Group 3

ERD Assumptions (Question 1):

Prereq and Day are both Multi-value attributes and Symbol and qualify can be derived.

Student -> Course (M-M)

Course -> Period (1-M)

Course -> Convenor (1-M)

Relational Schema and Database Data (Question 2):

Assumption: Student_Course is given a PK as its own unique identifier for the relational entity

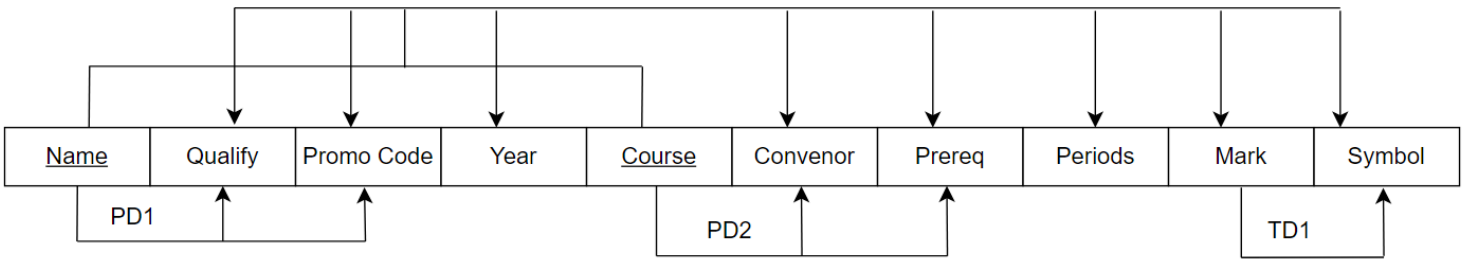
- Student(StuID, StuName)
- Student_Course(SCID, StuID, CourseID, Promo_code)
- Course(CourseID, Year, Mark)
- Course_Prereq(CourseID, Prereq)
- Convenor(ConvID, ConvName, CourseID)
- Period(PeriodID, CourseID)
- Period_day(PeriodID, Day)

```
INSERT INTO Convenors(ConvID, CourseID, ConvName) VALUES
(1, 'BOT202', 'Marx'), (2, 'ACC106' , 'Pavel'), (3, 'BOT104' , 'Wolf'), (4, 'MAM200' , 'Bush');

INSERT INTO Student(StuId, StuName) VALUES
(1, 'Abbot'), (2, 'Adams'), (3, 'Barnes'), (4, 'Chang');

INSERT INTO Student_Course(SCID, StuID, CourseID, Promo_code) VALUES
(1, 1, 'BOT202', 'CON'),  (2, 2, 'ACC106', 'REN'),  (3, 3, 'BOT104', 'CON'),  (4, 4, 'MAM200', 'CON');

INSERT INTO Period(PeriodID, CourseID) VALUES
(1, 'BOT202'), (2, 'ACC106'), (3, 'BOT104'), (4, 'MAM200');

INSERT INTO Course(CourseID, Year, Mark) VALUES
('BOT202', 2019, 54),  ('ACC106', 2019, 43), ('BOT104', 2019, 78), ('MAM200',2019, 66);

INSERT INTO Course_Prereq(CourseID, Prereq) VALUES
('BOT202', 'BOT104 or ZOO103'),  ('ACC106', ''), ('BOT104', ''), ('MAM200', 'MAM100');

INSERT INTO Period_Day(PeriodID, Day) VALUES
(1, '5th Daily'), (2, '4th or 6th Daily'), (3, '2nd Daily'), (4, '4th Daily');
```

StuName	Promo_code	Year	CourseID	ConvName	Prereq	Day	Mark
Abbot	CON	2019	BOT202	Marx	BOT104 or ZOO103	5th Daily	54
Adams	REN	2019	ACC106	Pavel		4th or 6th Daily	43
Barnes	CON	2019	BOT104	Wolf		2nd Daily	78
Chang	CON	2019	MAM200	Bush	MAM100	4th Daily	66

Note: SQL commands and data are shown below on page 4. 1 row from each student was taken to deliver this data above.

Functional Dependency Question 3:



Name -> Qualify, Promo Code
is a PD because qualify and promo code depend on Name (part of the PK)

Course -> Convenor, Prereq
is a PD because convenor and prereq depend on Course (part of the PK)

Mark -> Symbol
is a TD because symbol depends on mark which is not a PK

Name, Course -> Qualify, Promo code, Year, Convenor, Prereq, Period, Mark, Symbol
is a full functional dependency because all these attributes depend on the candidate key (Name, Course)

Functional Dependency (Question 4):

Is your relation scheme in 1st normal form or not? Give a reason for your answer

Yes, it's in 1NF because the relation has single-valued attributes and no repeating groups

Functional Dependency (Question 5):

Is your relation scheme in 3rd normal form or not? Give a reason for your answer.

No, it's not in 3NF because there is a transitive dependency Course -> (Convenor, Prereq)

Source SQL commands and data:

```
CREATE DATABASE GREENDALEDB;

USE GREENDALEDB;


CREATE TABLE IF NOT EXISTS CONVENORS(

ConvID INT,

CourseID VARCHAR(10),

ConvName VARCHAR(10),

PRIMARY KEY(ConvID),

FOREIGN KEY(CourseID) REFERENCES Course(CourseID)

);


CREATE TABLE IF NOT EXISTS STUDENT(

StuID INT,

StuName VARCHAR(16),

PRIMARY KEY(StuID)

);


CREATE TABLE IF NOT EXISTS STUDENT_COURSE(

SCID INT,

StuID INT,

CourseID VARCHAR(10),

Promo_code VARCHAR(3),
```

```
PRIMARY KEY(SCID),
FOREIGN KEY(CourseID) REFERENCES Course(CourseID),
FOREIGN KEY(StuID) REFERENCES Student(StuID)
);

CREATE TABLE IF NOT EXISTS PERIOD(
PeriodID INT,
CourseID VARCHAR(10),
PRIMARY KEY(PeriodID),
FOREIGN KEY(CourseID) REFERENCES Course(CourseID)
);

CREATE TABLE IF NOT EXISTS COURSE(
CourseID VARCHAR(10),
Year YEAR,
Mark INT,
PRIMARY KEY(CourseID)
);

CREATE TABLE IF NOT EXISTS Course_Prereq(
CourseID VARCHAR(10),
Prereq VARCHAR(32),
PRIMARY KEY(CourseID, Prereq)
```

```
);

CREATE TABLE IF NOT EXISTS Period_Day(
PeriodID INT,
Day VARCHAR(32),
PRIMARY KEY(PeriodID, Day)
);

INSERT INTO Convenors(ConvID, CourseID, ConvName) VALUES
(1, 'BOT202', 'Marx'), (2, 'ACC106' , 'Pavel'), (3, 'BOT104' , 'Wolf'), (4, 'MAM200' , 'Bush');

INSERT INTO Student(StuId, StuName) VALUES
(1, 'Abbot'), (2, 'Adams'), (3, 'Barnes'), (4, 'Chang');

INSERT INTO Student_Course(SCID, StuID, CourseID, Promo_code) VALUES
(1, 1, 'BOT202', 'CON'),  (2, 2, 'ACC106', 'REN'),  (3, 3, 'BOT104', 'CON'),  (4, 4, 'MAM200',
'CON');

INSERT INTO Period(PeriodID, CourseID) VALUES
(1, 'BOT202'), (2, 'ACC106'), (3, 'BOT104'), (4, 'MAM200');

INSERT INTO Course(CourseID, Year, Mark) VALUES
('BOT202', 2019, 54),  ('ACC106', 2019, 43), ('BOT104', 2019, 78), ('MAM200',2019, 66);
```

```
INSERT INTO Course_Prereq(CourseID, Prereq) VALUES

('BOT202', 'BOT104 or ZOO103'),  ('ACC106', ''), ('BOT104', ''), ('MAM200', 'MAM100');


INSERT INTO Period_Day(PeriodID, Day) VALUES

(1, '5th Daily'), (2, '4th or 6th Daily'), (3, '2nd Daily'), (4, '4th Daily');


SELECT Student.StuName, Student_Course.Promo_code, Course.Year, Course.CourseID,

Convenors.ConvName, Course_Prereq.Prereq , Period_Day.Day, Course.Mark

FROM Convenors JOIN Student_Course ON Convenors.CourseID = Student_Course.CourseID

JOIN Student ON Student_Course.StuID = Student.StuID

JOIN Period ON Convenors.CourseID = Period.CourseID

JOIN Course ON Convenors.CourseID = Course.CourseID

JOIN Course_Prereq ON Convenors.CourseID = Course_Prereq.CourseID

JOIN Period_Day ON Period.PeriodID = Period_Day.PeriodID;
```