Sri Lanka Institute of Information Technology

Assignment

MLB_PG.02.02_07

Online Book Store

Information System and Data Modeling – IT1090

B.Sc. (Hons) in Information Technology

Assignment 2 Cover Sheet

CASE STUDY NAME	Online Book Store
PROJECT ID	MLB_PG.02.02_07

Group Details:

	Student Registration Number	Student Name
1	**IT20133986**	**R.R.Manilka Fernando**
2	IT20133672	C.D.Adhihetty
3	IT20134426	Samaranayake A.K.D.D.V
4	IT20133818	Perera M.P.M
5	IT20135652	M.A.D.G.A Suriyawatta

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Introduction

This project deals with developing an e-commerce website for Online Bookstore. It provides the user with a catalogue of different books available for purchase in the store. In order to facilitate the online purchase, a shopping cart is provided to the user.

In order to an e-commerce website, a number of technologies must be studied and understood. These include multi-tiered architecture, server and client-side scripting techniques, implementation technologies such as JSP, programming language (such as JAVA, JAVA script and HTML.), relational databases (such as MySQL, Access).

This is a project with the objective to develop a basic website where a consumer is provided with a shopping cart application and also to know about the technologies used to develop such an application.

An Online Bookstore is a virtual store on the internet where customers can browse the catalogue and select books of interest. The selected books may be collected in a shopping cart. At checkout time, the items in the shopping cart will be presented as in order. At that time, more information will be needed to complete the transaction. Usually, the customer will be asked to fill a billing address, a shipping option, and payment information such as credit card number.

Hypothetical Scenario

Reading is important because it develops your mind and gives you excessive knowledge and lessons of life. But today people are very busy. They don't have time to go to the store and buy books. This online bookstore is an online web application where the customer can purchase books online. Through a web browser the customers can search for a book by its title, later can add to the shopping cart and finally purchase the books. The Online Bookstore application enables the vendor to set up a bookstore, customers to browse through the book, and a system administrator to approve and reject requests for new books and maintain lists of book categories.

There are two types of users that users can use in our bookstore. They are guest and registered user. To be a registered user, the user has to fill some forms which are available at the counter or they can register to the system using our website and give the correct details of the user. All the information is stored in a database. The registered user should pay the payment for an order. When a person becomes a registered user of our system, he can get the email that includes all of his/ her user ID, password and payment sheet. After that users can access the system.

Firstly, the user has to enter a username and password. In this time system checks the validity of the user logging details. Then the user has to reserve a book. Then the system shows the validity of the book and book price. User has to enter payment details. And also, he/she can send feedback to the system.

The system admin updates the system and will check the details of all users and all the payment sheets to separate the cost and profit.

Requirement Analysis

Main Requirements

- Customer register to the system as a guest.
- Check validity of the user registration details.
- View book categories
- Search book.
- Request for available offers.
- Check membership status
- User login to the site as a Registered User.
- Check validity of the user login details.
- Reserve a book.
- System show the availability.
- Registered user send feedback to the system.
- User edit user account details.
- Check validity of the edited details.
- Purchasing books
- Enter payment details.
- Enter payment method.
- Validate payment details.
- System Admin login as main admin.
- Check validity of the admin login.
- Generate system reports.
- Reply to feedbacks given by user.
- Manage user accounts.
- Send an email verification link.
- User and admin can view/edit user profile.
- Update database.
- Bookstore Manager login as an admin.
- Check validity of the manager login
- Add new books to the system
- Remove books that no longer are searched.
- Update database.
- Check orders.
- Assign delivery manager.
- Assign delivery staff.
- Notify drivers.

- Confirm order locations.
- Driver checkout order.
- System update order delivery status.
- Owner communicating with authors.
- Keeping website up to date.
- Making security patches.
- Updating the design of the website.
- View Reports.

Guest should create a new profile to become a registered user. The system checks the validity of the user registration details. User can view book categories and search books. And also, he/she can request for available offers. The system generates the User ID and Password. User can log in to the bookstore using the system-generated User ID and User Password. Then the system checks membership status. User can reserve a book. Then the system shows the availability of the book. Also registered user can send feedback to the system. Next user edits user account details. Then the system checks the validity of the edited details. Then the user can purchase books. He /She should enter the payment details and enter a payment method. After, the system validates the payment details. System Admin login to the system as main admin. The system checks the validity of the admin login. System admin generates system reports. System admin replies to feedbacks given by users. System admin also manages user accounts. Admin sends an email to the overdue payment and verification link. User and admin can view/edit the user profile. System admin updates the system database by updating user profiles. Bookstore Manager login to the system as an admin. The system checks the validity of the manager login. Bookstore manager adds new books to the system and removes books that no longer are searched. Bookstore manager should update the database and check orders. Also, he/she assign delivery manager, assign delivery staff and notify drivers. Finally, the bookstore manager confirms order locations. Then the driver checkouts order. System update order delivery status. Owner communicates with authors. The owner has a responsibility for updating the new system features to the system and make the system Up to Date. Also, he/she makes security patches and updates the design of the website. Finally, the owner views Report.

Data Requirements

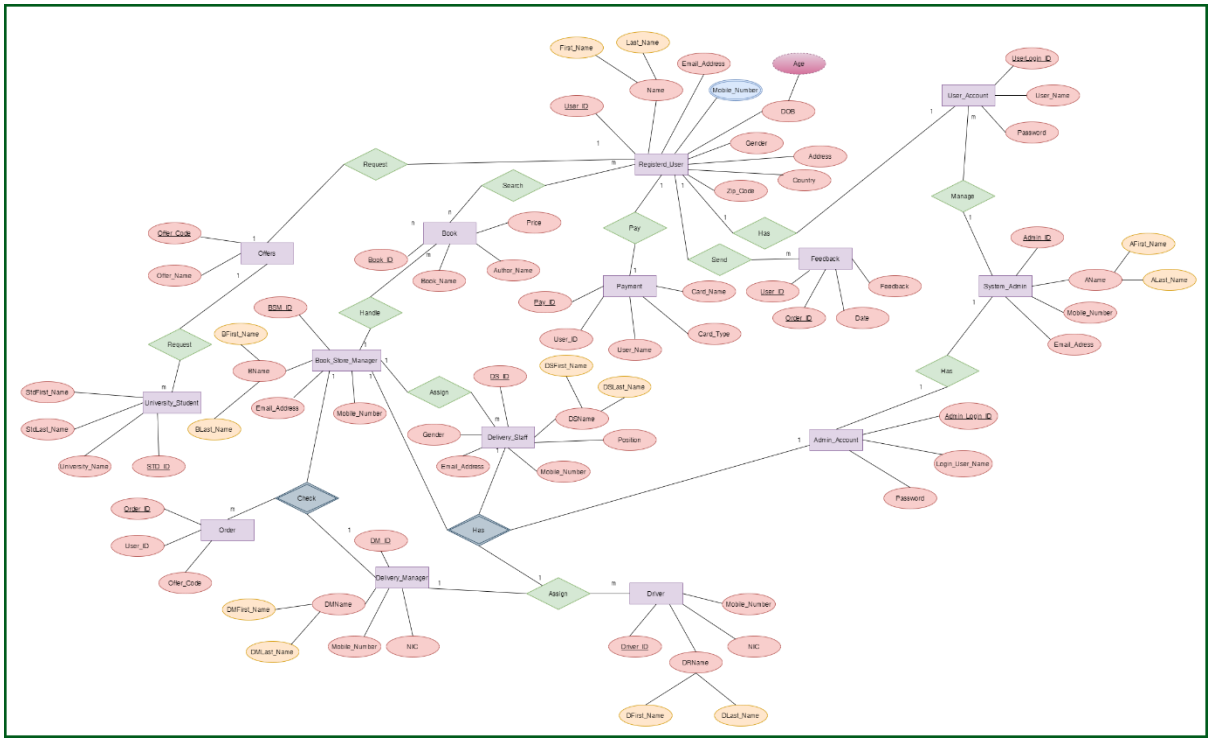
- User Name
- User ID
- User Password
- User Email
- Registration Date
- Book ID
- Book Type
- Book Name
- Book Price
- Offer Code
- Offer Name
- Payment Type
- Payment Method
- Order ID
- Order Price
- Total Income
- Admin ID
- Admin Type
- Admin Name
- Admin Password

Non-Functional Requirements

Non-functional requirements simply known as quality attributes. It describes the user visibility aspects of the system that are not directly concerned with specific functionality.

- ✓ Availability – 24 X 7 availability will be provided until the internet connections get failure.
- ✓ Security – Secure the system from unauthorized access and the system data base can only access directly by the admin. Also, by providing unique user ID and password, no one can access the system by any others' user ID and password.
- ✓ User friendly – Even newly registered user can use the system without any hesitations due to the system user friendliness.
- ✓ Reliability – Mean time to failure the system will very low and reliability of the system will very high.
- ✓ Performance – Any number of users can be able to access the system at the same time and the response of the system regarding to the user requests will be very high.
- ✓ System Modification – System modifications can only make by the admin and updated modifications will apply as the real time process and make the system Up-To-Date.
- ✓ Robustness – Percentage of events causing failure and probability of data corruption on failure is very low because of the real time data savings and even it gets failure, the time to restart after failure is very high, due to the backup systems

ER diagram


First_Name
Last_Name
Email_Address
Age
Name
Mobile_Number
User ID
DOB
Gender
Address
Country
Zip_Code
Registerd_User
Request
Search
Pay
Has
Send
Offers
Offer_Code
Offer_Name
Book
Price
Book_ID
Book_Name
Author_Name
Payment
Pay_ID
Card_Name
Card_Type
User_ID
User_Name
Feedback
Feedback
Order_ID
Date
User_Account
User_Name
Password
Manage
Admin_ID
AFirst_Name
ALast_Name
AName
Mobile_Number
Email_Adress
System_Admin
Handle
BDM_ID
Request
DFirst_Name
MName
Email_Address
Mobile_Number
Book_Store_Manager
Assign
DS_ID
DSFirst_Name
DSLast_Name
DSName
Gender
Delivery_Staff
Position
Email_Address
Mobile_Number
Has
Admin_Account
Admin_Level_ID
Login_User_Name
Password
StdFirst_Name
StdLast_Name
University_Name
STD_ID
University_Student
BLast_Name
Check
Order
Order_ID
User_ID
Offer_Code
DM_ID
Delivery_Manager
DMFirst_Name
DMName
DMLast_Name
Mobile_Number
NIC
Assign
Driver
Mobile_Number
Driver_ID
NIC
DRName
DFirst_Name
DLast_Name

Schema of the Database

1.registerd_user (User_ID, First_Name, Last_Name, Email_Address, Mobile_Number, DOB, Gender, Address, Country, Zip_Code)

2.user_account (UserLogin_ID, User_Name, Password)

3.system_admin (Admin_ID, AFirst_Name, ALast_Name, Mobile_Number, Email_Address)

4.admin_account (Admin_Login_ID, LoginUser_Name, Password)

5.book (Book_ID, Book_Name, Author_Name, Price)

6.payment (Pay_ID, User_ID, User_Name, Card_Type, Card_Name)

7.orders (Order_ID, User_ID, Offer_Code)

8.book_store_manager (BSM_ID, BFirst_Name, BLast_Name, Mobile_Number, Email_Address)

9.delivery_staff (DS_ID, DSFirst_Name, DSLast_Name, Position, Gender, Mobile_Number Email Address)

10.delivery_manager (DM_ID, DMFirst_Name, DMLast Name, Mobile_Number, Email_Address)

11.driver (Driver_ID, DFirst_Name, DLast_Name, Mobile_Number,NIC)

12.feedback (User_ID, Order_ID, Date, Feedback)

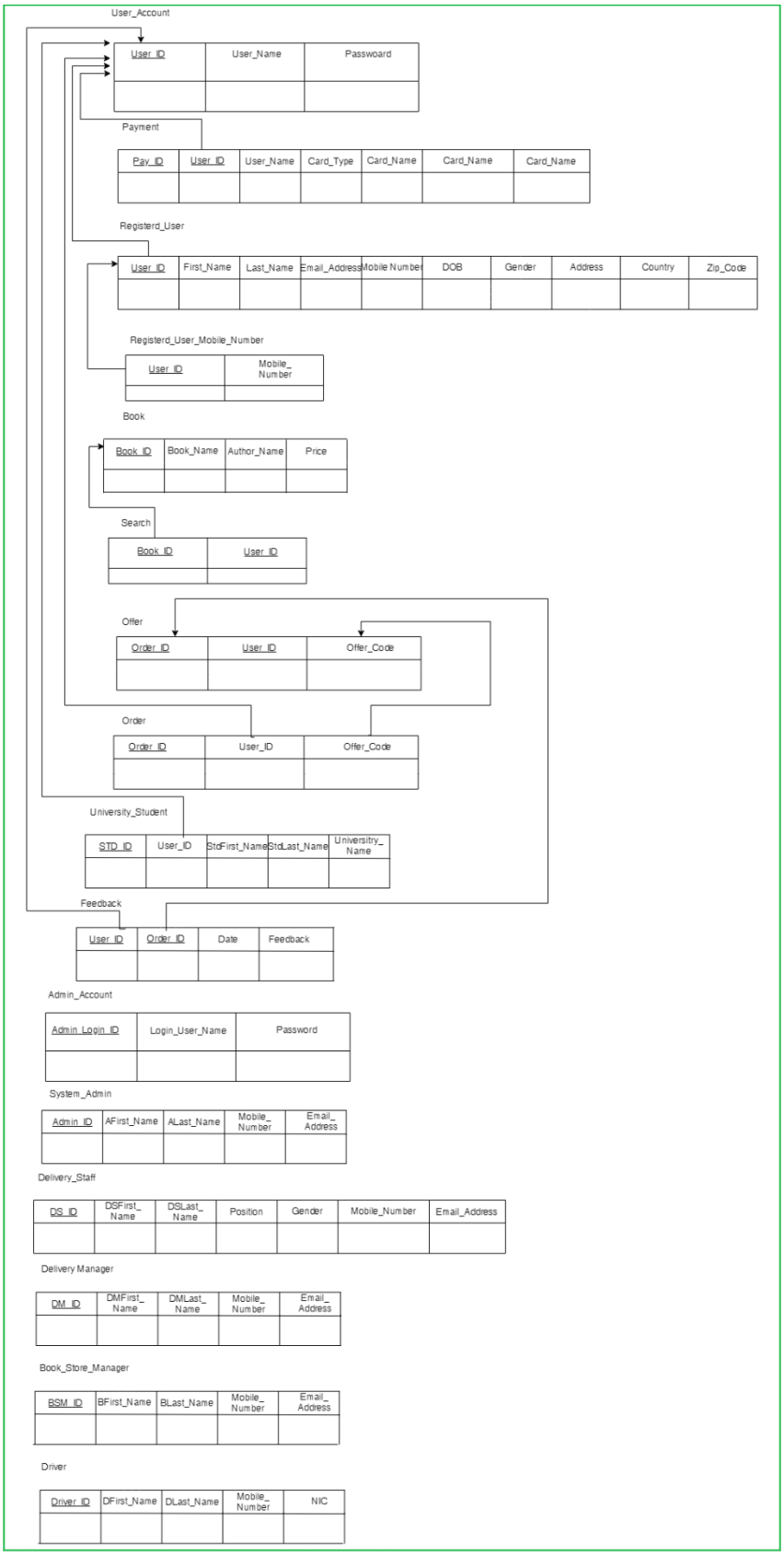
13.offer (Offer_Code, Offer_Name)

14.university_student (Std_ID, User_ID , StdFirst_Name, StdLast_Name, University_Name)

15. registerd_user_mobile_number (User_ID , Mobile_Number)

16. search (Book_ID, User_ID)

Relational Schema



SQL Queries

```
CREATE TABLE registerd_user(
User_ID char(20) NOT NULL,
First_Name varchar(30) NOT NULL,
Last_Name varchar(30) NOT NULL,
Email_Adress varchar(30) NOT NULL,
DOB datetime,
Gender varchar(15),
Address varchar(100),
Country varchar(50),
Zip_Code varchar(20),
constraint pk_registerd_user primary key(User_ID)
);


CREATE TABLE user_account(
UserLogin_ID char(20) NOT NULL,
User_Name varchar(50) NOT NULL,
Password varchar(50) NOT NULL,
constraint pk_user_account primary key(UserLogin_ID)
);


CREATE TABLE system_admin(
Admin_ID char(20) NOT NULL,
AFirst_Name varchar(30) NOT NULL,
ALast_Name varchar(30) NOT NULL,
Mobile_Number char(20),
Email_Address varchar(30) NOT NULL,
constraint pk_system_admin primary key(Admin_ID)
);


CREATE TABLE admin_account(
Admin_Login_ID char(20) NOT NULL,
Login_User_Name varchar(50) NOT NULL,
Password varchar(50) NOT NULL,
constraint pk_admin_account primary key(Admin_Login_ID)
);


CREATE TABLE book(
Book_ID char(20) NOT NULL,
Book_Name varchar(200) NOT NULL,
Author_Name varchar(100),
Price money,
constraint pk_book primary key(Book_ID)
);


CREATE TABLE payment(
Pay_ID char(20) NOT NULL,
User_ID char(20) NOT NULL,
User_Name varchar(50) NOT NULL,
Card_Type varchar(30),
Card_Name varchar(150) NOT NULL,
constraint pk_payment primary key(Pay_ID),
constraint fk_payment foreign key(User_ID) references registerd_user(User_ID)
);


CREATE TABLE orders(
Order_ID char(20) NOT NULL,
User_ID varchar(20) NOT NULL,
Offer_Code varchar(50) NOT NULL,
constraint pk_order primary key(Order_ID),
);


CREATE TABLE book_store_manager(
BSM_ID char(20) NOT NULL,
BFirst_Name varchar(30) NOT NULL,
BLast_Name varchar(30) NOT NULL,
Mobile_Number char(20),
Email_Address varchar(30) NOT NULL,
constraint pk_book_store_manager primary key(BSM_ID)
);
```

```
CREATE TABLE delivery_staff(
DS_ID char(20) NOT NULL,
DSFirst_Name varchar(30) NOT NULL,
DSLast_Name varchar(30) NOT NULL,
Position varchar(30) NOT NULL,
Gender varchar(30),
Mobile_Number char(20),
Email_Address varchar(50) NOT NULL,
constraint pk_delivery_staff primary key(DS_ID)
);


CREATE TABLE delivery_manager(
DM_ID char(20) NOT NULL,
DMFirst_Name varchar(30) NOT NULL,
DMLast_Name varchar(30) NOT NULL,
Mobile_Number char(20),
Email_Address varchar(30) NOT NULL,
constraint pk_delivery_manager primary key(DM_ID)
);


CREATE TABLE driver(
Driver_ID char(20) NOT NULL,
DFirst_Name varchar(30) NOT NULL,
DLast_Name varchar(30) NOT NULL,
Mobile_Number char(20),
NIC varchar(20) NOT NULL,
constraint pk_driver primary key(Driver_ID)
);


CREATE TABLE feedback(
User_ID char(20) NOT NULL,
Order_ID char(20) NOT NULL,
Date datetime,
Feedback varchar(1000),
constraint fk1_feedback foreign key(User_ID) references registerd_user (User_ID),
constraint fk2_feedback foreign key(Order_ID) references orders(Order_ID)
);


CREATE TABLE offer(
Offer_Code char(20) NOT NULL,
Offer_Name varchar(500),
constraint pk_offer primary key(Offer_Code)
);


CREATE TABLE university_student(
STD_ID char(20) NOT NULL,
User_ID varchar(20) NOT NULL,
StdFirst_Name varchar(30) NOT NULL,
StdLast_Name varchar(30) NOT NULL,
University_Name varchar(300) NOT NULL,
constraint pk_university_student primary key(STD_ID)
);


CREATE TABLE registerd_user_mobile_number(
User_ID char(20) NOT NULL,
Mobile_Number char(20),
constraint fk_registerd_user_mobile_number foreign key(User_ID) references registerd_user(User_ID)
);


CREATE TABLE search(
Book_ID char(20) NOT NULL,
User_ID Char(20) NOT NULL,
constraint fk1_search foreign key(Book_ID) references book(Book_ID),
constraint fk2_search foreign key(User_ID) references registerd_user(User_ID)
);
```

```
INSERT INTO registerd_user VALUES('WL12856','Tharindu','Rathnayake','tharindu123@gmail.com','1998/04/25',
'Male', 'NO 20, Wawa Road, Anuradapura','Sri Lanka','50000');
INSERT INTO registerd_user VALUES ('WL85469','Brayan','Fernando','brayanfer35@gmail.com','1982/07/15',
'Male', 'NO 450, Mallika Road, Kandy','Sri Lanka','45210');
INSERT INTO registerd_user VALUES ('WL25694','Danush','Veeraman','dansuhlk35@gmail.com','1992/03/19',
'Male', 'NO 45, Gothan Lane, Santacruz','India','400054');
INSERT INTO registerd_user VALUES ('WL36751','Khlew','Wan','khlewwan345@gmail.com','1999/11/20',
'Female', '9TH SURAWONGSE RD BANGRAK','Thailand','10500');
INSERT INTO registerd_user VALUES ('WL12348','Maryam','Sara','maryamsarad@gmail.com','2001/06/06',
'Female', 'Box No. 72639, Dubai','Emirates','72639');


INSERT INTO user_account VALUES('WLL-12856','Thari123','dshhs@#12');
INSERT INTO user_account VALUES('WLL-85469','Brayn_Max','bmbm!@#2546');
INSERT INTO user_account VALUES('WLL-25694','Danush','125463982@G');
INSERT INTO user_account VALUES('WLL-36751','Won36','jkiirion45698');
INSERT INTO user_account VALUES('WLL-12348','Maryamsara','safSAD123@#$');


INSERT INTO system_admin VALUES('WLA-11111','Harsha','Madushan',94715694239,'harshamadu2014@gmail.com');
INSERT INTO system_admin VALUES('WLA-22222','Buddika','Dananjaya',94777456823,'buddikadana25@gmail.com');
INSERT INTO system_admin VALUES('WLA-33333','Maduka','Samanmali',94785694571,'madukasamnmali@gmail.com');


INSERT INTO admin_account VALUES('WLS-11111','Harsha25','hgejh@#$2563');
INSERT INTO admin_account VALUES('WLS-22222','Buddika_Dana2','1632454@#G');
INSERT INTO admin_account VALUES('WLS-88888','GAGAMI25','hxzcjz25#$@');
INSERT INTO admin_account VALUES('WLS-77777','Chathum_P_26','Chthu123#$^');
INSERT INTO admin_account VALUES('WLS-55555','Merisha24','coc12546@#$');


INSERT INTO book VALUES('B-356','The Killing Joke','Alan Moore','$13.74');
INSERT INTO book VALUES('B-426','Corduoy','Don Freeman','$21.56');
INSERT INTO book VALUES('B-1246','House Industries','Andy Cruz','$18.36');
INSERT INTO book VALUES('B-003','Robotics','B.Z Sandler','$18');
INSERT INTO book VALUES('B-2636','The Glass Castel','Jeannette Walls','$12.56');


INSERT INTO payment VALUES('WL/303','WL12856','Thari123','VISA','Tharindu Rathnayake');
INSERT INTO payment VALUES('WL/256','WL85469','Brayan_Max','VISA','Brayan Fernando');
INSERT INTO payment VALUES('WL/1023','WL25694','Danush','mastercard','Danush Veeraman');
INSERT INTO payment VALUES('W/L362','WL36751','Won36','American Express','Kehlew Van Chu');
INSERT INTO payment VALUES('W/L2500','WL12348','Maryamsara','mastercard','Maryam Sara');


INSERT INTO orders VALUES('WL.O.335','WL12856','WL//100');
INSERT INTO orders VALUES('WL.O.1023','WL85469','WL//185');
INSERT INTO orders VALUES('WL.O.452','WL25694','WL//48');
INSERT INTO orders VALUES('WL.O.2256','WL36751','WL//50');
INSERT INTO orders VALUES('WL.O.745','WL12348','WL//300');


INSERT INTO book_store_manager VALUES('WLA-77777','Chathum','Perera',94714562387,'chathumperera24@gmail.com');
INSERT INTO book_store_manager VALUES('WLA-88888','Gagamiga','Halhalapa',94777475695,'gagamiganew2016.com');
INSERT INTO book_store_manager VALUES('WLA-99999','Sanuka','Dilruwan',94754712536,'sanukamax2456li@gmail.com');


INSERT INTO delivery_staff VALUES('WLA-55555','Merisha','Godakawela','Stock
Keeper','female',94707895241,'merishagobts546@gmail.com');
INSERT INTO delivery_staff VALUES('WLA-
66666','Sewmini','Hettiarachchi','Checker','female',947278912344,'sewminipinky2000@gmail.com');
INSERT INTO delivery_staff VALUES('WLA-
11223','Surath','Chathuranga','Security','male',94704853651,'surathchathuranga22@gmail.com');


INSERT INTO delivery_manager VALUES('WLA-12345','Udula','Tharupathi',94777725698,'udulatharu2000@gmail.com');
INSERT INTO delivery_manager VALUES('WLA-06789','Hasaranga','Vithanage',94701562348,'hasarangavithanage1@gmail.com');
INSERT INTO delivery_manager VALUES('WLA-11223','Piyathma','Devindu',94714859622,'piyathmadevindu@gmail.com');


INSERT INTO driver VALUES('WLD-123','Rasika','Manohar',94778956213,'19984562938');
INSERT INTO driver VALUES('WLD-069','Susil','Jayantha',94717775689,'784596892v');
INSERT INTO driver VALUES('WLD-443','Priyantha','Hbarakada',94711234569,'7045697852v');
```

```
INSERT INTO feedback VALUES('WL12856','WL.O.335','2020/07/25','Exellent');
INSERT INTO feedback VALUES('WL85469','WL.O.1023','2020/04/05','Great service');
INSERT INTO feedback VALUES('WL25694','WL.O.452','2020/07/12','I appreciate your service');
INSERT INTO feedback VALUES('WL36751','WL.O.2256','2019/12/12','Exellent');
INSERT INTO feedback VALUES('WL12348','WL.O.745','2020/08/03','Great service');


INSERT INTO offer VALUES('WL//100','Seasonal Offer');
INSERT INTO offer VALUES('WL//185','Customer Offer');
INSERT INTO offer VALUES('WL//48','Seanonal Offer');
INSERT INTO offer VALUES('WL//50','University Student Offer');
INSERT INTO offer VALUES('WL//300','University Student Offer');


INSERT INTO university_student VALUES('STD-01285','WL98989','Dihan','Vinduja','SLIIT');
INSERT INTO university_student VALUES('STD-78956','WL45454','Gangamini','Athmaja','NSBM');
INSERT INTO university_student VALUES('STD-00365','WL12121','Chathum','Adihetti','University of Colombo');
INSERT INTO university_student VALUES('STD-46987','WL36363','Pawani','Perera','ACBT');
INSERT INTO university_student VALUES('STD-12378','WL48484','Manilka','Fernando','University of Kelaniya');


INSERT INTO registerd_user_mobile_number VALUES('WL12856',94772636593);
INSERT INTO registerd_user_mobile_number VALUES('WL85469',94714589326);
INSERT INTO registerd_user_mobile_number VALUES('WL25694',222600414);
INSERT INTO registerd_user_mobile_number VALUES('WL36751',022364146);
INSERT INTO registerd_user_mobile_number VALUES('WL12348',3327233);


INSERT INTO search VALUES('B-356','WL12856');
INSERT INTO search VALUES('B-426','WL85469');
INSERT INTO search VALUES('B-1246','WL25694');
INSERT INTO search VALUES('B-003','WL36751');
INSERT INTO search VALUES('B-2636','WL12348');
```

Description of Database performance

Database performance can be defined as the rate at which a database management system (DBMS) supplies information to users. Let's examine the following five factors:

- System Resources
- Workload
- Throughput
- Contention
- Optimization

System Resources

System resources are the hardware and software tools at the disposal of the system. The system resources application is often used to check how much memory or RAM your computer has available. System resources can show you what software is installed on your computer.

System resources example:

- cache controllers
- Include memory
- such as database kernel

Workload

Mostly workload management is used to solve more difficult client consolidation problems. An accurate and complete definition of the workload is important to predict or understand the performance of the system.

Workload management consists of the following elements;

- Services
- Connected load balancing
- A framework to ensure high availability
- Load balancing advisory
- Failover capability

Workload example:

- map reduce, memory/storage/compute resource intensive applications analytics.
- such a heavy month-end processing of payroll

Throughput

The overall ability to process data is called the throughput of a system. Transferring data from one location to another over a period of time is known as throughput. Knowing throughput capacity of your hardware is very important when setting DBMS throughput targets.

Throughput example:

- performance of hard drives
- RAM
- measure the as well as Internet and network connections.
- In data transmission
- Network throughput

Contention

This is the condition in which two or more components of a workload attempt to use in a contradictory manner.

Contention example:

- If two or more components of the workload are attempting to use a single resource in a conflicting way, such as dual updates to the same piece of data. As contention increases, throughput decreases.
- Dual update to the same piece of data

Optimization

Performance Optimization is the modernization of a software system to work faster and more efficiently.

Optimization example:

- SQL formulation
- database configuration parameters
- table design
- data distribution

Performance Requirements

- Speed of the website, both navigation and data operations will be considered in performance.
- Using a well-organized and a simple code the performance will be boosted, and it is necessary for this online bookstore.
- By the use of simple database, the performance of data entry will be improved.
- Speed and Usability are the performance requirements for this system.
- According to the user stories, the system should navigate without defects and also there should not be any delays.
- Not only that, background, font size, font color also has to be user friendly.
- Accuracy is one of the essential requirements other than the ones mentioned above. It is essential that calculations are faultless. And products are categorized properly.

Security Requirements

Specifically, system security requirements are defined as a specific requirement that must be met in order to achieve security objectives. This is a security feature for those who use the system, or as an attribute that the system should have in order for users to gain confidence in the system. Security requirements are considered as a non-functional requirement.

Let's examine the following four factors:

- Payment Processing
- Physical Assets
- Trade Secrets
- Corporate Planning

Security Requirement in online bookstore

- The access permission for system data may only be charged by the system's data administrator and staff.
- All external communications between the book store's data server and user must be encrypted.
- Only authorized users have the ability to access and interpret data.
- The customer's payment details authentication and confidentiality must be safe.
- The system must encrypt sensitive data and information that connected clients and the internet.
- The system must have security controls for any possible service attacks.
- The behavior of the system must be correct and predictable.