Week 5 Workshop

# Question 1

Consider the student registration form shown below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Number**  **Student Name**  **Student Address** |  |  | D0843215  P Smith  1 Mill Close Swansea |
| **Module Number** | **Module Title** | **Tutor Number** | **Tutor** |
| PM951 S212 WL34 | Computing Databases Accounting | 037428  096524  069211 | T. Grayson  J. Treely  M. Mannelly |

# Answer the following:

1. Arrive at UNF by:
   * writing down all the attributes from the form above – call this entity STUDENT
   * choosing a suitable identifier for the entity
   * finding and showing any repeating group (remember to use { }).

**STUDENT** (Student Number, Student Name, Student Address, {Module Number, Module Title, Tutor Number, Tutor})

1. Arrive at 1NF by:
   * removing the repeating group and write two separate entities.

**STUDENT1** (Student Number(PK), Student Name, Student Address)

**MODULE-INFO1** (Module Number(PK), Student Number(FK), Module Title, Tutor Number, Tutor)

1. Arrive at 2NF by:
   * finding any partial functional dependencies (remember to use ->)
   * removing those attributes which are in the partial functional dependency.

**STUDENT2** (Student Number (PK), Student Name, Student Address)

**MODULE-INFO2** (Module Number(PK), Student Number(FK), Module Title, Tutor Number, Tutor)

**MODULE2** (Module Number (PK), Student Number (FK), Module Title)

1. Arrive at 3NF by:
   * finding any transitive dependencies (remember to use ->)
   * removing those attributes which are in the transitive dependency.

**STUDENT3** (Student Number (PK), Student Name, Student Address)

**MODULE3** (Module Number (PK), Student Number (FK), Module Title)

**TUTOR3** (Module Number (FK), Tutor Number(PK), Tutor)

# Question 2

1. Normalise the model specification for TV rental shown below to 3NF. Model Specification

|  |  |
| --- | --- |
| MODEL: CTV029 MANUFACTURER: Samsung | |
| RELEASE DATE: 26/06/07 | |
| MODEL SPECIFICATION: 50 inch DVD colour television | |
| MONTHLY RENTAL: £24.50 | |
| **SPECIFICATIONS** FEATURE DESCRIPTION FEATURE | DESCRIPTION |
| S50 50 inch screen FRE | Freeview |
| BR Blu-Ray AUS | Auto-search |
| DD Digital |  |
| **ALLOWABLE** MODEL MANUFACTURER | DESCRIPTION |
| **REPLACEMENTS** |  |
| CT017 HP | 50 inch DVD colour TV |
| CT030 Bang and Olufsen | 54 inch DVD colour TV |

UNF:

**MODEL SPECIFICATION** (TV Model, TV Manufacturer, Release Date, Monthly Rental, Model Spec {Feature, Feature Description, Replacement Model, Replacement Manufacturer, Model Description})

1NF:

**MODEL SPECIFICATION1**(TV Model (PK), TV Manufacturer, Release Date, Monthly Rental, Model Spec)

**INFO(**Feature (PK), Release Date (FK) Feature Description, Replacement Model, Model Description, Replacement Manufacturer)

2NF:

**MODEL SPECIFICATION2**(TV Model (PK), TV Manufacturer, Release Date, Monthly Rental, Model Spec)

**INFO2(**Feature (PK), Release Date (FK) Feature Description, Replacement Model, Model Description, Replacement Manufacturer)

**SPECIFICATION2(**Feature (PK), Release Date (FK) Feature Description)

3NF:

**MODEL SPECIFICATION3**(TV Model (PK), TV Manufacturer, Release Date, Monthly Rental, Model Spec)

**SPECIFICATION3(**Feature (PK), Release Date (FK) Feature Description)

**REPLACEMENTS3** (Replacement Model (PK), Feature (FK), Model Description, Replacement Manufacturer)

1. Explain, with an example, the following two terms:
   1. Functional dependency

🡪 A particular link between two traits is called functional dependence.

For instance, if the value of attribute A determines only one value of attribute B at any given time, attribute B is functionally dependent on attribute A.

|  |  |  |  |
| --- | --- | --- | --- |
| Food - ID | Type | Cost | Quality |
| 12 | Veg | 200 | A |
| 13 | Non-Veg | 400 | A |
| 14 | Non-Veg | 300 | B |

Here is a table listing several meal varieties along with their prices and quality. Cost may vary depending on the food's type and ID. They are dependent on one another in terms of function. However, none of these determine quality, thus the dependency doesn't shift to another attribute.

* 1. Transitive dependency.
* When there is an intermediate dependency, transitive dependence occurs. If we assume three attributes A, B and C, and they have functional dependencies, A 🡪B, B🡪 C.

Then, transitive dependencies would be, A🡪B🡪C.

|  |  |  |
| --- | --- | --- |
| Customer-ID | Seat-Type | Cost |
| 12 | Platinum | 300 |
| 13 | Gold | 200 |
| 14 | Silver | 100 |

Here, for instance, is a table that lists the various movie theater seat kinds and their associated prices. In this case, cost is influenced by seat type, but seat type is also influenced by customer id because clients select a particular seat. Therefore, this is transitive dependency.