Shop Database

In this problem, you will be dealing with a shop. There should be 3 roles that can be found in a shop:

1. **Manager**
2. **Employee**
3. **Customer**

Each employee has a post. A Manager is also an employee! But there can be only one manager in a shop and multiple employees in the same post. Here are the available posts for an employee:

1. **Manager**
2. **Custodian**
3. **Store operator**
4. **Product manager**
5. **Cashier**
6. **Parking operator**

Each employee should have the following information –

1. **ID**
2. **Name**
3. **Post**
4. **Starting time**
5. **Ending time**
6. **Hourly payment**

A product should have the following information –

1. **ID**
2. **Name**
3. **Unit**
4. **Quantity**
5. **Product buying price**
6. **Product selling price**
7. **Profit**

A customer should have the following information –

1. **ID**
2. **Products that purchase**

$$ The manager should have access to all the information, including product information, employee information, customer information, and cost information.

Each employee ID should be unique. Employee ID should start with "E-" followed by 7 digits, e.g.: "E-1234567". **If input violates this rule, then an exception should be thrown.** You should be careful about the total working time of an employee. Each employee should have a maximum working hours of 10 hours and minimum working hours of 4 hours. **If input violates this rule, then an exception should be thrown.**

Each product ID should be unique. The product ID should start with "P-" followed by 7 digits, e.g., "P-1234567". **If input violates this rule, then an exception should be thrown.** You should be careful about the quantity of a product. The initial quantity should be a minimum of 100 and a maximum of 300. Things that are measured in kilograms should have a quantity of a minimum of 200 kg to a maximum of 800 kg. Products that are measured in liters should have a quantity of a minimum of 200 liters to a maximum of 800 liters. If the product doesn't have a unit set the unit to – "no unit". Otherwise, it should be either "kg" or "liters". **If input violates this rule, then an exception should be thrown.** When a customer purchases a product, the quantity should be decreased by the same amount. If the available quantity of the product is less than the customer's required quantity, then the customer will be able to buy the product according to the available quantity. Then the available quantity of the product will be 0 after the purchase.

Each customer ID should be unique. Customer ID should start with "C-" followed by 8 digits e.g.: "C-12345678". **If input violates this rule, then an exception should be thrown.** A customer cannot buy a product more than its availability. **If input violates this rule, then an exception should be thrown.**

A manager's ID should be unique. Manger's ID should start with "M-" followed by 3 digits e.g.: "M-123". **If input violates this rule, then an exception should be thrown.** There cannot be more than one manager in a shop. The manager should have access to all the information:

1. **Customer information**
2. **Employee information**
3. **Products information**

The manager should be the only one to be able to know the buying price of the product and the profit from each product. The manager should be able to perform the following tasks:

1. **Total management cost**
2. **Total profit**
3. **Update the product price and quantity of the products.**

Calculation of the total management cost:

$\sum$ (Each employee salary cost = (ending time – starting time) * hourly payment) + Product buying cost

Calculation of the profit:

Product selling cost – total shop cost