

PROJECT 1 REPORT

WIA2001 - DATABASE

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1.0 Description of Business

The He & She Coffee is a business of fostering a sustainable economy ecosystem for the in-campus community. Through a lifestyle business concept, He & She Coffee helps to build strong students' backgrounds and personalities. The main purpose of the He & She Coffee shop is to serve every customer with delightfully delicious coffee. Currently, there are more than 10 operating outlets around the country. To give back to the community, He & She Coffee staff and employees are recruited from the students community. The mission of He & She Coffee is to provide a place for the student's connections with leading local and global companies and help university students to bridge the gap between their university experience and their professional career.

1.1 Business Rules

- Each outlet have more than 1 employees
- Each employee may only work at one outlet at a time
- Each employee will only have 1 position
- Each manager will be appointed to supervise more than 1 outlet
- Each outlet will only have 1 manager
- Each outlet will have 1 or more products
- Each product may exists in 1 or more outlets
- the only customer info that will be stored is the name, which will be linked to their order
- 1 customer can make 1 or more orders
- Each order is either dine-in or take-away, cannot be both
- Each order may have 1 or more order items
- Each order item may have quantities different than each other, and it will only be tied to 1 order
- Customers are required to make payments after making orders
- Only cash, card and e-wallet payment methods are accepted

1.2 Business Objectives

- To develop a centralized point of sales system for He & She Coffee
- To generate the daily, monthly and yearly sales report
- To calculate the ins and outs of the stock everyday and set up restock schedule
- To ease the management of He & She Coffee through searching for information required for managing it
- To increase the productivity of He & She Coffee employees

2.0 User Requirements

1. Maintaining data and record
 - a. To maintain data on orders
 - b. To maintain data on employees
 - c. To maintain data on remaining stock quantity
 - d. To maintain data on payments
 - e. To maintain data on products
2. Searching data and record
 - a. To perform searches on orders
 - b. To perform searches on employees
 - c. To perform searches on products
 - d. To perform searches on sales
3. Generating report
 - a. To generate daily, monthly, yearly sales report
 - b. To generate sales report per product

3.0 Data Model

a) Entity name: job

| Attribute | Constraints | Remarks |
|-----------|-------------|------------------------------------|
| job_type | Not null | Max length 50 |
| salary | Not null | In RM, 2 decimal places, per month |

Cardinalities:

- One-to-many relationship with employees entity

b) Entity name: category

| Attribute | Constraints | Remarks |
|-------------|-------------|---------------|
| category_id | Primary key | - |
| name | Not null | Max length 50 |

Cardinalities:

- One-to-many relationship products entity

c) Entity name: product

| Attribute | Constraints | Remarks |
|-------------|--|----------------------------------|
| product_id | Primary key | - |
| category_id | Foreign key (references id of product_category entity) | - |
| name | Not null | Max length 50 |
| unit_price | Not null, default 0 | Stored in RM, two decimal points |

Cardinalities:

- One-to-one relationship with line_order entity
- One-to-one relationship category entity

- Many-to-many relationship stock

d) Entity name: employee

| Attribute | Constraints | Remarks |
|---------------|---|----------------|
| employee_id | Primary key | - |
| name | Not null | Max length 50 |
| phone_number | Not null | |
| position_name | Foreign key (references id of position) | - |
| type | Not null | full/part time |
| outlet_id | Foreign key (references id of outlet) | |

Cardinalities:

- Many-to-one relationship with outlet entity

e) Entity name: manager

| Attribute | Constraints | Remarks |
|--------------|-------------|---------------|
| manager_id | Primary key | - |
| name | Not null | Max length 50 |
| phone_number | Not null | |

Cardinalities:

- One-to-many relationship outlet entity
- One-to many relationship employee entity

f) Entity name: outlet

| Attribute | Constraints | Remarks |
|------------|---|---------------|
| outlet_id | Primary key | - |
| name | Not null | Max length 50 |
| address_1 | Not null | Max length 50 |
| address_2 | - | Max length 50 |
| city | Not null | Max length 50 |
| zipcode | Not null | Max length 50 |
| state | Not null | Max length 50 |
| manager_id | Foreign key (references id of manager entity) | - |

Cardinalities:

- One-to-many relationship with employee entity
- Many-to-one relationship with manager entity
- One-to-many relationship with stock entity
- One-to-many relationship with order entity

g) Entity name: stock

| Attribute | Constraints | Remarks |
|----------------|---|---------|
| outlet_id | Primary Key Foreign key (references id of outlets entity) | - |
| product_id | Primary Key Foreign key (references id of products entity) | - |
| stock_quantity | Not null, default 0 | - |

Cardinalities:

- Many-to-one relationship with outlets entity
- Many-to-many relationship with products

h) Entity name: order

| Attribute | Constraints | Remarks |
|---------------|--|--|
| order_id | Primary key | - |
| outlet_id | Foreign key (references id of outlet entity) | - |
| customer_name | Not null | Max length 50 |
| created_at | Not null, default to current timestamp | Timestamp, displayed as dd/mm/yyyy hh:mm |
| type | Not null | Dine-in, takeaway |

Cardinalities:

- Many-to-one relationship with outlets entity
- One-to-many relationship with line_order entity
- One-to-one relationship with payment entity

i) Entity name: line_order

| Attribute | Constraints | Remarks |
|------------|---|-------------------------|
| order_id | Primary key, Foreign key (references id of orders entity) | - |
| product_id | Primary key, Foreign key (references id of products entity) | - |
| quantity | Not null, default 0 | - |
| subtotal | Not null, default 0.00 | In RM, 2 decimal places |

Cardinalities:

- Many-to-one relationships with order entity
- Many-to-many relationship with product entity

j) Entity name: payment

| Attribute | Constraints | Remarks |
|----------------|--|--|
| payment_id | Primary key | - |
| order_id | Foreign key (references id of orders entity) | - |
| employee_id | Foreign key (references id of employee entity) | - |
| payment_amount | Not null | - |
| payment_date | Not null, default to current timestamp | Timestamp, displayed as dd/mm/yyyy hh:mm |
| payment_method | Not null | Cash, e-wallet, card |
| status | Not null | Paid |

Cardinalities:

- One-to-one relationships with order entity
- One-to-many relationships with employee entity

Relationships

One-to-one relationships:

1. One outlet is managed by one manager
2. One employee has one position
3. One order has one payment
4. One product belongs to one category

One-to-many relationships:

1. One outlet has many employees
2. One position can be employed by many employees
3. One employee serves many orders
4. One product belongs to many outlets
5. One manager manages many employees
6. One outlet has many products in stock

Many-to-one relationships:

1. Many employees work for one outlet
2. Many products can belong to one category
3. Many outlets can be managed by one manager

Many-to-many relationships:

1. Many outlets have many products
2. Many products belong to many orders
3. Many products are in stock of many outlets

Normalization

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Initially we have a large, unnormalized entity called **order**

- **order** (order_id, outlet_id, address_1, address_2, city, zipcode, state, manager_id, manager_name, employee_id, employee_name, employee_phone_num, employee_type, employee_salary, product_id, category_id, prod_name, category_name, subtotal, stock_quantity, customer_name, created_at, type, quantity, unit_price, employee_id, payment_amount, payment_date, payment_method, status)

1NF

The entity can be split into 3 smaller entities:

- **outlet** (outlet_id, address_1, address_2, city, zipcode, state, manager_id, manager_name, employee_id, employee_name, employee_phone_num, employee_type, employee_salary)
- **order** (order_id, outlet_id, customer_name, created_at, type, quantity, subtotal, employee_id, payment_amount, payment_date, payment_method, status)
- **product** (product_id, category_id, prod_name, category_name, unit_price, outlet_id, stock_quantity)

2NF

Since an **outlet** may have many employees, and a manager can manage many outlets, therefore the entity can be further split into **employee** and **manager**.

- **outlet** (outlet_id, address_1, address_2, city, zipcode, state, manager_id)
- **manager** (manager_id, name, outlet_id)
- **employee** (employee_id, name, phone_number, type, salary, outlet_id, manager_id)

An **order** can be composed of 1 or more items. From this information we can create another entity called line_order. An **order** entity will have one **payment**

- **order** (order_id, outlet_id, customer_name, created_at, type)
- **line_order** (order_id, product_id, quantity, subtotal)
- **payment** (payment_id, order_id, employee_id, payment_amount, payment_date, payment_method, status)

Since the headquarter manages multiple outlets, each outlet having the same kind of **products** while having different **stock** quantities, this will produce:

- **product** (product_id, category_id, prod_name, category_name, unit_price)
- **stock** (outlet_id, product_id, stock_quantity)

3NF

A **product** can belong to a **category**, therefore another entity can be derived from it:

- **category** (category_id, name)
- **product** (product_id, category_id, name, unit_price)

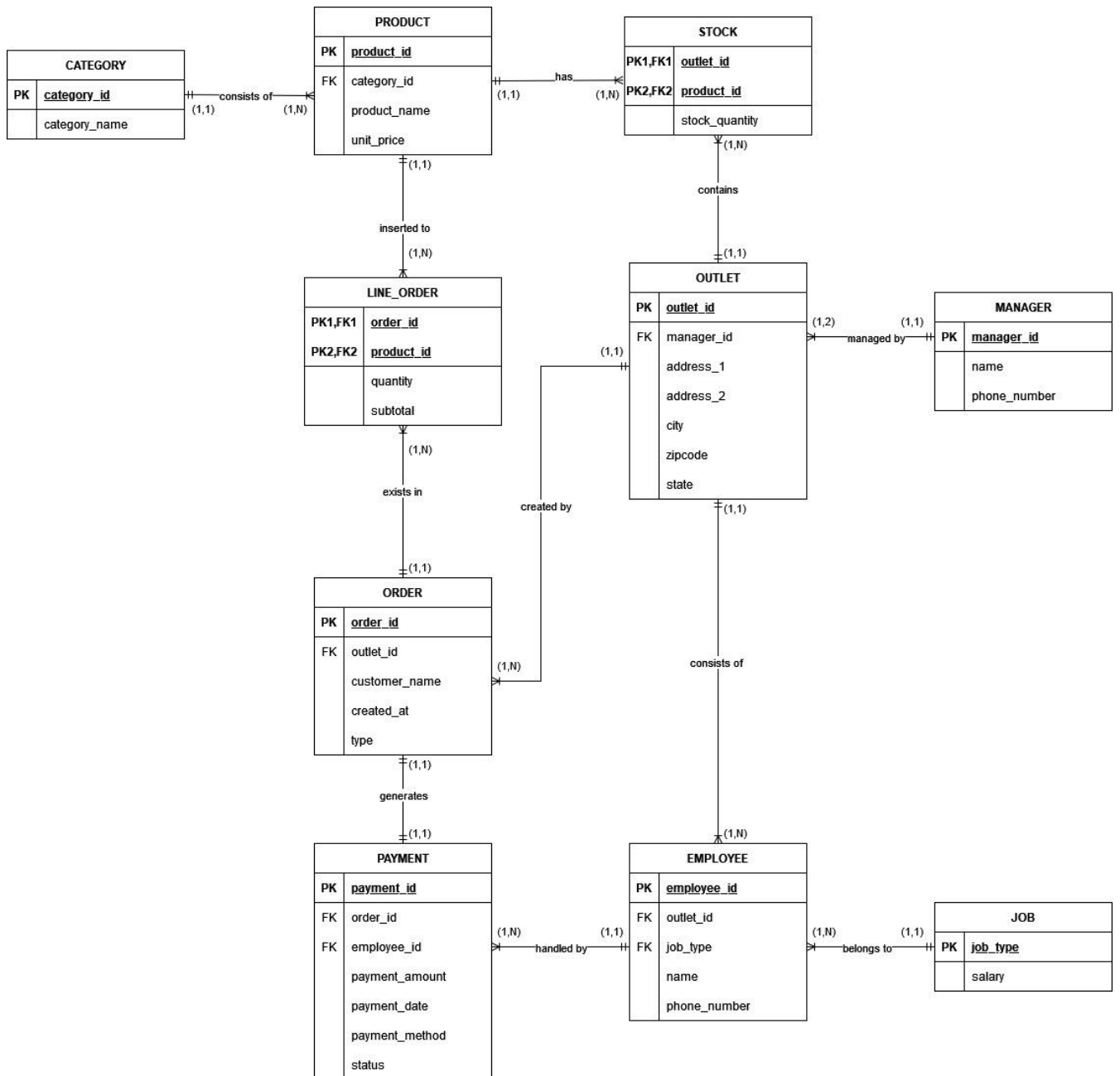
An **employee** can have only one job position at a time. Therefore another entity called **job** can be created:

- **employee** (employee_id, name, phone_number, job_type, type, outlet_id)
- **job** (job_type, salary)

Other entities will remain unchanged:

- **payment** (payment_id, order_id, employee_id, payment_amount, payment_date, payment_method, status)
- **order** (order_id, outlet_id, customer_name, created_at, type)
- **line_order** (order_id, product_id, quantity, subtotal)
- **stock** (outlet_id, product_id, stock_quantity)
- **outlet** (outlet_id, address_1, address_2, city, zipcode, state, manager_id)
- **manager** (manager_id, name, phone_number, outlet_id)

Entity Relational Diagram



Appendix

PROOF OF INTERVIEW



From the left: Aiman Daniel, Mr. Mukmin (Manager) and Nursara Ain