**COSC 344 assignment 1**

**Group 5:**

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1. **Mini-world description:**

For this assignment we chose to model a chain of retail bookstores as our mini world. The database keeps information on its customers, suppliers, inventory information, accounts and employees.

Early on in our group brainstorm sessions we have encountered the challenge that there are too many possibilities for expansion and our mini-world became rather complex very quickly. To reduce complexity and fit within the scope of this assignment, we chose to emphasise on user perspective and selected information to include based on what would be useful to the bookstore’s owner/management.

A brief summary of the aspects modelled in our assignment:

* The bookstore entity represents each store in the chain, we keep information on the city, address, account and date opened for each store. We chose to model each bookstore’s address as a single attribute because for our purpose of identifying the bookstore, splitting it further would be counterintuitive.
* Suppliers plays the key role of suppling books to the business. We keep their business names, contact numbers and identifies each uniquely through their bank account number (in the unlikely event that multiple suppliers share the same name).
* Books are uniquely identified through ISBN, and organised according to title and author information.
* When a customer makes an order for books, employees takes down the customer’s information, including: names, contact phone number, and delivery address. Each customer is also uniquely identified through a customer ID. (in the event of returns, refunds, or loyalty discounts).
* Sales are organised in the forms of orders, being sold by employees to customers. Each order contains recorded information on the customer, employee, date and time the order was made, as well as the transaction number. The transaction number uniquely identifies each order.
* Employee’s information is kept on the database, including their names, contact numbers, hourly rate, weekly hours and information on their qualifications. Employees are identified uniquely through their IRD number (NZ tax number) This is for the purpose of staff management, payroll and promotion.

**2. Entities and Attributes**

SUPPLIER

* Bank\_Account\_Number: simple, single-valued, integer, Key Attribute
* Company\_Name: simple, single-valued, string
* Contact\_number: simple, single-valued, integer

BOOKSTORE

* City: simple, single valued, string
* Address: simple, singled valued, string
* Account: simple, singled valued, integer
* Date\_opened: simple, single valued, date

BOOK

* Title: simple, single-valued, string
* ISBN: simple, single-valued, integer, Key Attribute
* Author: composite (FName, Middle\_INIT, LName), single-valued, string
* Price: simple, single-valued, real
* Amount\_In\_Stock: simple, single-valued, integer

ORDER

* Date: simple, single-valued, date
* Time: simple, single-valued, time
* Transaction\_Number: simple, single-valued, integer, Key Attribute

EMPLOYEE

* Name: composite (FName, Middle\_INIT, LName), single-valued, string
* IRD\_Number: simple, single-valued, integer, Key Attribute
* Contact\_Number: simple, single-valued, integer
* Weekly\_Hours: simple, single-valued, real
* Hourly\_Rate: simple, single-valued, real
* Wage: derived, single-valued, real

CUSTOMER

* Delivery\_Address: composite(Street\_Number, Street\_Name, Suburb, City, Postcode), single-valued, string
* Customer\_ID: simple, single-valued, integer, Key Attribute
* Name: composite (FName, LName), single-valued, string
* Phone\_Number: simple, single-valued, integer

QUALIFICATIONS (Weak entity)

* Name: simple, single-valued, string, Weak Key Attribute
* Type: simple, multi-valued, string
* Date\_Received: simple, single-valued, date
* Expiry\_Date: simple, single-valued, date

**3. Relationships**

SUPPLIES

* M: N relationship.
* There are many suppliers on the database of the bookstore, each supplier could supply multiple (types of) books.
* SUPPLIER is total participation; BOOK is total participation.

WORKS\_FOR

* N:1 relationship
* An employee can only work for one bookstore, a bookstore can have many employees working for it.
* EMPLOYEE is total participation; BOOKSTORE is total participation.

SELLS

* M:N relationship.
* Multiple number of employees can sell a multiple number of orders to customers.
* EMPLOYEE has partial participation; ORDER has total participation.

HAS

* 1:N relationship.
* One employee could have multiple qualifications, but not every employee has a qualification.
* Each qualification is identified through identifying the employee first.
* EMPLOYEE has partial participation; QUALIFICATION has total participation.

MAKES

* 1:N relationship.
* One customer can make multiple orders over time.
* Both ORDER and CUSTOMER has total participation.

CONTAINS

* 1:N relationship
* One order can contain multiple number of books.
* BOOK has partial participation; order has total participation in this relationship.

4. **ER diagram**

