staff, customers) will have limited access based on their roles, ensuring only authorized users can view or modify certain information. This system helps maintain data security.
Audit Logs	Key changes, like updates to profiles or orders, will be recorded. This logging supports security by making it clear who modified what and when which is essential for regulatory compliance.

These database requirements ensure that Biz Horizon's platform will manage data effectively, remain secure, and support growth as needed.

6.0 Other Requirements

Legal and Compliance Requirements:

- Biz Horizon must comply with PIPEDA (Personal Information Protection and Electronic Documents Act) to protect customer data and ensure all data handling meets Canadian privacy standards.

Integration Requirements:

- The platform must integrate with third-party payment processors to enable secure financial transactions.

7.0 Approval

The signatures below indicate their approval of the contents of this document.

Project Role	Name	Signature	Date
Team Lead	Nigar Ahmadova		07.11.2024
Team Member	Adler Pazhouhan		07.11.2024
Team Member	Fatima Arab		07.11.2024
Team Member	Elizabeth Thomas		07.11.2024
Team Member	Anar Samadzade		07.11.2024