Bahria University

# Computer Science Department



**Submitted By:**

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**Submitted to:**

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**Submission Date:**

[26/10/2018]

**DEPARTMENT OF COMPUTER SCIENCE**

**BAHRIA UNIVERSITY, KARACHI CAMPUS**

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| --- |
| **ASSIGNMENT** |
| **Marks: 10** |

# 

**Question 1:** Display the relationships and participation of the following entities Professor, Courses and semester in an ER-Diagram using given scenarios.

1. Professors can teach the same course in several semesters, and each offering must be recorded.
2. Professors can teach the same course in several semesters, and only the most recent such offering needs to be recorded.
3. Every professor must teach some course.
4. Every professor teaches exactly one course (no more, no less).
5. Every professor teaches exactly one course (no more, no less), and every course must be taught by some professor.

f. suppose that certain courses can be taught by a team of professors jointly, but it is possible that no one professor in a team can teach the course. Model this situation, introducing additional entity sets and relationship sets if necessary**.**

**Answer:**

**MEMBER\_INCLUDES\_IN**

(0,N)

(0,N)

**Group**

**Professor**

(0,N)

(0,N)

**Teaches**

(1,N)

(0,N)

**Semester**

(1,1)

(1,1)

(0,N)

**Teaches**

(1,N)

**Course**

**Question 2**: Normalize the data given on next page, up to 3NF along with the following business rules:

a. Patients checkup details will be managed by the system.

b. A Doctor can check multiple patients on the same date.

c. A Patient can visit multiple doctors on different dates.

d. A drug can be prescribed to multiple patients.

e. Two of the patients can have similar names but different fathers’ names.

f. Multiple patients can be checked by multiple doctors on the same date.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Deptno** | **Dname** | **Doctor\_id** | **Doctor\_name** | **DOJ** | **Patient\_**  **name** | **Patient\_**  **father\_name** | **Patient\_DOB** | **Checkup\_date** | **Drug\_code** | **Drug\_Name** | **Disease** |
| **10** | **Cardiology** | **500** | **Khalid** | **25-Dec-**  **08** | **Waleed** | **Ahmed** | **4-Aug-92** | **25-Sep-14** | **101** | **Angiotensin**  **II** | **To reduce blood pressure** |
| **20** | **Dermatology** | **501** | **Waseem** | **5-Oct-05** | **Nasir** | **Jameshed** | **20-May-90** | **5-Aug-15** | **201** | [**Allantoin**](http://www.medindia.net/doctors/drug_information/allantoin.htm) | **For skin diseases** |
| **30** | **Dentistry** | **502** | **Ahmed** | **20-Jan-**  **02** | **Zahid** | **Kaleem** | **15-Feb-94** | **1-Jan-16** | **302** | **Vicodin** | **For severe pain conditions** |
| **10** | **Cardiology** | **500** | **Khalid** | **25-Dec-**  **08** | **Nasir** | **Jameshed** | **20-May-90** | **5-Oct-14** | **101** | **Angiotensin**  **II** | **To reduce blood pressure** |
| **20** | **Dermatology** | **501** | **Waseem** | **5-Oct-05** | **Zahid** | **Kaleem** | **15-Feb-94** | **5-Aug-15** | **201** | [**Allantoin**](http://www.medindia.net/doctors/drug_information/allantoin.htm) | **For skin diseases** |
| **30** | **Dentistry** | **502** | **Ahmed** | **20-Jan-**  **02** | **Waleed** | **Ahmed** | **4-Aug-92** | **1-Jan-16** | **302** | **Vicodin** | **For severe pain conditions** |

**Answer:**

**1NF**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Primary**  **Key** |  | **Primary**  **Key** |  |  | **Primary**  **Key** | **Primary**  **Key** |  |  | **Primary**  **Key** |  |  |
| **Deptno** | **Dname** | **Doctor\_id** | **Doctor\_name** | **DOJ** | **Patient\_**  **name** | **Patient\_**  **father\_name** | **Patient\_DOB** | **Checkup\_date** | **Drug\_code** | **Drug\_Name** | **Disease** |
| **10** | **Cardiology** | **500** | **Khalid** | **25-Dec-**  **08** | **Waleed** | **Ahmed** | **4-Aug-92** | **25-Sep-14** | **101** | **Angiotensin**  **II** | **To reduce blood pressure** |
| **20** | **Dermatology** | **501** | **Waseem** | **5-Oct-05** | **Nasir** | **Jameshed** | **20-May-90** | **5-Aug-15** | **201** | [**Allantoin**](http://www.medindia.net/doctors/drug_information/allantoin.htm) | **For skin diseases** |
| **30** | **Dentistry** | **502** | **Ahmed** | **20-Jan-**  **02** | **Zahid** | **Kaleem** | **15-Feb-94** | **1-Jan-16** | **302** | **Vicodin** | **For severe pain conditions** |
| **10** | **Cardiology** | **500** | **Khalid** | **25-Dec-**  **08** | **Nasir** | **Jameshed** | **20-May-90** | **5-Oct-14** | **101** | **Angiotensin**  **II** | **To reduce blood pressure** |
| **20** | **Dermatology** | **501** | **Waseem** | **5-Oct-05** | **Zahid** | **Kaleem** | **15-Feb-94** | **5-Aug-15** | **201** | [**Allantoin**](http://www.medindia.net/doctors/drug_information/allantoin.htm) | **For skin diseases** |
| **30** | **Dentistry** | **502** | **Ahmed** | **20-Jan-**  **02** | **Waleed** | **Ahmed** | **4-Aug-92** | **1-Jan-16** | **302** | **Vicodin** | **For severe pain conditions** |

**2NF:**

**Doctor Info:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Doctor\_id**  **(Primary Key)** | **Doctor\_name** | **DOJ** | **Deptno** | **Dname** |
| **500** | **Khalid** | **25-Dec-**  **08** | **10** | **Cardiology** |
| **501** | **Waseem** | **5-Oct-05** | **20** | **Dermatology** |
| **502** | **Ahmed** | **20-Jan-**  **02** | **30** | **Dentistry** |

**Patient Info**

|  |  |  |
| --- | --- | --- |
| **Patient\_name**  **(Primary key)** | **Patient\_father\_name**  **(Primary Key)** | **Patient\_DOB** |
| **Waleed** | **Ahmed** | **4-Aug-92** |
| **Nasir** | **Jameshed** | **20-May-90** |
| **Zahid** | **Kaleem** | **15-Feb-94** |

**Drug Information:**

|  |  |  |
| --- | --- | --- |
| **Drug\_code**  **(Primary Key)** | **Drug\_Name** | **Disease** |
| **101** | **Angiotensin**  **II** | **To reduce blood pressure** |
| **201** | [**Allantoin**](http://www.medindia.net/doctors/drug_information/allantoin.htm) | **For skin diseases** |
| **302** | **Vicodin** | **For severe pain conditions** |

**Patient Check Up**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Patient\_name**  **(Foreign key)** | **Patient\_**  **father\_name**  **(Foreign Key)** | **Checkup\_date** | **Drug\_code**  **(Foreign Key)** | **Doctor\_id**  **(Foreign Key)** |
| **Waleed** | **Ahmed** | **25-Sep-14** | **101** | **500** |
| **Nasir** | **Jameshed** | **5-Aug-15** | **201** | **501** |
| **Zahid** | **Kaleem** | **1-Jan-16** | **302** | **502** |
| **Nasir** | **Jameshed** | **5-Oct-14** | **101** | **500** |
| **Zahid** | **Kaleem** | **5-Aug-15** | **201** | **501** |
| **Waleed** | **Ahmed** | **1-Jan-16** | **302** | **502** |

**3NF**

**Doctor Info**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Dname** | **Doctor\_id**  **(Primary Key)** | **DOJ** | **Deptno**  **(Foreign Key)** | **Doctor\_name** |
| **Cardiology** | **500** | **25-Dec-**  **08** | **10** | **Khalid** |
| **Dermatology** | **501** | **5-Oct-05** | **20** | **Waseem** |
| **Dentistry** | **502** | **20-Jan-**  **02** | **30** | **Ahmed** |

**Department**

|  |  |
| --- | --- |
| **Deptno**  **(Primary Key)** | **Dname** |
| **10** | **Cardiology** |
| **20** | **Dermatology** |
| **30** | **Dentistry** |

**Patient Info**

|  |  |  |
| --- | --- | --- |
| **Patient\_**  **Name**  **(Primary Key)** | **Patient\_**  **father\_name**  **(Primary Key)** | **Patient\_DOB** |
| **Waleed** | **Ahmed** | **4-Aug-92** |
| **Nasir** | **Jameshed** | **20-May-90** |
| **Zahid** | **Kaleem** | **15-Feb-94** |

**Drug:**

|  |  |  |
| --- | --- | --- |
| **Drug\_code**  **(Primary Key)** | **Drug\_Name** | **Disease** |
| **101** | **Angiotensin**  **II** | **To reduce blood pressure** |
| **201** | [**Allantoin**](http://www.medindia.net/doctors/drug_information/allantoin.htm) | **For skin diseases** |
| **302** | **Vicodin** | **For severe pain conditions** |

**Patient Full checkup**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Patient\_**  **Name**  **(Foreign Key)** | **Patient\_**  **father\_name**  **(Foreign Key)** | **Doctor\_id**  **(Foreign Key)** | **Checkup\_date** | **Drug\_code**  **(Foreign Key)** |
| **Waleed** | **Ahmed** | **500** | **25-Sep-14** | **101** |
| **Nasir** | **Jameshed** | **501** | **5-Aug-15** | **201** |
| **Zahid** | **Kaleem** | **502** | **1-Jan-16** | **302** |
| **Nasir** | **Jameshed** | **500** | **5-Oct-14** | **101** |
| **Zahid** | **Kaleem** | **501** | **5-Aug-15** | **201** |
| **Waleed** | **Ahmed** | **502** | **1-Jan-16** | **302** |