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**Normalisation.doc**

4.2 Normalisation 4.2.1 Database Design Examine the following database (consisting of one table) that was designed to store the following information:

Student ID Student Name Student Dob

Modules Student is studying

Students *can enroll* in the college *before deciding* which *modules* to take, and *not all modules* are *oﬀered each year*. The following database, consisting of one table with the **primary key** = studentID and moduleID, was designed.

Give your opinion, using examples from the data below, on whether or not the current database is good or bad.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **studentID\*** | **studentName** | **dob** | **moduleID\*** | **moduleName** |
| 1 | Sean | 2000-01-03 | 100 | Applied Databases |
| 2 | Bill | 1990-04-23 | 100 | Applied Databases |
| 3 | Tom | 1973-12-10 | 101 | Java Programming |
| 3 | Tom | 1973-12-10 | 104 | Mobile Apps |
| 4 | Mary | 1991-04-12 | 101 | Java Programming |
| 4 | Mary | 1991-04-12 | 102 | Computer Architecture |
| 5 | Joe | 1982-06-29 | 100 | Applied Databases |
| 5 | Joe | 1982-06-29 | 104 | Mobile Apps Table |

**Discussion**

The database design above is not good.

The student details are duplicated for every subject taken

Students cannot enroll without selecting subjects as the moduleID ﬁeld is a required ﬁeld. Subject details are duplicated for every student taking the same subject.

There is not way to limit the subject for a given year

A better design for above scenario would be a database with at a table containing student information and a table for subject information. Since all modules are not oﬀered each year there should probably be a table to indicate what is available every year as well. Then lastly a table to indicate subject taken by students referenced from the subject and students tables.

# Student Table

The following minimum columns should be in the student table.

|  |  |  |
| --- | --- | --- |
| **studentID\*** | **StudentName** | **dob** |
| 1 | Sean | 2000-10-03 |
| 2 | Bill | 1990-04-23 |

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|  |  |  |
| --- | --- | --- |
| **studentID\*** | **StudentName** | **dob** |
| 3 | Tom | 1973-12-10 |
| 4 | Mary | 1991-04-12 |
| 5 | Joe | 1982-06-29 |

Possible extensions to this table.

Enrollment status

Progress levels, like undergraduate etc.

# Module Table

At the minimum the modules table should include these ﬁelds

|  |  |
| --- | --- |
| **moduleID\*** | **moduleName** |
| 100 | Applied Databases |
| 101 | Java Programming |
| 102 | Computer Architecture |
| 103 | *Unavailabe Subject* |
| 104 | Mobile Apps |

Possible extensions to the table

prerequisites to the subject graduate levels etc

module credits

# Available Subjects by year

|  |  |  |
| --- | --- | --- |
| **idx\*** | **year** | **subject** |
| 1 | 2019 | 100 |
| 2 | 2019 | 101 |
| 3 | 2019 | 102 |
| 4 | 2019 | 104 |

This table simply lists subjects available for a given year by inserting a year and subject id into the table. This information can the be used for the selection criteria query when subjects are selected by students for a given year.

# Sujects selected by student

|  |  |  |
| --- | --- | --- |
| **idx\*** | **Student** | **Subject** |
| 1 | 1 | 100 |
| 2 | 2 | 100 |
| 3 | 3 | 101 |
| 4 | 3 | 104 |

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|  |  |  |
| --- | --- | --- |
| **idx\*** | **Student** | **Subject** |
| 6 | 4 | 102 |
| 7 | 5 | 100 |
| 8 | 5 | 104 |

The student and subject ﬁelds will have foreign key constraints applied to ensure only valid students and subjects are entered in the table. Another constraint on entering data in the table might be to check the availability criteria of the subject chosen.

The last table simply list the selections by student ID against subject ID. It should probably have a ﬂag column to indicate when a subject was completed. Another possible ﬁeld to add would be credits obtained on completion.

Possible table extensions:

Subject completed Credits obtained

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