Information Systems and Data Modeling – IT1090

Assignment 02

Title: Online Examination System for Employees	
Batch Number: Y1S2 WD 03.01	Group Number: MLB_03.01_04

Declaration:

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We hereby certify that no part of this assignment has been copied from any other group's work or from any other source. No part of this assignment has been written / produced for our group by another person except where such collaboration has been authorized by the subject lecturer/tutor concerned.

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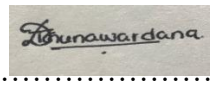
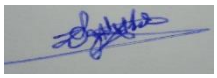
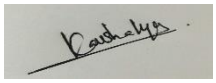
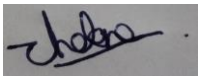
IT22916594	Gunawardana D. T	 ……
IT22334060	Kuruppuarachchi A. C	 ……
IT22356772	Kaushalya L. B. S	 ……
IT22338952	Fernando G. W. C. K	 ……

Submitted on: 28/05/2023

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Hypothetical Scenario

The “Blue Kite” online examination system is a complete system created to make it easier and faster for employees to take their exams. It provides a user-friendly and secure environment for employees to enroll for exams, attempt exams, view exam results, view notices, and edit their user profiles.

Visitors can access the FAQ and contact the website. To enroll for an exam visitors must register to the website.

Employees can access the system by logging in with their email and password. The system validates the login credentials and redirects to the home page. If the credentials are invalid employee must re-enter login credentials or can change the password through forget password. Once logged in, employees can check notices. To attempt an exam, employees first have to enroll for the exam. Once enrolled, employees can access the exams at their convenience within the designated exam duration. After completing an exam, employees can view their exam results. The exam provider publishes the results after the exam is finished. Employees can access their individual results and view their scores provided by the exam provider. Employees also have the ability to manage their user profiles within the system. They can update personal information, such as contact details or job roles, to ensure accurate record-keeping.

Support staff can view and respond to user questions sent through emails, and messages. To provide personalized and effective help, staff can access user information, including account details and communication history. Additionally, they have access to FAQ to answer common user questions and also, they have access to answer technical questions.

Exam provider can create and update exams and publish exam results.

System administrators have high-level control over the entire system and its configurations. They monitor system performance, handle system upgrades, and ensure the system is available and accessible to all authorized users.

Administrators have privileged access to manage the overall system functionality. They can manage accounts, exams, and system admins.

Requirement Analysis

Main Requirements

Functional Requirements

Visitor, Employee, Support Staff, Exam Provider, Administrator and system administrator can access this system in different ways where it is related to them.

1. Visitor and Registered User (Employee)

   User Requirements:

   - Visitors can register into the system.
   - Visitors can check FAQ.
   - Both visitors and employees can access the social media links through our website.
   - Both Visitors and Employees can explore the website and contact the Blue Kite examination system.
   - Employees login to the system using by providing required user login credentials.
   - Employees can enroll for an exam and attempt an exam.
   - Employees can check notices.
   - Employees can check the results of their attempted exam.
   - Employees can change their user profile.

   System Requirements:

   - The system allows for new registrations.
   - The system should display registration form to the new user.
   - The system should approve registration Details and Create a user Account.
   - The system should validate the login Credentials entered by the Registered User.
   - The system needs to store all the details of employees, exam providers, support staff, system admins and admin.
   - The system manages notifications.
   - The system allows registered users to edit their profile details.
   - The system should display the notices, exams, FAQ, and reports.
   - The system should connect with the social media links and show details.

2. Support Staff

   User requirements:

   - Support staff can login to the system by entering login credentials.
   - Support staff can manage FAQ by answering questions.
   - Support staff should be able to receive, review, and respond to user inquiries sent via emails or messages.
   - Support staff should have the knowledge and expertise to answer technical questions or issues raised by users.

   System requirements:

   - The system should validate the login credentials entered by support staff.
   - The system displays the FAQ to the support staff.
   - The system should provide support staff with the ability to access user information, including account details and communication history, to provide personalized and efficient support.

3. Exam Provider

   User requirements:

   - Exam Provider can login to the system by entering login credentials.
   - Exam Provider can create exams.
   - Exam Provider can update exams.
   - Exam Provider can publish exam results.

   System requirements:

   - The system should validate the login credentials entered by Exam Provider.
   - The system should be able to publish exam results securely.
   - The system should provide a user-friendly interface for the exam provider to create and update exams efficiently.

4. Administrator And System Administrator

   User requirements:

   - Administrator and system administrator have the ability to perform any task performed by the employees, support staff and exam providers in the same way
   - Administrators can manage employees, exam providers and support staff accounts. (Activate and deactivate accounts)
   - Administrators can manage databases in the system.
   - Administrators can manage any backend process in the system.
   - Administrators have access to change details in any registered users (employee, support staff)
   - Administrators can get reports on the daily exam result information.
   - Administrators can edit 'notice' details.
   - Administrators can edit 'about'.

   System requirements:

   - System should validate the admin & system admin login credentials.
   - The system should store and manage user data securely, ensuring data privacy and protection.
   - The system should have efficient database management to handle user profiles, exam information, and results.
   - The system should be compatible with various devices and browsers for accessibility.

Non-Functional Requirements

Nonfunctional requirements are the requirements that define how a system should perform and describe the system's quality attributes, such as performance, reliability, and security. If these are not achieved, the system may be useless.

- Performance: The system should be able to handle a large number of users without slowing down.
- Security: The system must be secure from unauthorized access.
- Usability: The system must be easy to use for employees, exam providers and administrators.
- Maintainability: The system easy to be maintain and update
- Availability: The system should be available at any time in the day.

  The system should be able to provide exams to employees at any time.

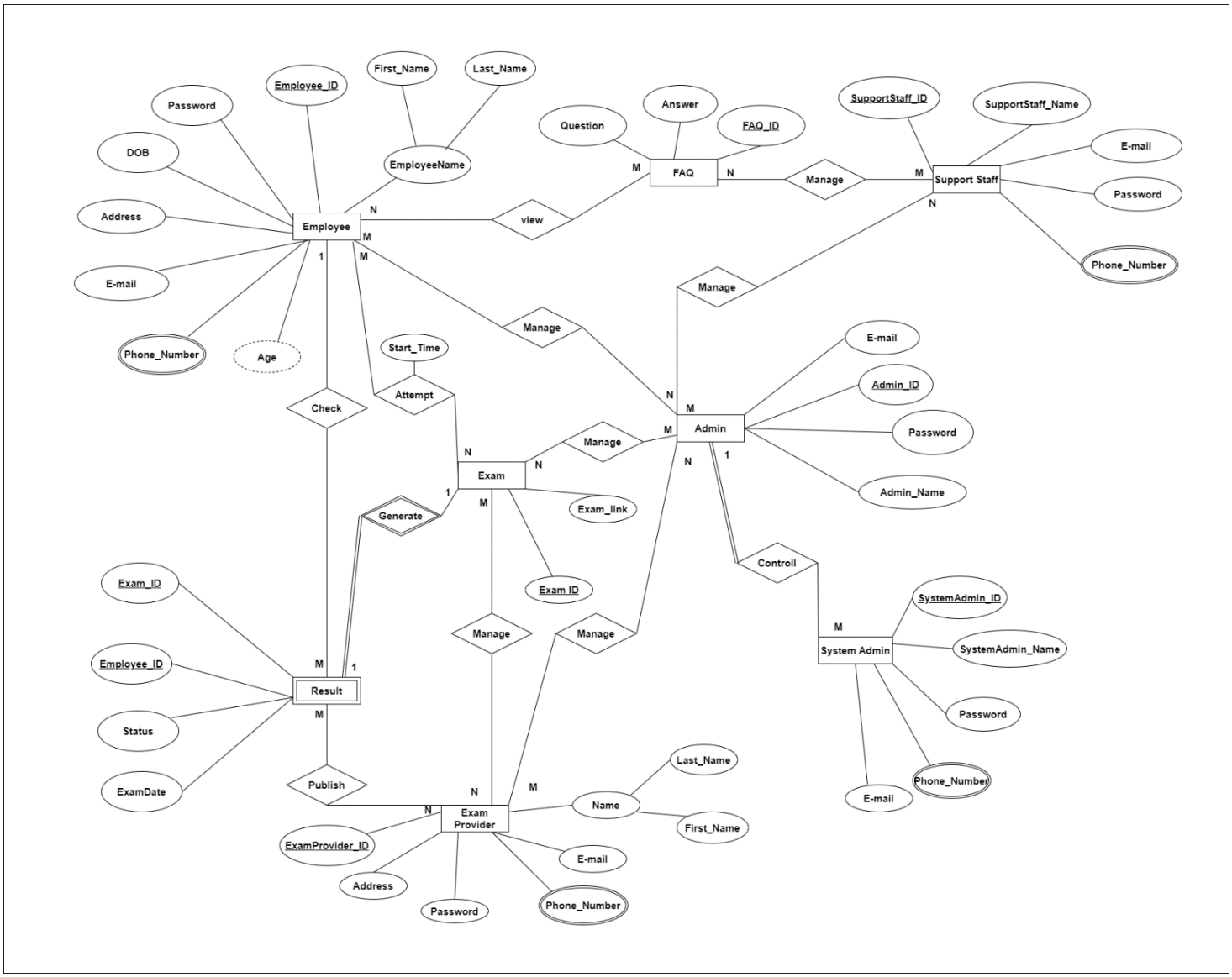
Data Requirements

- Employee
  - Employed
  - First_Name
  - Last_Name
  - Password
  - DOB
  - Address
  - Email
- FAQ
  - FAQID
  - Answer
  - Question
- SupportStaff
  - SupportStaff_ID
  - SupportStaff_Name
  - Email
  - Password
- Admin
  - Admin_ID
  - Admin_Name
  - password
  - email
- System_Admin
  - SystemAdmin_ID
  - SystemAdmin_Name
  - Password
  - Email

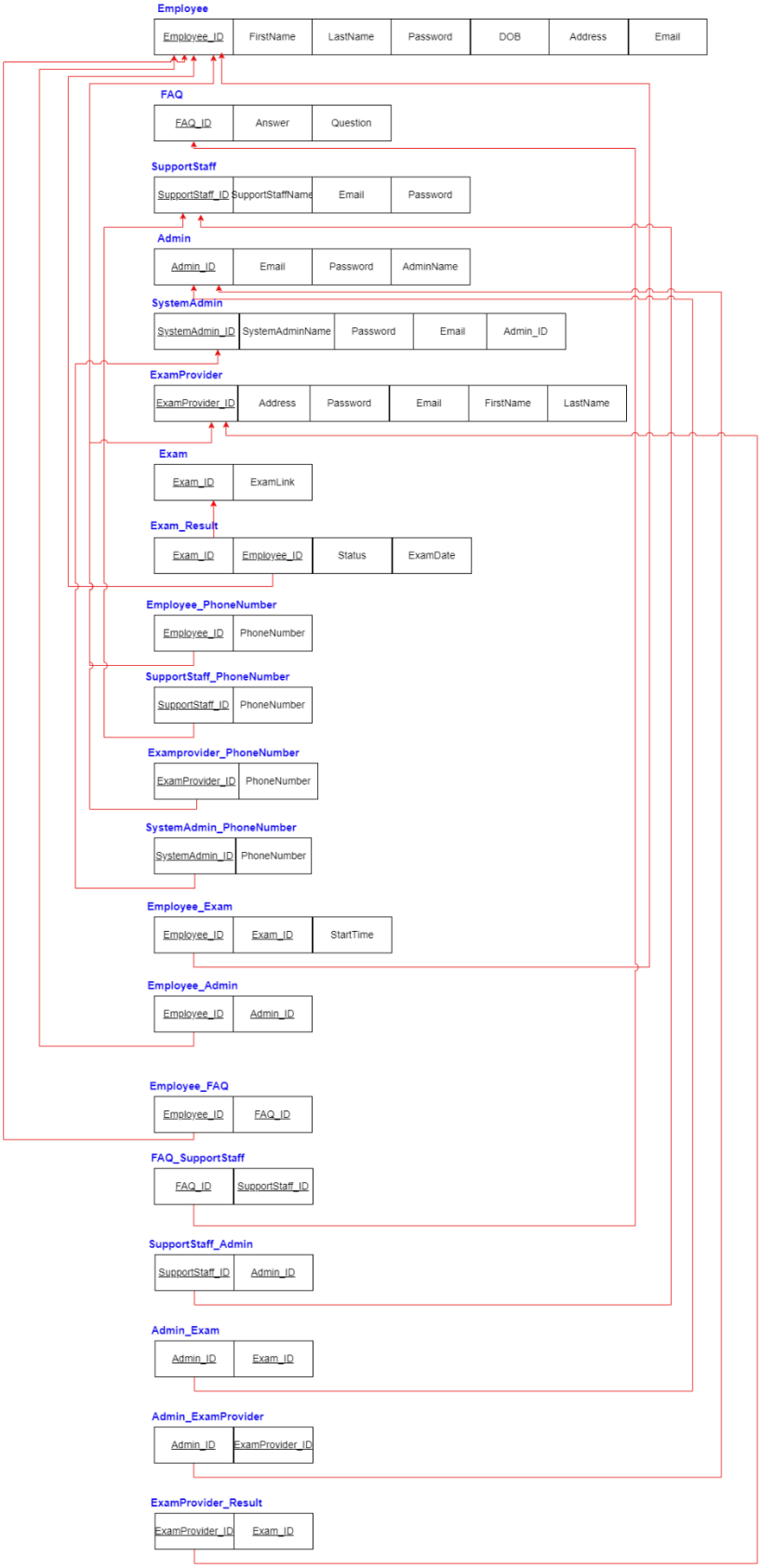
- Exam_Provider
  - ExamProvider_ID
  - First_Name
  - Last_Name
  - Email
  - Password
- Exam
  - ExamID
  - ExamLink
- Exam_Result
  - Exam_ID
  - Employee_ID
  - Status
  - ExamDate
- Employee_PhoneNo
  - Employee_ID
  - PhoneNo
- SupportStaff_PhoneNo
  - SupportStaff_ID
  - PhoneNo
- ExamProvider_PhoneNo
  - ExamProvider_ID
  - PhoneNo
- SystemAdmin_PhoneNo
  - SystemAdmin_ID
  - PhoneNo
- Employee_Exam(
  - Employee_ID
  - Exam_ID

- Employee_Admin
  - Employee_ID
  - Admin_ID
- Employee_FAQ
  - Employee_ID
  - FAQ_ID
- SupportStaff
  - FAQ_ID
  - SupportStaff_ID
- SupportStaff_Admin
  - SupportStaff_ID
  - Admin_ID
- Exam_Admin
  - Exam_ID
  - Admin_ID
- ExamProvider_Admin
  - ExamProvider_ID
  - Admin_ID
- ExamProvider_Result
  - ExamProvider_ID
  - Exam_ID

Entity Relationship (ER Diagram)



Relational Schema



SQL Queries

Creating Tables

```
/*Create Employee table */
CREATE TABLE Employee(
EmployeeID varchar(8) NOT NULL,
First_Name varchar(25) NOT NULL,
Last_Name varchar(25) NOT NULL,
Password varchar(128) NOT NULL,
DOB Date NOT NULL,
Address varchar(255) NOT NULL,
Email varchar(255) NOT NULL,
    CONSTRAINT Employee_PK PRIMARY KEY(EmployeeID)
);


/*Create FAQ table */
CREATE TABLE FAQ(
FAQID varchar(8) NOT NULL,
Answer varchar(8),
Question varchar(100),
    CONSTRAINT FAQ_PK PRIMARY KEY(FAQID)
);


/*Create SupportStaff table */
CREATE TABLE SupportStaff(
SupportStaff_ID varchar(10)NOT NULL ,
SupportStaff_Name varchar(100),
Email varchar(255) NOT NULL,
Password varchar(20),
    CONSTRAINT SS_PK PRIMARY KEY(SupportStaff_ID)
);


/*Create Admin table */
CREATE TABLE Admin(
Admin_ID varchar(20) NOT NULL,
Admin_Name varchar(20),
password varchar(20),
email varchar(255) NOT NULL,
   CONSTRAINT Admin_PK PRIMARY KEY(Admin_ID)
);
```

```sql
/*Create System_Admin table */
CREATE TABLE System_Admin(
     SystemAdmin_ID varchar(10)NOT NULL,
    SystemAdmin_Name Varchar(30),
    Password varchar(128) NOT NULL,
    Email varchar(64) NOT NULL,
    CONSTRAINT SystemAdmin_PK PRIMARY KEY(SystemAdmin_ID)
);


/*Create Exam_Provider table */
CREATE TABLE Exam_Provider(
     ExamProvider_ID varchar(8)NOT NULL,
     First_Name varchar(25) NOT NULL,
     Last_Name varchar(25) NOT NULL,
     Email varchar(255) NOT NULL,
     Password varchar(128) NOT NULL,
    CONSTRAINT ExamProvider_PK PRIMARY KEY(ExamProvider_ID)
);


/*Create Exam table */
CREATE TABLE Exam(
    ExamID varchar(8)NOT NULL,
    ExamLink varchar(255) NOT NULL,
    CONSTRAINT Exam_PK PRIMARY KEY(ExamID)
);


/*Create Exam_Result table */
CREATE TABLE Exam_Result(
    Exam_ID varchar(8) NOT NULL,
    Employee_ID varchar(8) NOT NULL,
    Status varchar(8) NOT NULL,
    ExamDate Date NOT NULL,
    CONSTRAINT ER_PK PRIMARY KEY(Exam_ID,Employee_ID),
    CONSTRAINT ER_FK1 FOREIGN KEY(Exam_ID) REFERENCES Exam(ExamID),
    CONSTRAINT ER_FK2 FOREIGN KEY(Employee_ID) REFERENCES
Employee(EmployeeID)
);
```

```sql
/*Create Employee_PhoneNo table */
CREATE TABLE Employee_PhoneNo(
    Employee_ID varchar(8) NOT NULL,
    PhoneNo  decimal (10, 0) NOT NULL,
    CONSTRAINT EP_PK PRIMARY KEY(Employee_ID),
    CONSTRAINT EP_FK FOREIGN KEY(Employee_ID) REFERENCES
Employee(EmployeeID)
);

/*Create SupportStaff_PhoneNo table */
CREATE TABLE SupportStaff_PhoneNo(
    SupportStaff_ID varchar(10) NOT NULL,
    PhoneNo  decimal (10, 0) NOT NULL,
    CONSTRAINT SP_PK PRIMARY KEY(SupportStaff_ID),
    CONSTRAINT SP_FK FOREIGN KEY(SupportStaff_ID) REFERENCES
SupportStaff(SupportStaff_ID)
);

/*Create ExamProvider_PhoneNo table */
CREATE TABLE ExamProvider_PhoneNo(
    ExamProvider_ID varchar(8) NOT NULL,
    PhoneNo  decimal (10, 0) NOT NULL,
    CONSTRAINT ExP_PK PRIMARY KEY(ExamProvider_ID),
    CONSTRAINT ExP_FK FOREIGN KEY(ExamProvider_ID) REFERENCES
Exam_Provider(ExamProvider_ID)
);

/*Create SystemAdmin_PhoneNo table */
CREATE TABLE SystemAdmin_PhoneNo(
    SystemAdmin_ID varchar (10) NOT NULL,
    PhoneNo  decimal (10, 0) NOT NULL,
    CONSTRAINT SystemAdmin_PK PRIMARY KEY (SystemAdmin_ID) ,
    CONSTRAINT SystemAdmin_FK FOREIGN KEY (SystemAdmin_ID) REFERENCES
System_Admin(SystemAdmin_ID)
);

/*Create Employee_Exam table */
CREATE TABLE Employee_Exam(
    Employee_ID varchar(8) NOT NULL,
    Exam_ID varchar(8) NOT NULL,
    StartTime DATETIME,
    CONSTRAINT EmExam_PK PRIMARY KEY(Employee_ID, Exam_ID),
    CONSTRAINT EmExam_FK1 FOREIGN KEY(Employee_ID) REFERENCES
Employee(EmployeeID),
    CONSTRAINT EmExam_FK2 FOREIGN KEY(Exam_ID) REFERENCES Exam(ExamID)
```

```
);

/*Create Employee_Admin table */
CREATE TABLE Employee_Admin(
    Employee_ID varchar(8) NOT NULL,
    Admin_ID varchar(20) NOT NULL,
    CONSTRAINT EmAdmin_PK PRIMARY KEY(Employee_ID, Admin_ID),
    CONSTRAINT EmAdmin_FK1 FOREIGN KEY(Employee_ID) REFERENCES
Employee(EmployeeID),
    CONSTRAINT EmAdmin_FK2 FOREIGN KEY(Admin_ID) REFERENCES
Admin(Admin_ID)
);


/*Create Employee_FAQ table */
CREATE TABLE Employee_FAQ(
    Employee_ID varchar(8) NOT NULL,
    FAQ_ID varchar(8) NOT NULL,
    CONSTRAINT EmFAQ_PK PRIMARY KEY(Employee_ID, FAQ_ID),
    CONSTRAINT EmFAQ_FK1 FOREIGN KEY(Employee_ID) REFERENCES
Employee(EmployeeID),
    CONSTRAINT EmFAQ_FK2 FOREIGN KEY(FAQ_ID) REFERENCES FAQ(FAQID)
);


/*Create FAQ_SupportStaff table */
CREATE TABLE FAQ_SupportStaff(
    FAQ_ID varchar(8) NOT NULL,
    SupportStaff_ID varchar(10) NOT NULL,
    CONSTRAINT FAQSs_PK PRIMARY KEY( FAQ_ID,SupportStaff_ID),
    CONSTRAINT FAQSs_FK1 FOREIGN KEY(FAQ_ID) REFERENCES FAQ(FAQID),
    CONSTRAINT FAQSs_FK2 FOREIGN KEY(SupportStaff_ID) REFERENCES
SupportStaff(SupportStaff_ID)
);


/*Create SupportStaff_Admin table */
CREATE TABLE SupportStaff_Admin(
    SupportStaff_ID varchar(10) NOT NULL,
    Admin_ID varchar(20) NOT NULL,
    CONSTRAINT SsAdmin_PK PRIMARY KEY(SupportStaff_ID,Admin_ID),
    CONSTRAINT SsAdmin_FK1 FOREIGN KEY(SupportStaff_ID) REFERENCES
SupportStaff(SupportStaff_ID),
    CONSTRAINT SsAdmin_FK2 FOREIGN KEY( Admin_ID) REFERENCES
Admin(Admin_ID)
);
```

```sql
/*Create Exam_Admin table */
CREATE TABLE Exam_Admin(
    Exam_ID varchar(8) NOT NULL,
    Admin_ID varchar(20) NOT NULL,
    CONSTRAINT ExAdmin_PK PRIMARY KEY(Exam_ID,Admin_ID),
    CONSTRAINT ExAdmin_FK1 FOREIGN KEY(Exam_ID) REFERENCES
Exam(ExamID),
    CONSTRAINT ExAdmin_FK2 FOREIGN KEY( Admin_ID) REFERENCES
Admin(Admin_ID)
);


/*Create ExamProvider_Admin table */
CREATE TABLE ExamProvider_Admin(
    ExamProvider_ID varchar(8) NOT NULL,
    Admin_ID varchar(20) NOT NULL,
    CONSTRAINT ExpAdmin_PK PRIMARY KEY(ExamProvider_ID,Admin_ID),
    CONSTRAINT ExpAdmin_FK1 FOREIGN KEY(ExamProvider_ID) REFERENCES
Exam_Provider(ExamProvider_ID),
    CONSTRAINT ExpAdmin_FK2 FOREIGN KEY( Admin_ID) REFERENCES
Admin(Admin_ID)
);


/*Create ExamProvider_Result table */
CREATE TABLE ExamProvider_Result(
    ExamProvider_ID varchar(8) NOT NULL,
    Exam_ID varchar(8) NOT NULL,
    CONSTRAINT ExpResult_PK PRIMARY KEY(ExamProvider_ID,Exam_ID),
    CONSTRAINT ExpResult_FK1 FOREIGN KEY(ExamProvider_ID) REFERENCES
Exam_Provider(ExamProvider_ID),
    CONSTRAINT ExpResult_FK2 FOREIGN KEY( Exam_ID) REFERENCES
Exam(ExamID)
);
```

Insert data into Tables

```
/*Admin*/

INSERT INTO Admin VALUES ('AD220458' , 'Pradeep Rathnayake',
'Admin@bluekite', 'admin.pradeep.r@bkite');



/*Employee*/

INSERT INTO Employee
 VALUES ('EM190040', 'Kenura', 'Ransidu', 'bluekite@123', '2002-09-
30', '665/1 naamal uyana, waliwita', ' em190040@gmail.com'),
('EM220010', 'Kasun', 'Ekanayake', 'bluekite@123', '1998-06-20', '76 A
Wasanawatta, Mattegoda.', em220010@gmail.com'),
('EM180050', 'Janith', 'Liyanaarachchi', 'bluekite@123', '1999-04-20',
'No. 201 camel road, Ja ela', em180050@gmail.com'),
('EM220200', 'Dilshan', 'Dilanka', 'bluekite@123', '2002-07-14', '25 ,
saama road, Kaluthara.', em220200@gmail.com'),
('EM200450', 'Rashmika', 'Subhashini', 'bluekite@123', '1992-10-21',
'11/2 salmal uyana, Thalahena', em200450@gmail.com');




/*Exam provider*/
INSERT INTO Exam_Provider VALUES
('EP190011', 'Dahami', 'Kaveesha', 'dahamikaveeesha99@gmail.com',
'bluekite@123'),
('EP190233', 'Supun', 'Lakshan', 'SupunLak123@gmail.com',
'bluekite@123'),
('EP180055', 'Salman', 'Saley', 'Saleysalman@yahoo.com',
'bluekite@123'),
('EP230696', 'Shehan', 'Janendra', 'sheshan.j98@gmail.com',
'bluekite@123'),
('EP221128', 'Hiruni', 'Bhagya', 'hiru.bhagya95@gmail.com',
'bluekite@123');
```

```
/*support staff*/
INSERT INTO SupportStaff  VALUES
('SS199595', 'Maleesha Thennakoan', 'thennakoan.mv@gmail.com',
'bluekite@123'),
('SS223030', 'Hansaja Lakruwan', 'hansaja.lak2002@gmail.com',
'bluekite@123'),
('SS230012', 'Hirun Tharusha', 'tharushaliyanage@gmail.com',
'bluekite@123'),
('SS209878', 'Hiru wathsala', 'hiruwathsala@gmail.com',
'bluekite@123'),
('SS210010', 'Themiya Sankajeewa', 'themiyasankajeewa21@yahoo.com',
'bluekite@123');


/*System Admin*/
INSERT INTO System_Admin VALUES
('SA220010', 'Anjana Indunil', 'admin@sa123',
'anjanaindu3699@gmail.com'),
('SA220020', 'Dileka Tharuki', 'admin@sa123',
'dilekatharuki2002@gamil.com'),
('SA220030', 'Anjana Chathurangi', 'admin@sa123',
'anjana.chathurangi1027@gmail.com'),
('SA220040', 'Sachini kaushalya', 'admin@sa123',
'sachikaushalya99@gamil.com'),
('SA220050', 'Chalana Kaveesha', 'admin@sa123',
'chalanaKaveesha2000@gmail.com');


/*FAQ*/
INSERT INTO FAQ VALUES
('FAQ001', 'Yes', 'Can employees get exam results in fast?'),
('FAQ002', 'Yes', 'Is blukite provides all exams for emloyees?'),
('FAQ003', 'Yes', 'Are there exam unit in this system ?'),
('FAQ004', 'Yes', 'Can Employees attempt exam any time ?'),
('FAQ005', 'No', 'Can Employees can know their grade ?');


/*Exam*/
INSERT INTO Exam VALUES
('BK101', 'https://forms.gle/uZ7rnjC9C3XKmMsQ8'),
('BK102', 'https://forms.gle/Ufq4Fn7hudBm3PEA9'),
('BK103', 'https://forms.gle/VTCX5uTRMX3r2Fmw6'),
('BK201', 'https://forms.gle/x1LX1ZMgzLWjerfY6'),
('BK301', 'https://forms.gle/71ZKuvxKyNrsAMU79');
```

```sql
/*Employee_Admin*/
INSERT INTO Employee_Admin VALUES
('EM180050', 'AD220458'),
('EM190040', 'AD220458'),
('EM200450', 'AD220458'),
('EM220010', 'AD220458'),
('EM220200', 'AD220458');


/*Employee_PhoneNo*/
INSERT INTO Employee_PhoneNo VALUES
('EM180050', '0774412664'),
('EM190040', '0722412339'),
('EM200450', '0714411505'),
('EM220010', '0762402669'),
('EM220200', '0759831255');


/*ExamProvider_admin*/
INSERT INTO ExamProvider_Admin VALUES
('EP180055', 'AD220458'),
('EP190011', 'AD220458'),
('EP190233', 'AD220458'),
('EP221128', 'AD220458'),
('EP230696', 'AD220458');


/*FAQ_SupportStaff*/
INSERT INTO FAQ_SupportStaff VALUES
('FAQ001', 'SS199595'),
('FAQ002', 'SS209878'),
('FAQ003', 'SS210010'),
('FAQ004', 'SS223030'),
('FAQ005', 'SS230012');



/*SupportStaff_admin*/
INSERT INTO SupportStaff_Admin VALUES
('SS199595', 'AD220458'),
('SS209878', 'AD220458'),
('SS210010', 'AD220458'),
('SS223030', 'AD220458'),
('SS230012', 'AD220458');
```

```sql
/*exam_result*/
INSERT INTO Exam_result VALUES
('BK101', 'EM180050', 'pass', '2023-04-12 ' ),
('BK103', 'EM190040', 'pass', '2023-04-18 '),
('BK102', 'EM200450', 'fail', '2023-05-10 '),
('BK301', 'EM220010', 'pass', '2023-05-19'),
('BK201', 'EM200450', 'fail','2023-05-20');


/*exam_admin*/
INSERT INTO Exam_admin VALUES
('BK101', 'AD220458'),
('BK102', 'AD220458'),
('BK103', 'AD220458'),
('BK201', 'AD220458'),
('BK301', 'AD220458');


/*ExamProvider_result*/

INSERT INTO ExamProvider_Result VALUES
('EP180055', 'BK101'),
('EP190011', 'BK102'),
('EP190233', 'BK103'),
('EP180055', 'BK201'),
('EP230696', 'BK301');


/*Employee_faq*/
INSERT INTO Employee_faq VALUES
('EM180050', 'FAQ001'),
('EM190040', 'FAQ002'),
('EM200450', 'FAQ003'),
('EM220010', 'FAQ004'),
('EM220200', 'FAQ005');


/*Employee Exam*/
INSERT INTO Employee_Exam VALUES
('EM180050', 'BK101', NULL),
('EM190040', 'BK102', NULL),
('EM200450', 'BK103', NULL),
('EM220010', 'BK201', NULL),
('EM220200', 'BK301', NULL);
```

```sql
/*ExamProvider_PhoneNo*/
INSERT INTO examprovider_phoneno
VALUES ('EP180055', '757672599'),
('EP190011', '772432865'),
('EP190233', '771799584'),
('EP221128', '770256388'),
('EP230696', '777577219');


/*SupportStaff_PhoneNo*/
INSERT INTO supportstaff_phoneno
VALUES ('SS199595', '761799335'),
('SS209878', '726865133'),
('SS210010', '757877311'),
('SS223030', '770512487'),
('SS230012', '762438954');


/*SystemAdmin_PhoneNo*/
INSERT INTO SystemAdmin_PhoneNo
VALUES ('SA220010', '0711218744'),
('SA220020', '0775772190'),
('SA220030', '0765572317'),
('SA220040', '0714631872'),
('SA220050', '0724677215');
```

Performance Considerations

- System must be active 24 hours, 365 days for a Registered user to access the system without any inconvenience.
- A Registered User can access the system numerous times by entering his/ her login credentials.
- Users must be able to access the website at any time using any device or browser.
- The system should be able to handle a large number of concurrent users and exams without experiencing performance degradation.
- The system should provide fast response times to ensure a smooth and efficient user experience.
- The system should be able to handle multiple users taking exams simultaneously.

Security Requirements

- Personal details of users should be encrypted before sending to the database.
- Unauthorized users should be unable to access restricted features.
- The password of a user account must be a strength password which includes uppercase letters, lowercase letters, numbers, and special characters.
- For one email address, there should be only one user account.