**ASSIGNMENT/ASSESSMENT ITEM COVER SHEET**

**Hossain**

**Sayeed Bin**

**Student Name:**

**FIRST NAME Family / last NAME**

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7

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3

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0

**Student Number:**  Email: c3340471@uon.edu.au

**Course Code** **Course Title**

Database Management 2

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*(Example)*  *(Example)*

Intro to University

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Campus of Study: (eg Callaghan, Ourimbah, Port Macquarie)

Callaghan

Assignment 2: Database Design & Implementation

4 June 2021

Assessment Item Title: Due Date/Time:

Tutorial Group (If applicable): Word Count (If applicable):

Lecturer/Tutor Name:

Kellie Bohlsen

**x**

Extension Granted: Yes No Granted Until:

Please attach a copy of your extension approval

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**Please tick box if applicable**

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02.07.21

Sayeed Bin Hossain

Sayeed Bin Hossain

C3340471

Assessment Item 1

Database Design & Implementation

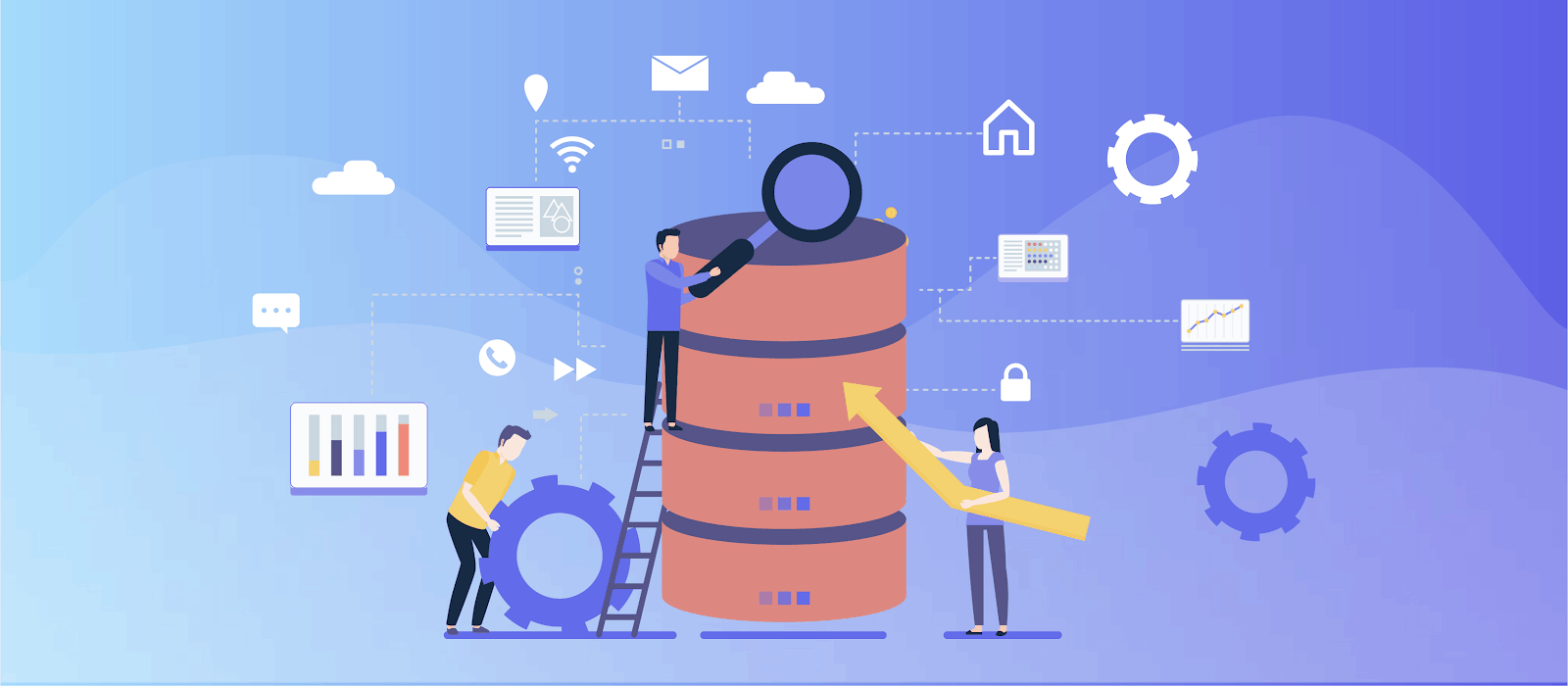


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**Part 2: Relational Mapping & Normalisation**

**1.1 RELATIONAL MAPPING**

|  |
| --- |
| **Customer** (CustomerID, FName, LName, Address, Phone, Status)  **Primary Key** CustomerID |
| **PhoneCustomer** (CustomerID)  **Primary Key** CustomerID  **Foreign Key** CustomerID **references** Customer(CustomerID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **Member** (CustomerID, username, email)  **Primary Key** CustomerID  **Foreign Key** CustomerID **references** Customer (CustomerID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **Guest** (CustomerID)  **Primary Key** CustomerID  **Foreign Key** CustomerID **references** Customer (CustomerID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **Order** (OrderNo, orderDate, orderTime, subtotal, discountAmount, tax, totalDue, paymentMethod, orderStatus, type, description, approvalNo, preorderDate, preorderTime, customerID, employeeNo)  **Primary Key** OrderNo  **Foreign Key** employeeNo **references** Instore (EmployeeNo)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** CustomerID **references** Customer (CustomerID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **PhoneOrder** (OrderNo)  **Primary Key** OrderNo  **Foreign Key** OrderNo **references** Order (OrderNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **OnlineOrder** (OrderNo)  **Primary Key** OrderNo  **Foreign Key** OrderNo **references** Order (OrderNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **WalkinOrder** (OrderNo, CustomerName)  **Primary Key** OrderNo  **Foreign Key** OrderNo **references** Order (OrderNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **Delivery** (OrderNo, DeliveryTime, DeliveryAddress, DriverID)  **Primary Key** OrderNo  **Foreign Key** OrderNo **references** Order (OrderNo)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** DriverID **references** Driver (employeeID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **pickup** (OrderNo)  **Primary Key** OrderNo  **Foreign Key** OrderNo **references** Order (OrderNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **OrderContains** (OrderNo, ItemNo, UnitPrice, Quantity)  **Primary Key** OrderNo, ItemNo  **Foreign Key** OrderNo **references** Order (OrderNo)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** ItemNo **references** MenuItem (ItemNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **MenuItem** (ItemNo, Name, Size, price, category, description)  **Primary Key** ItemNo |
| **MenuItemContains** (ItemNo, IngredientsNo, Quantity)  **Primary Key** ItemNo, Ingredients  **Foreign Key** ItemNo **references** MenuItem(ItemNo)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** IngredientsNo **references** Ingredients (Code)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **Ingredients** (Code, Name, Type, Description, CurrentStockLevel, SuggestedStockLevel, ReOrderLevel, LastStockTake)  **Primary Key** Code |
| **Supplier** (SupplierID, Name, Address, Phone, Email, ContactPerson)  **Primary Key** SupplierID |
| **Supplies** (IngredientsNo, SupplierID, Quantity)  **Primary Key** IngredientsNo, SupplierId  **Foreign Key** IngredientsNo **references** Ingredients (Code)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** SupplierID **references** Supplier (SupplierID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **IngredientsOrder** (OrderNo, DateOfOrder, Status, TotalAmount, SupplierID)  **Primary Key** OrderNo  **Foreign Key** SupplierID **references** Supplier (SupplierID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **IngredientsOrderContains** (OrderNo, IngredientsNo, Quantity, Price)  **Primary Key** OrderNo, IngredientsNo  **Foreign Key** IngredientsNo **references** Ingredients (Code)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** OrderNo **references** IngredientsOrder (OrderNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **Employee** (employeeNo, firstName, lastName, Address, contactNo, TFN, bankCode, bankName, acc, paymentRate, Status, description)  **Primary Key** employeeNo  **Alternate Key** TFN |
| **InStore** (employeeNo)  **Primary Key** employeeNo |
| **Driver** (employeeNo, licenseNo)  **Primary Key** employeeNo  **Alternate Key** licenseNo |
| **Shift** (ShiftID, StartDate, StartTime, EndDate, EndTime)  **Primary Key** ShiftID |
| **DriverShift** (ShiftID)  **Primary Key** ShiftID  **Foreign Key** ShiftID **references** Shift (ShiftID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **InstoreShift** (ShiftID, employeeNo)  **Primary Key** ShiftID  **Foreign Key** ShiftID **references** Shift (ShiftID)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** employeeNo **references** Employee (employeeNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **DriverWorks** (ShiftID, totalDelivery, paymentRatePerDelivery, employeeNo)  **Primary Key** ShiftID, employeeNo  **Foreign Key** ShiftID **references** DriverShift (ShiftID)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** employeeNo **references** Driver (employeeNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **InstoreWorks** (ShiftID, employeeNo)  **Primary Key** ShiftID  **Foreign Key** ShiftID **references** InstoreShift (ShiftID)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** employeeNo **references** Instore (employeeNo)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **EmployeePayment** (PaymentID, GrossPaymment, TaxWithheld, TotalAmountPaid, PaymentDate, StartDate, EndDate)  **Primary Key** PaymentID |
| **DeliveryPayment** (PaymentID, ShiftID)  **Primary Key** PaymentID  **Foreign Key** PaymentId **references** EmployeePayment (PaymentID)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** ShiftID **references** DriverShift(ShiftID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **InstorePayment** (PaymentID, ShiftID)  **Primary Key** PaymentID  **Foreign Key** ShiftID **references** InStoreShift(ShiftID)  **ON UPDATE CASCADE, ON DELETE CASCADE**  **Foreign Key** PaymentID **references** EmployeePayment (PaymentID)  **ON UPDATE CASCADE, ON DELETE CASCADE** |
| **Discount** (discountCode, description, startDate, endDate, requirements, discountPercentage)  **Primary Key** discountCode |
| **Promotion** (promotionCode, description, startDate, endDate, price, itemQuantity, deliveryMethod)  **Primary Key** promotionCode |
| **Category** (categoryID, categoryName)  **Primary Key** categoryID |

**1.2 Normalization**

Almost all the entities are in normalised relation except for the followings:

### 1.2.1 Customer –

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CustomerID | FName | LName | Address | Phone | Status |
| 001 | Sayeed | Hossain | 1A,  2B | 012 | Verified |
| 002 | Bin | Hossain | 1A,  4D | 013 | Verified |

Customer table is not in normalized form because one customer can have multiple address. For example, Customer A has a home address and an office address. So, there can be multiple values.

**Primary Key** – Customer ID

**FD1:** CustomerID -> Fname

* **1st Normal Form –** We separate the addresses into multiple rows.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CustomerID | FName | LName | Address | Phone | Status |
| 001 | Sayeed | Hossain | 1A | 012 | Verified |
| 001 | Sayeed | Hossain | 2B | 012 | Verified |
| 002 | Bin | Hossain | 1A | 013 | Verified |
| 002 | Bin | Hossain | 4D | 013 | Verified |

Now the table is in 1st Normal Form as each attribute of the table have atomic (single) values

* **2nd Normal Form –** We decompose the table into two tables – customer and customerAddress

Customer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CustomerID | Fname | LName | Status | Phone |
| 001 | Sayeed | Hossain | Verified | 012 |

**Customer** (CustomerID, FName, LName, Status, Phone)

**Primary Key** CustomerID

CustomerAddress

|  |  |
| --- | --- |
| CustomerID | Address |
| 001 | 1A |
| 001 | 2B |

**CustomerAddress** (CustomerID, Address)

**Primary Key** CustomerID, Address

**Foreign Key** CustomerID **references** Customer (CustomerID)

**ON UPDATE CASCADE, ON DELETE CASCADE**

* **3rd Normal Form** – Transitive Dependency is when a non-prime attribute depends on other non-prime attributes rather than depending upon the prime attributes or primary key. The table is already in 3rd Normal Form as there is no transitive Dependency.
* **Boyce-Codd Form** **–** Table is already in Boyce-Codd Form as for each functional dependency (x -> y), x is the super key.

### 1.2.2 Order –

* **1st Normal Form** – The table is already in 1st Normal Form as each attributes of the table have atomic (single) values.
* **2nd Normal Form –** The table is already in 2nd Normal Form as there are no partial dependency. That is, no non-prime attribute is dependent on the proper subset of any candidate key of the table.
* **3rd Normal Form** **–** The table is already in 3rd Normal Form as there are no transitive dependency.
* **Boyce-Codd Form** **–** Table is not in Boyce-Codd Form as there exists functional dependency (x -> y), where x is not the super key.

**FD1:** OrderNo ->orderDate, orderTime, subtotal, discountAmount, tax, totalDue, paymentMethod, orderStatus, type, description, approvalNo, preorderDate, preorderTime, customerID, employeeNo

**FD2:** PaymentApproval -> OrderNo

For functional dependency FD2, the table is not in BCNF. So, we decompose the table into two table

**Orders** (OrderNo, orderDate, orderTime, subtotal, discountAmount, tax, totalDue, paymentMethod, orderStatus, type, description, preorderDate, preorderTime, customerID, employeeNo)

**Primary Key** OrderNo

**Foreign Key** employeeNo **references** InStore (employeeNo)

**ON UPDATE CASCADE, ON DELETE CASCADE**

**CustomerPaymentInfo** (OrderNo, PaymentApprovalNumber)

**Primary Key** OrderNo

**Foreign Key** OrderNo **references** Orders (OrderNo)

**ON UPDATE CASCADE, ON DELETE CASCADE**

### 1.2.3 MenuItem –

* **1st Normal Form** – The table is not in 1st Normal Form as the attribute “Size” can have multiple value (Small/medium/large). So, we separate the rows with each value. Now each attributes of the table have atomic (single) values.
* **2nd Normal Form –** Now, the table is in 1st NF.

**Primary Key – ItemNo, Size**

**FD1:** ItemNo, Size -> price

**FD2:** ItemNo -> Name (Partial Dependency)

The table is not in 2nd Normal Form as there exists partial dependency. So, we decompose the table based on 1st NF and 2nd NF.  
  
**MenuItem** (ItemNo, name, description)

**Primary Key** ItemNo

**MenuItemDetails** (ItemNo, Size, price)

**Primary Key** ItemNo, Size

**Foreign Key** ItemNo **references** ItemName (ItemNo)

**ON UPDATE CASCADE, ON DELETE CASCADE**

* **3rd Normal Form** **–** The table is already in 3rd Normal Form as there are no transitive dependency.
* **Boyce-Codd Form** **–** Table is already in Boyce-Codd Form as for each functional dependency (x -> y), x is the super key.