INFO90002 FINAL ASSESSMENT PART 1

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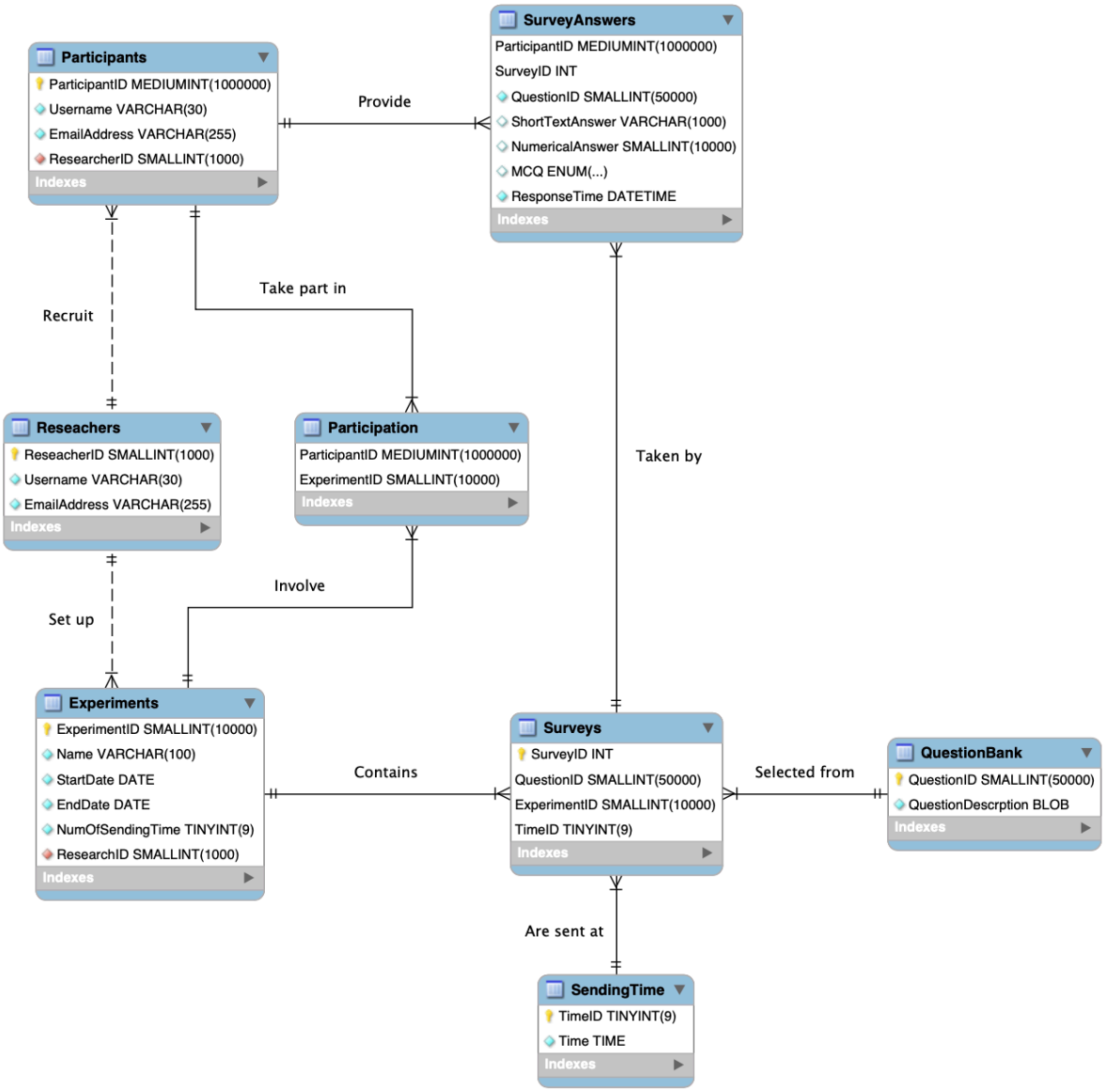
Question 1:

Assumptions:

- The sending time is assumed to be in the working hours, set by hours from 9am to 17pm per day excluding weekend.



Question 2

```
CREATE TABLE Product
(Barcode INT,
 Name VARCHAR(255),
 ProductArea VARCHAR(50),
 Price DECIMAL(7,2),
 PRIMARY KEY (Barcode));

CREATE TABLE Customer
(Username VARCHAR(30),
 FirstName VARCHAR(20),
 LastName VARCHAR(30),
 Email VARCHAR(255),
 Phone VARCHAR(10),
 Address VARCHAR(255),
 PRIMARY KEY (Username));

CREATE TABLE Rates
(Barcode INT,
 Username VARCHAR(30),
 Rating TINYINT,
 RatingDate DATE,
 PRIMARY KEY (Barcode, Username),
 FOREIGN KEY (Barcode) REFERENCES Product (Barcode),
 FOREIGN KEY (Username) REFERENCES Customer (Username));

CREATE TABLE OrderItem
(Barcode INT,
 ID INT,
 Quantity TINYINT,
 PRIMARY KEY (Barcode, ID),
 FOREIGN KEY (Barcode) REFERENCES Product (Barcode),
 FOREIGN KEY (ID) REFERENCES `Order`(ID));
```

```
CREATE TABLE `Order`
(ID INT,
 OrderDate DATE,
 ContactName VARCHAR(20),
 PaymentInformation VARCHAR(100),
 DeliveryDate DATE,
 TotalCost DECIMAL(10,2),
 Username VARCHAR(30),
 PRIMARY KEY (ID),
 FOREIGN KEY (Username) REFERENCES Customer (Username));
```

Question 3

Q3A. List the game date, team name and all players who were selected for a team that eventually had to forfeit (walkover) in 2018?

```
SELECT GameDate, TeamName, FirstName, LastName
FROM game
INNER JOIN playerteam AS pt ON pt.GameID = game.GameID
INNER JOIN player AS p ON p.PlayerID = pt.PlayerID
INNER JOIN team ON pt.TeamID = team.TeamID
WHERE (Team1Score IS NULL OR Team2Score IS NULL)
AND YEAR(GameDate) = 2018;
```

GameDate	TeamName	FirstName	LastName
2018-09-28	Moorabbin Seniors	Rupert	Hamer
2018-09-28	Moorabbin Seniors	Alfred	Deakin
2018-09-28	Moorabbin Seniors	Gareth	Evans
2018-09-28	Moorabbin Seniors	Tim	Fischer
2018-09-28	Moorabbin Seniors	Bill	Haydn
2018-09-28	Monash Uni Seniors	Lance	Barnard
2018-09-28	Monash Uni Seniors	Frank	Crean
2018-09-28	Monash Uni Seniors	Alexander	Downer
2018-09-28	Monash Uni Seniors	George	Reid
2018-09-28	Monash Uni Seniors	Arthur	Fadden

10 rows returned

Q3B. How many points did the *Melbourne University Rugby Club* team score in each year of the *Dewar Shield* competition? List the team name, and cumulative score for each year. Order the result from the highest cumulative score to lowest.

```
SELECT SeasonYear, TeamName,
        SUM(CASE WHEN Team1 = TeamID THEN Team1Score
            ELSE Team2Score END) AS Points
FROM game
INNER JOIN team ON Team1 = TeamID OR Team2 = TeamID
INNER JOIN club AS c ON c.ClubID = team.ClubID
INNER JOIN season AS s ON s.SeasonID = game.SeasonID
INNER JOIN competition AS comp ON comp.CompetitionID = s.CompetitionID
WHERE ClubName = 'Melbourne University Rugby Club'
AND CompetitionName = 'Dewar Shield'
GROUP BY SeasonYear, TeamName
ORDER BY Points DESC;
```

SeasonYear	TeamName	Points
2016	Melbourne Uni Men	209
2018	Melbourne Uni Men	155
2014	Melbourne Uni Men	150
2017	Melbourne Uni Men	136
2015	Melbourne Uni Men	135
2013	Melbourne Uni Men	102

6 rows returned

Q3C. *Elizabeth Blackburn* has played for three different clubs. How many games did she play for each club? List the club name and number of games.

```
SELECT ClubName, COUNT(DISTINCT GameID) AS NumberOfGames
FROM player AS p
INNER JOIN clubplayer AS cp ON p.PlayerID = cp.PlayerID
INNER JOIN club AS c ON cp.ClubID = c.ClubID
INNER JOIN playerteam AS pt ON p.PlayerID = pt.PlayerID
WHERE FirstName = 'Elizabeth' AND LastName = 'Blackburn'
GROUP BY ClubName
ORDER BY NumberOfGames DESC;
```

	ClubName	NumberOfGames
▶	Melbourne City	37
	Melbourne University Rugby Club	37
	Powerhouse Rugby	37

3 rows returned

Q3D. List the teams and scores for all games played on 4th October 2015 at 10.00 a.m.

```
SELECT (CASE WHEN game.Team1 = t1.TeamID THEN t1.TeamName END)
            AS Team1,
        Team1Score,
       (CASE WHEN game.Team2 = t2.TeamID THEN t2.TeamName END)
            AS Team2,
        Team2Score
FROM game
INNER JOIN team AS t1 ON game.Team1 = t1.TeamID
INNER JOIN team AS t2 ON game.Team2 = t2.TeamID
WHERE GameDate = '2015-10-04'
AND StartTime = '10:00:00';
```

	Team1	Team1Score	Team2	Team2Score
▶	Melbourne Uni Mixed	37	Melbourne City Mixed	7
	Powerhouse Mixed	20	Footscray Mixed	20
	Moorabbin Mixed	39	Monash Uni Mixed	0
	Geelong Rugby Mixeds	16	Harlequin Mixed	15

4 rows returned

Q3E. Write the **SQL** and two (2) versions of **Relational Algebra** for the following query:
List all team names of the *Geelong Rugby Club*

```
SELECT TeamName
FROM team NATURAL JOIN club
WHERE ClubName = 'Geelong Rugby Club';
```

TeamName
Geelong Rugby Mens
Geelong Rugby Womens
Geelong Rugby Mixeds
Geelong Rugby Seniorss

4 rows returned

Version 1:

$$\pi_{\text{TeamName}} (\sigma_{\text{ClubName = "Geelong Rugby Club"}} (\text{team} \bowtie \text{club}))$$

Version 2:

$$\pi_{\text{TeamName}} (\sigma_{\text{ClubName = "Geelong Rugby Club"}} (\text{club}) \bowtie \text{team})$$

Question 4

- 1NF – no repeating groups – all atomic cells
- 2NF – to be in 2NF – there should be no partial functional dependencies

  Venue, Class are the partial primary key
  Date is the partial primary
  Venue is the partial primary
  Class is the partial primary

  - ⇨ Capacity (**Venue, Class**, Capacity)
  - ⇨ Date (**Date**, Day)
  - ⇨ Venue (**Venue**, Address)
  - ⇨ Class (**Class**, Weeks)
  - ⇨ Pilates Class (**Date, Venue, Class**, Time, Trainer, Certificate)

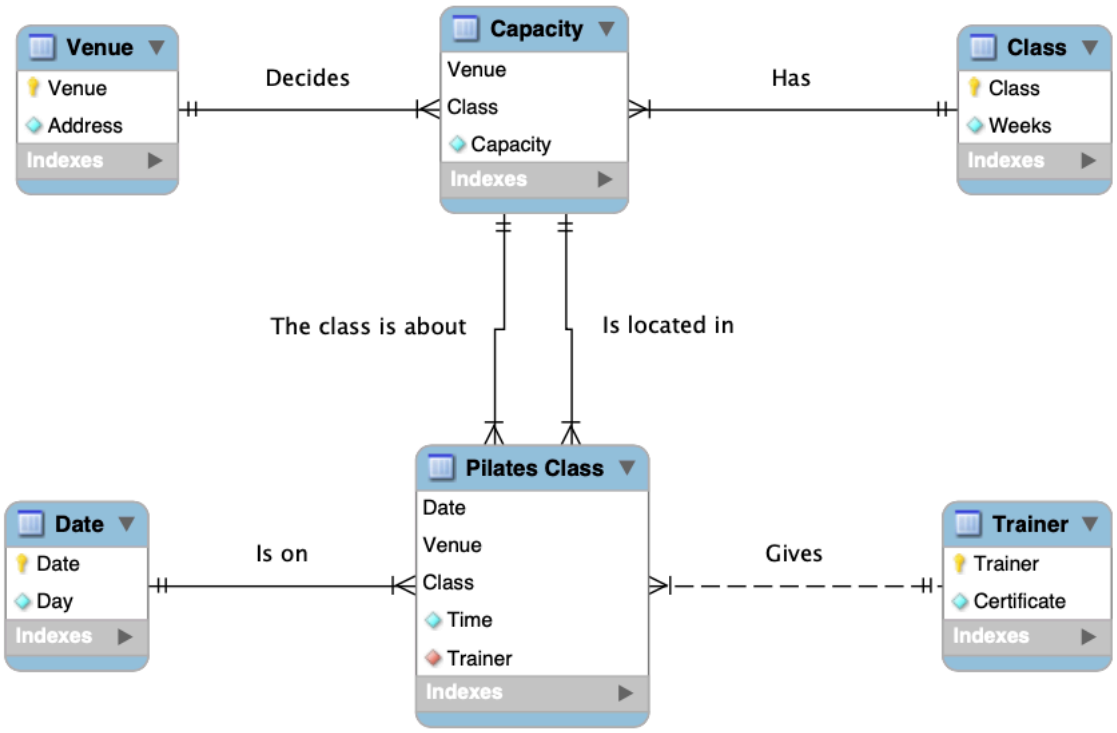
  Now, the tables are in the 2NF

- 3NF – to be in 3NF – there should be no transitive functional dependencies

  Trainer is a non-key attribute

  - ⇨ Capacity (**Venue, Class**, Capacity)
  - ⇨ Date (**Date**, Day)
  - ⇨ Venue (**Venue**, Address)
  - ⇨ Class (**Class**, Weeks)
  - ⇨ Trainer (**Trainer**, Certificate)
  - ⇨ Pilates Class (**Date, Venue, Class**, Time, *Trainer*)

  Now, the tables are in the 3NF


Venue
Venue
Address
Indexes
Decides
Capacity
Venue
Class
Capacity
Indexes
Has
Class
Class
Weeks
Indexes
The class is about
Is located in
Pilates Class
Date
Venue
Class
Time
Trainer
Indexes
Date
Date
Day
Indexes
Is on
Gives
Trainer
Trainer
Certificate
Indexes