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Curtin University – Department of Computing

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Unit name:	Database Systems	Unit ID:	ISYS2014
Lecturer / unit coordinator:	Mr. Prasanna	Tutor:	
Date of submission:	27/10/2022	Which assignment?	Final (Leave blank if the unit has only one assignment.)

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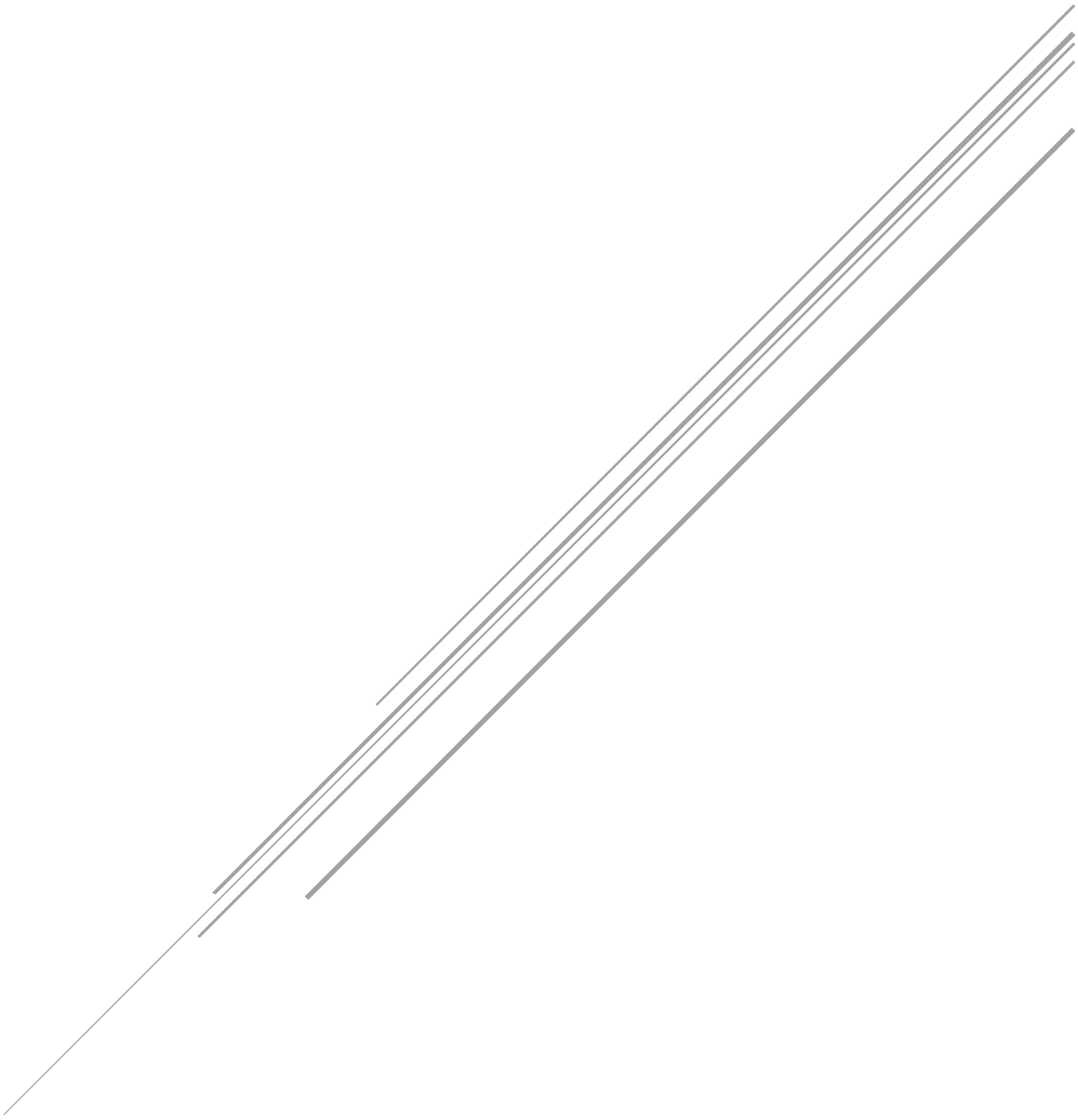
USER GUIDE

NAME: NAVULLAGE NETHMI NAWANGA SIVA

CURTIN ID: 20688651

ISYS2014/ ISYS5008 FINAL ASSESMENT DOCUMENTATION



DESIGNING AND IMPLEMENTING THE DATABASE

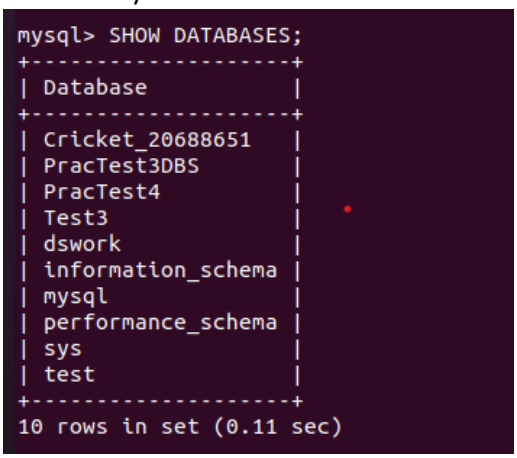
1. CREATING THE DATABASE

The following command are run on the Linux terminal using the MySQL version 8.0.30-0ubuntu0.20.04.2 for Linux on x86_64 ((Ubuntu)).

Go into your preferred folder and run **sudo mysql -u root OR mysql -u -root -p;** command and enter your password to go into your mysql environment.

To create a new database within the mysql environment, use the following command:
CREATE DATABASE Cricket_20688651;

The below command in the image can be used to see if the database has been created successfully.



Run the **USE Cricket_20688651**; command to go into the created database and edit it.

2. ADDING TABLES TO THE DATABASE

On the command line within your preferred folder outside the mysql environment, run the command **vim TableCommands.sql** to create a vim folder where all of your mysql commands could be added. There are five tables in total; the below attached image displays how to write the commands within the created .**sql** text file to create the needed tables.

```
/* MySQL file for creating tables for Assignment */


-- create Team table
DROP TABLE IF EXISTS Team;
CREATE TABLE Team(
        TeamCountry     VARCHAR(255) NOT NULL,
        PRIMARY KEY(TeamCountry)
);


-- create Players table
DROP TABLE IF EXISTS Players;
CREATE TABLE Players(
            playerId CHAR (8) NOT NULL,
            playerName          VARCHAR(255) NOT NULL,
            TeamCountry         VARCHAR(255) NOT NULL,
            PRIMARY KEY(playerId),
            FOREIGN KEY(TeamCountry) REFERENCES Team(TeamCountry)
);

-- create Venue table
DROP TABLE IF EXISTS Venue;
CREATE TABLE Venue(
        VenueName       VARCHAR(255) NOT NULL,
        VenueLocation           VARCHAR(255) NOT NULL,
        PRIMARY KEY(VenueName)
);



-- create MatchDetails table
DROP TABLE IF EXISTS MatchDetails;
CREATE TABLE MatchDetails(
        MId CHAR(8) NOT NULL,
        VenueName       VARCHAR(255) NOT NULL,
        TeamOne         VARCHAR(255) NOT NULL,
        TeamTwo         VARCHAR(255) NOT NULL,
        Year    INT NOT NULL,
        Type VARCHAR(255) NOT NULL,
        PRIMARY KEY(MId),
        FOREIGN KEY(VenueName) REFERENCES Venue(VenueName)
);

-- create Score table
DROP TABLE IF EXISTS Score;
CREATE TABLE Score(
         scoreId CHAR(8) NOT NULL,
         TeamOneScore    VARCHAR(255) NOT NULL,
         TeamTwoScore    VARCHAR(255) NOT NULL,
         Winner          VARCHAR(255) NOT NULL,
         MId CHAR(8) NOT NULL,
         PRIMARY KEY(scoreId),
         FOREIGN KEY(MId) REFERENCES MatchDetails(MId)
);


```

In order to run the following commands within your database, type the command:

SOURCE TableCommands.sql; in your mysql environment.

Run the below command to check if the tables have been added successfully to the database.

```
mysql> SHOW TABLES;
+----------------------------+
| Tables_in_Cricket_20688651 |
+----------------------------+
| MatchDetails               |
| Players                    |
| Score                      |
| Team                       |
| Venue                      |
+----------------------------+
5 rows in set (0.00 sec)
```

3. ADDING SAMPLE DATA TO THE TABLES CREATED

To add sample data to the tables, similarly as done above create another sql file to write all the commands to. Use the command **vim ValueCommands.sql** to create the file. Given below is an an example on how to add data to each table, write your commands as follows.

```
1 --ADDING VALUES TO THE TABLES CREATED;
2
3 /*****************************************************/
4 INSERT INTO Team VALUES
5 ('New Zealand');
6 INSERT INTO Team VALUES
7 ('Pakistan');
8 INSERT INTO Team VALUES
9 ('Australia');
10 INSERT INTO Team VALUES
11 ('India');
12
```

```
27 /*********************************************/
28 INSERT INTO Players VALUES
29 ('A001','Umar Gul', 'Pakistan');
30 INSERT INTO Players VALUES
31 ('A002','Yuvraj Singh', 'India');
32 INSERT INTO Players VALUES
33 ('A003','Irfan Pathan', 'India');
34
```

```
92 /*****************************************/
93 INSERT INTO Venue VALUES
94 ('Newlands' , 'Cape Town');
95 INSERT INTO Venue VALUES
96 ('Kingsmead', 'Durban');
97 INSERT INTO Venue VALUES
98 ('The Wanderers Stadium', 'Johannesburg');
99
```

```
142 /***********************************************/
143 INSERT INTO MatchDetails VALUES
144 ('A001' , 'Newlands', 'New Zealand', 'Pakistan','2007', '1st Semi Final');
145 INSERT INTO MatchDetails VALUES
146 ('A002' , 'Kingsmead', 'Australia', 'India', '2007', '2nd Semi Final');
147 INSERT INTO MatchDetails VALUES
148 ('A003' , 'The Wanderers Stadium', 'India', 'Pakistan', '2007', 'Final');
149

207 /***************************************/
208 INSERT INTO Score VALUES
209 ('A001' , '147/4', '143/8', 'Pakistan', 'A001');
210 INSERT INTO Score VALUES
211 ('A002' , '188/5', '173/7', 'India', 'A002');
212 INSERT INTO Score VALUES
213 ('A003' , '157/5', '152', 'India', 'A003');
```

The above entered sample data has been taken from the T20 Cricket series held in the year 2007 from the site https://www.kaggle.com/datasets/gauravarora1091/t20-world-cups20072021 .

Enter reasonable amount of data and run the command **SOURCE ValueCommands.sql;** within your database in your mysql environment to add the data to the relevant tables.

Run the below commands to check if the values have been added to the tables. Your output should look like follows.

```
mysql> SELECT * FROM Players;
+----------+---------------------+-------------+
| playerId | playerName          | TeamCountry |
+----------+---------------------+-------------+
| A001     | Umar Gul            | Pakistan    |
| A002     | Yuvraj Singh        | India       |
| A003     | Irfan Pathan        | India       |
| A004     | Shahid Afridi       | Pakistan    |
| A005     | Tilakaratne Dilshan | Sri Lanka   |
| A006     | Shahid Afridi       | Pakistan    |
| A007     | Stuart Broad        | England     |
| A008     | Michael Hussey      | Australia   |
| A009     | Craig Kieswetter    | England     |
| A010     | Mahela Jayawardene  | Sri Lanka   |
| A011     | Chris Gayle         | West Indies |
| A012     | Marlon Samuels      | West Indies |
| A013     | Angelo Mathews      | Sri Lanka   |
| A014     | Virat Kohli         | India       |
| A015     | Kumar Sangakkara    | Sri Lanka   |
| A016     | Jason Roy           | England     |
| A017     | Lendl Simmons       | West Indies |
| A018     | Marlon Samuels      | West Indies |
| A019     | Daryl Mitchell      | New Zealand |
| A020     | Mathew Wade         | Australia   |
| A021     | Mitchell Marsh      | Australia   |
+----------+---------------------+-------------+
21 rows in set (0.00 sec)

mysql> SELECT * FROM Team;
+--------------+
| TeamCountry  |
+--------------+
| Australia    |
| England      |
| India        |
| New Zealand  |
| Pakistan     |
| South Africa |
| Sri Lanka    |
| West Indies  |
+--------------+
8 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM MatchDetails;
+------+--------------------------------------+-------------+--------------+------+----------------+
| MId  | VenueName                            | TeamOne     | TeamTwo      | Year | Type           |
+------+--------------------------------------+-------------+--------------+------+----------------+
| A001 | Newlands                             | New Zealand | Pakistan     | 2007 | 1st Semi Final |
| A002 | Kingsmead                            | Australia   | India        | 2007 | 2nd Semi Final |
| A003 | The Wanderers Stadium                | India       | Pakistan     | 2007 | Final          |
| A004 | Trent Bridge                         | Pakistan    | South Africa | 2009 | 1st Semi Final |
| A005 | Kennington Oval                      | Sri Lanka   | West Indies  | 2009 | 2nd Semi Final |
| A006 | Lords                                | Pakistan    | Sri Lanka    | 2009 | Final          |
| A007 | Daren Sammy National Cricket Stadium | England     | Sri Lanka    | 2010 | 1st Semi Final |
| A008 | Daren Sammy National Cricket Stadium | Australia   | Pakistan     | 2010 | 2nd Semi Final |
| A009 | Kensington Oval                      | Australia   | England      | 2010 | Final          |
| A010 | R.Premadasa Stadium                  | Sri Lanka   | Pakistan     | 2012 | 1st Semi Final |
| A011 | R.Premadasa Stadium                  | Australia   | West Indies  | 2012 | 2nd Semi Final |
| A012 | R.Premadasa Stadium                  | Sri Lanka   | West Indies  | 2012 | Final          |
| A013 | Shere Bangla National Stadium        | Sri Lanka   | West Indies  | 2014 | 1st Semi Final |
| A014 | Shere Bangla National Stadium        | India       | South Africa | 2014 | 2nd Semi Final |
| A015 | Shere Bangla National Stadium        | India       | Sri Lanka    | 2014 | Final          |
| A016 | Arun Jaitley Stadium                 | England     | New Zealand  | 2016 | 1st Semi Final |
| A017 | Wankhede Stadium                     | West Indies | India        | 2016 | 2nd Semi Final |
| A018 | Eden Gardens                         | England     | West Indies  | 2016 | Final          |
| A019 | Sheikh Zayed Stadium                 | England     | New Zealand  | 2021 | 1st Semi Final |
| A020 | Dubai International Cricket Stadium  | Pakistan    | Australia    | 2021 | 2nd Semi Final |
| A021 | Dubai International Cricket Stadium  | New Zealand | Australia    | 2021 | Final          |
+------+--------------------------------------+-------------+--------------+------+----------------+
21 rows in set (0.01 sec)

mysql> SELECT * FROM Venue;
+--------------------------------------+---------------+
| VenueName                            | VenueLocation |
+--------------------------------------+---------------+
| Arun Jaitley Stadium                 | Delhi         |
| Daren Sammy National Cricket Stadium | St Lucia      |
| Dubai International Cricket Stadium  | Dubai         |
| Eden Gardens                         | Kolkata       |
| Kennington Oval                      | London        |
| Kensington Oval                      | Barbados      |
| Kingsmead                            | Durban        |
| Kingsmeaf                            | Durban        |
| Lords                                | London        |
| Newlands                             | Cape Town     |
| R.Premadasa Stadium                  | Colombo       |
| Sheikh Zayed Stadium                 | Abu Dhabi     |
| Shere Bangla National Stadium        | Dhaka         |
| The Wanderers Stadium                | Johannesburg  |
| Trent Bridge                         | Nottingham    |
| Wankhede Stadium                     | Mumbai        |
```

```
mysql> SELECT * FROM Score;
+---------+--------------+--------------+-------------+------+
| scoreId | TeamOneScore | TeamTwoScore | Winner      | MId  |
+---------+--------------+--------------+-------------+------+
| A001    | 147/4        | 143/8        | Pakistan    | A001 |
| A002    | 188/5        | 173/7        | India       | A002 |
| A003    | 157/5        | 152          | India       | A003 |
| A004    | 149/4        | 142/5        | Pakistan    | A004 |
| A005    | 158/5        | 101          | Sri Lanka   | A005 |
| A006    | 138/6        | 139/2        | Pakistan    | A006 |
| A007    | 132/3        | 128/6        | England     | A007 |
| A008    | 197/7        | 191/6        | Australia   | A008 |
| A009    | 148/3        | 147/6        | England     | A009 |
| A010    | 139/4        | 123/7        | Sri Lanka   | A010 |
| A011    | 205/4        | 131          | West Indies | A011 |
| A012    | 137/6        | 101          | West Indies | A012 |
| A013    | 160/6        | 80/4         | Sri Lanka   | A013 |
| A014    | 176/4        | 172/4        | India       | A014 |
| A015    | 134/4        | 130/4        | Sri Lanka   | A015 |
| A016    | 159/3        | 153/8        | England     | A016 |
| A017    | 196/3        | 192/2        | West Indies | A017 |
| A018    | 161/6        | 155/9        | West Indies | A018 |
| A019    | 167/5        | 166/4        | New Zealand | A019 |
| A020    | 177/5        | 176/4        | Australia   | A020 |
| A021    | 173/2        | 172/4        | Australia   | A021 |
+---------+--------------+--------------+-------------+------+
21 rows in set (0.01 sec)
```

4. RUNNING QUERIES

Below given are sample questions and the queries created for each question, which can be used as a guide to create your own queries. Write them down in a text file to be edited and used easily.

```
--Part 3
--QUERIES


--Q1: Obtain the teams that played in the year 2016
SELECT TeamOne, TeamTwo, Year,Type FROM MatchDetails WHERE Year= 2016 ;


--Q2: Select Venue Name and Year when team India played
SELECT VenueName, year FROM MatchDetails WHERE TeamOne = 'India' OR TeamTwo = 'India';


--Q3: Order the best players of the match by descending player names and display the country that won the match
SELECT p.playerId, p.playerName,s.Winner FROM Players p NATURAL JOIN Score s
 WHERE p.playerId = s.scoreId  GROUP BY playerId  ORDER BY playerName DESC;


--Q4: Display number of matches Sri Lanka played in Finals
SELECT COUNT(MId) AS Number_of_matches_SL_Played_in_Finals FROM MatchDetails
WHERE TeamOne= 'Sri Lanka' OR TeamTwo = 'Sri Lanka' AND Type = 'Final';



--Q5: Select the best players from West Indies
SELECT * FROM Players WHERE TeamCountry = 'West Indies';


--Q6: Select Winner, Scores and Venue Where Team One Scored more than Team Two in the 1st Semi Final
SELECT Distinct S.Winner, S.TeamOneScore, S.TeamTwoScore, v.VenueName
 FROM Score S RIGHT OUTER JOIN MatchDetails v ON S.TeamOneScore > S.TeamTwoScore WHERE v.Type = '1st Semi Final';



--Q7: Select match details and scores for Finals and order by year
SELECT s.TeamOne, s1.TeamOneScore, s.TeamTwo, s1.TeamTwoScore, s.Year, s.Type FROM MatchDetails s
LEFT OUTER JOIN Score s1 ON s.MId = s1.scoreId WHERE s.Type LIKE'F%' ORDER BY s.Year;



--Q8: Select man of the match for each winning team and order by ascending order of the names
SELECT v.playerName AS Man_of_the_match, s.Winner FROM Players v INNER JOIN Score s
 ON v.playerId = s.scoreId  ORDER BY v.playerName ASC;


--Q9: Display venues where most of the matches have been played
SELECT A.VenueName FROM MatchDetails A  WHERE A.Year > ALL(SELECT AVG(Year) FROM MatchDetails);

```

Using the given statements above you can test your database created and obtain desired data from each query. Below given are sample outputs for some of the above given queries.

--Q4: Display the number of matches Sri Lanka played in Finals

```
mysql> SELECT COUNT(MId) AS Number_of_matches_SL_Played_in_Finals FROM MatchDetails
    -> WHERE TeamOne= 'Sri Lanka' OR TeamTwo = 'Sri Lanka' AND Type = 'Final';
+---------------------------------------+
| Number_of_matches_SL_Played_in_Finals |
+---------------------------------------+
|                                     6 |
+---------------------------------------+
1 row in set (0.00 sec)
```

--Q8: Select match details and scores for all the Finals and order by year

```
mysql> SELECT s.TeamOne, s1.TeamOneScore, s.TeamTwo, s1.TeamTwoScore, s.Year, s.Type FROM MatchDetails s
    -> LEFT OUTER JOIN Score s1 ON s.MId = s1.scoreId WHERE s.Type LIKE'F%' ORDER BY s.Year;
+-------------+--------------+-------------+--------------+------+-------+
| TeamOne     | TeamOneScore | TeamTwo     | TeamTwoScore | Year | Type  |
+-------------+--------------+-------------+--------------+------+-------+
| India       | 157/5        | Pakistan    | 152          | 2007 | Final |
| Pakistan    | 138/6        | Sri Lanka   | 139/2        | 2009 | Final |
| Australia   | 148/3        | England     | 147/6        | 2010 | Final |
| Sri Lanka   | 137/6        | West Indies | 101          | 2012 | Final |
| India       | 134/4        | Sri Lanka   | 130/4        | 2014 | Final |
| England     | 161/6        | West Indies | 155/9        | 2016 | Final |
| New Zealand | 173/2        | Australia   | 172/4        | 2021 | Final |
+-------------+--------------+-------------+--------------+------+-------+
7 rows in set (0.03 sec)
```

5. USING ADVANCED FEATURES

There are multiple advanced features that can be used such as stored-procedures, triggers, views and indexes.

Within the database, I have created and implemented three of the above-mentioned features:

1. Views

Views can be created using the following commands. Below given is an example on how to create a view.

```
1
2 --Part 4
3
4 --Creating views
5
6 --Creating a view to display final match details over the years
7
8 CREATE VIEW Final AS SELECT s.TeamOne, s1.TeamOneScore, s.TeamTwo, s1.TeamTwoScore, s.Year, s.Type
9 FROM MatchDetails s  LEFT OUTER JOIN Score s1 ON s.MId = s1.scoreId WHERE s.Type LIKE'F%' ORDER BY s.Year;
10
11
12 --Command to display the View Final
13 SELECT * FROM Final;
14
15
```

The above created view can be used to display information about the final matches of every T20 series that was held from the year 2007 – 2021. The command to display the view has also been mentioned. On the terminal, the above commands would look like follows.

```
mysql> CREATE VIEW Final AS SELECT s.TeamOne, s1.TeamOneScore, s.TeamTwo, s1.TeamTwoScore
Y s.Year;
Query OK, 0 rows affected (0.01 sec)

mysql> SELECT * FROM Final;
+-------------+--------------+-------------+--------------+------+-------+
| TeamOne     | TeamOneScore | TeamTwo     | TeamTwoScore | Year | Type  |
+-------------+--------------+-------------+--------------+------+-------+
| India       | 157/5        | Pakistan    | 152          | 2007 | Final |
| Pakistan    | 138/6        | Sri Lanka   | 139/2        | 2009 | Final |
| Australia   | 148/3        | England     | 147/6        | 2010 | Final |
| Sri Lanka   | 137/6        | West Indies | 101          | 2012 | Final |
| India       | 134/4        | Sri Lanka   | 130/4        | 2014 | Final |
| England     | 161/6        | West Indies | 155/9        | 2016 | Final |
| New Zealand | 173/2        | Australia   | 172/4        | 2021 | Final |
+-------------+--------------+-------------+--------------+------+-------+
7 rows in set (0.00 sec)
```

2. Procedures

To create procedures, use the commands mentioned below and check your output by referring to the commands used in the images.

```
56 --Create procedure to add a new team to table Team
57
58 CREATE PROCEDURE newTeam(
59 e VARCHAR(255)
60 )
61 COMMENT 'Insert new Team to table Team'
62 INSERT INTO Team(TeamCountry)
63 VALUES(e);
64
65 /*To check if Procedure is working*/
66 CALL newTeam('Bangladesh');
67 SELECT * FROM Team;
68
69
```

```
mysql> CREATE PROCEDURE newTeam(
    -> e VARCHAR(255)
    -> )
    -> COMMENT 'Insert new Team to table Team'
    -> INSERT INTO Team(TeamCountry)
    -> VALUES(e);
Query OK, 0 rows affected (0.14 sec)

mysql> CALL newTeam('Bangladesh');
Query OK, 1 row affected (0.05 sec)

mysql> SELECT * FROM Team;
+--------------+
| TeamCountry  |
+--------------+
| Australia    |
| Bangladesh   |
| England      |
| India        |
| New Zealand  |
| Pakistan     |
| South Africa |
| Sri Lanka    |
| West Indies  |
+--------------+
9 rows in set (0.00 sec)
```

3. Indexes

Using the commands mentioned below, you can create indexes for any of your tables. The output looks as follows.

```
mysql> CREATE INDEX PlayerInd ON Players(playerName);
Query OK, 0 rows affected (0.43 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> CREATE INDEX TeamInd ON Team(TeamCountry);
Query OK, 0 rows affected (0.11 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

6. CONNECTING DATABASE USING PYTHON3

To connect the database to python3 and to run the queries we will use MySQL Connector. To import the connector run the command **pip install mysql-connector-python.** Then run the command **python3** to move into the python environment; there, use the command **import mysql.connector** to import the connector.

To create a python file to write your commands into, outside your python environment, in your desired folder, run the command **vim PythonCommands.py**.

To connect to your database and to create a cursor, type the following command.

```
#Python commands for part 3 queries


import mysql.connector

#Connecting to the database
mydb = mysql.connector.connect(
  host="localhost",
  user="root",
  password="Nethmi20030127",
  database="Cricket_20688651"
)


#Creating the cursor
mycursor = mydb.cursor()

```

This is an example code used to print a query output using python.

```
#Query One to Obtain teams that played in year 2016
select_one = "SELECT TeamOne, TeamTwo, Year,Type FROM MatchDetails WHERE Year= 2016"

mycursor.execute(select_one)

myresult = mycursor.fetchall()

print()
print("Obtain the teams that played in the year 2016")
print()

for x in myresult:
  print(x)
```

After writing all the queries close the created server and the connection to the database using these commands.

```
#Close cursor
mycursor.close()
#Close connection to database
mydb.close()

```

Run the command **python3 PythonConnection.py** within the terminal to obtain your output to see if the queries are working as expected. Below given is a sample output.

```
nslv@nslv-virtual-machine:~/Cyber/CyberFinal$ python3 PythonConnection.py

Obtain the teams that played in the year 2016

('England', 'New Zealand', 2016, '1st Semi Final')
('West Indies', 'India', 2016, '2nd Semi Final')
('England', 'West Indies', 2016, 'Final')

Select Venue Name and Year when team India played

('Kingsmead', 2007)
('The Wanderers Stadium', 2007)
('Shere Bangla National Stadium', 2014)
('Shere Bangla National Stadium', 2014)
('Wankhede Stadium', 2016)

Order the best players of the match by descending player names and display the country that won the match

('A002', 'Yuvraj Singh', 'India')
('A014', 'Virat Kohli', 'India')
('A001', 'Umar Gul', 'Pakistan')
('A005', 'Tilakaratne Dilshan', 'Sri Lanka')
('A007', 'Stuart Broad', 'England')
('A004', 'Shahid Afridi', 'Pakistan')
('A006', 'Shahid Afridi', 'Pakistan')
('A021', 'Mitchell Marsh', 'Australia')
('A008', 'Michael Hussey', 'Australia')
('A020', 'Mathew Wade', 'Australia')
('A012', 'Marlon Samuels', 'West Indies')
('A018', 'Marlon Samuels', 'West Indies')
('A010', 'Mahela Jayawardene', 'Sri Lanka')
('A017', 'Lendl Simmons', 'West Indies')
('A015', 'Kumar Sangakkara', 'Sri Lanka')
('A016', 'Jason Roy', 'England')
('A003', 'Irfan Pathan', 'India')
('A019', 'Daryl Mitchell', 'New Zealand')
('A009', 'Craig Kieswetter', 'England')
('A011', 'Chris Gayle', 'West Indies')
('A013', 'Angelo Mathews', 'Sri Lanka')

Display number of matches Sri Lanka played in Finals

(6,)

Select the best players from West Indies
```