Data Base Systems

Name: Aoun-Haider

ID: FA21-BSE-133

Theory Task: 02

Submitted to: Sir Abdul Qayyum

Date: 11-05-2023

Question: 01

The Motor Vehicle Department Punjab has many branches, and they want to automate their process with the help of a database system. The detail of the process is given below:

The Motor Vehicle Department Punjab administers takes driving tests and issues driving licenses to drivers. It's a two-step process. First, the issuance of Learners Permit for a year and then issues the driving License on permanent basis to drivers. Any person who wants a driver's license must take a learner's Permit first. And then after at least six week he/she can get permanent license. Before awarding the license, the department conduct a driving test of an applicant. After passing driving test the applicant can get driving license with a unique number. If he/she fails the exam, he can take the driving test again any time after a week of the failed exam date, at any branch. The person may take his driving test at any branch any time before the learner's license expiry date (which is usually set at one year after its issuing date). A driver's license must also record if the driver has completed driver's education.

The department want to record the data of:
 - Employees working at different branches
 - Applicant data
 - Learner Permit details
 - License details
 - Test conduction details

Draw an ERD diagram to represent the data requirements as following:
* Identify the main entity types. [5]
* Identify the main relationship types between the entity types. Also Identify recursive relationship(s), if any. [10]
* Identify attributes and associate them with entity or relationship types. [3]
* Determine candidate and primary key attributes for
  each (strong) entity type. [2]

Solution:

Main entity types:

1) Employee
2) Applicant
3) Learner permit
4) Driving License
5) Test conduction

Main relationship types:

1) Employee works at Branch
2) Applicant applies for Learner Permit
3) Learner Permit is issued by Employee
4) Applicant takes Driving test
5) Driving Test is conducted by Employee
6) Driving License records Driver Education

Attribute types:

1) Employee: ID, Name, Position, Branch ID
2) Applicant: Applicant ID, Name, Date of Birth, Address, Phone Number, Email
3) Learner Permit: Permit Number, Applicant ID, Issue Date, Expiry Date
4) Driving License: License Number, Applicant ID, Issue Date, Expiry Date, Education
5) Test Conduction: Test ID, Test Date, Applicant ID, Employee ID, Branch ID

Candidate and primary key attributes:

1) Employee: Employee ID (PK)
2) Applicant: Applicant ID (PK)
3) Learner Permit: Permit Number (PK)
4) Driving License: License Number (PK)
5) Test Conduction: Test ID (PK)

[Motor vehicle Department punjab]

Employee

ID (PK)
Name
Position
Branch ID

Branch

ID (PK)
Name
Address

works for

Driving License

Lisence no. (PK)
Issue Date
Expiry Date
Education

issue

handle

Applicant

APPID (PK)
Name
Date of Birth
Address
Phone Number
Email

Applies for

organizes

conducts

Test

Test ID (PK)
Test Date

gives

issue

Learner permit
---
permit no (PK)
Issue Date
Expiry Data

Applies for