**Programming Assignment Unit 1**

**University of the People**

**CS 2203 Databases 1**

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Step One: Identification of entities:

| Number | Entity Set |
| --- | --- |
| 1 | Doctor |
| 2 | Patient |
| 3 | Appointment |

Step Two: From the data that is given, there are no duplicate entities to remove, as such I can move to the next step.

Step Three: For each of the given entity set, the attributes need to be listed.

**Doctor entity set:**

| **Attributes** | **Type** | **Domain** | **Optional** |
| --- | --- | --- | --- |
| Doctor\_ID | Unique identifier | Text | No |
| Doctor\_Name | Composite attribute | Text | No |
| Doctor\_Phone | Single Valued attribute | Text | Yes |
| Specialty\_Number | Single Valued attribute | Numeric | No |
| Specialty\_Name | Multi – Valued attribute | Text | No |

**Patient entity set;**

| **Attributes** | **Type** | **Domain** | **Optional** |
| --- | --- | --- | --- |
| Patient\_ID | Unique Identifier | Text | No |
| Patient\_Name | Composite Attribute | Text | No |
| Patient\_Phone | Single Valued attribute | Text | Yes |
| Patient\_Email | Single Valued attribute | Text | Yes |
| Patient\_Address | Composite attribute | Text | Yes |
| Patient\_Allergy | Single Valued attribute | Text | Yes |
| Patient\_Date | Single Valued attribute | Datetime | No |
| Doctor\_ID | Single Valued attribute | Text | No |

**Appointment entity set:**

| **Attributes** | **Type** | **Domain** | **Optional** |
| --- | --- | --- | --- |
| Appointment\_ID | Unique Identifier | Text | No |
| Appointment\_Date | Single Valued attribute | Text | No |
| Doctor\_ID | Single Valued attribute | Text | No |
| Patient\_ID | Single Valued attribute | Text | No |
| Blood\_Pressure | Composite attribute | Text | Yes |
| Pulse | Single Valued attribute | Text | Yes |
| Treatment\_Notes | Multi-Valued attribute | Text | Yes |
| Medicine\_Notes | Multi-Valued attribute | Text | Yes |

Step Four: The relation of each entity set.

**Doctor:**

Primary Key: Doctor\_ID

Candidate Keys: Doctor\_ID, {Doctor\_Name, Doctor\_Phone}

Degree of Relation: 4

**Patient:**

Primary Key: Patient\_ ID

Candidate Keys: Patient\_ ID {Patient\_ Name, Patient\_ Phone, Patient\_ Email, Patient\_ Address}

Degree of Relation: 8

**Appointment:**

Primary Key: Appointment\_ ID

Candidate Keys: Appointment\_ ID {Appointment\_ Date, Doctor\_ ID, Patient\_ ID}

Degree of Relation: 8

Step Five: The relationship set.

Appointment – Patient: Many to Many / May

Appointment – Doctor: One to Many/ May

Patient – Doctor: Many to Many / May

Step Six: Each entity set attributes and the constraint rules:

**Doctor:**

| **Constraint Types** | **Description - Attributes** |
| --- | --- |
| Entity integrity | Doctor\_ ID is not null (not optional) |
| Referential integrity | Parent/Base (Primary Key = Doctor\_ ID) of the relationships with APPOINTMENT (Foreign Key = Doctor\_ ID) and PATIENT (Foreign Key = Doctor\_ ID) |
| Sematic integrity | The Specialty\_Number value must be positive |
| Domain | Doctor\_Phone value must be at least 8 digits in length |
| Null | The optional attributes (Doctor\_Phone) |
| Unique | Candidate key formed by {Doctor\_Name, Doctor\_Phone} |

**Patient:**

| **Constraint Types** | **Description - Attributes** |
| --- | --- |
| Entity integrity | Patient\_ ID is not null (not optional) |
| Referential integrity | Parent/Base (Primary Key = Patient\_ ID) of the relationship with APPOINTMENT (Foreign Key = Patient\_ ID) |
| Domain | Patient\_Phone value must be at least 9 digits in length |
| Null | The optional attributes (Patient\_ Phone, Patient\_ Email, Patient\_ Address, Patient\_ Allergy). |
| Unique | Candidate key formed by {Patient\_ Name, Patient\_ Phone, Patient\_ Email, Patient\_ Address} |

**Appointment:**

| **Constraint Types** | **Description - Attributes** |
| --- | --- |
| Entity integrity | Appointment\_ ID is not null (not optional) |
| Sematic integrity | Pulse and Blood pressure must both be positive values |
| Domain | Appointment\_Date must be inserted in a specific format. |
| Null | The optional attributes (Blood\_ Pressure, Pulse, Treatment\_ Notes and Medicine\_ Notes) |
| Unique | Candidate key formed by {Appointment\_ Date, Doctor\_ ID, Patient\_ ID}. |

**Word Count: 534 Words**

**Reference:**

Sharma, N., Perniu, L., Chong, R. F., Iyer, A., Nandan, C., Mitea, A. C., Nonvinkere, M. & Danubianu, M. (2010). Database fundamentals. IBM Canada. Pg 77,78,79,80,81,82,83,84