Acme Supermarket

Acme, Inc. is a holding that encompasses many companies worldwide. One of them is Acme Supermarket, Inc., which runs a world-wide on-line supermarket.

The goal of this project is to develop a web information system that Acme Supermarket, Inc. can use to manage their business. This document provides an informal description of their requirements; ask your lecturers for clarifications and details.

Information requirements

1. The actors of the system are customers, clerks, and administrators. The system must store the following profile data for each actor: names, surnames, email address, home address, and preferred language; optionally, it may store a phone number, and a photo.
2. The system must store a catalogue of items. Every item is characterised by the following data: an SKU, a category, a name, a description, a price in euro, and an optional picture.
3. For every category, the system must store a name, a description, and an optional picture.
4. Every customer has a shopping cart into which into which he or she can put items from the catalogue. Shopping carts may include comments by the corresponding customers.
5. A customer places an order when he or she checks his or her shopping cart out. Every order has a ticker, the full name of the customer, a placement moment, a delivery address, the comments that the customer wrote in the corresponding shopping cart, and the total price. Obviously, it must also include some information about the items ordered: their SKUs, their names, the quantities ordered, and their retail prices. By default, the delivery address of an order is the address of the corresponding customer, but it can be modified at will.
6. Orders are served by clerks. The system must store the moment when an order is delivered to the corresponding customer. If applicable, it must also store the moment when it is cancelled by the corresponding customer. Obviously, an order cannot be cancelled after it is delivered and it cannot be delivered if it was cancelled.
7. The actors of the system may comment on the items. The system stores the following data about each comment: a title, an author, the moment when it is published, a number of stars in range zero up to five, and a body in plain text. Every item has an average number of stars that is computed from its corresponding comments, if any.
8. An SKU (Stock Keeping Unit) is a code that uniquely identifies an item within the inventory of a supermarket. The code consists of six letters or digits that must be generated randomly. The SKUs are generated automatically by the system, and they cannot be changed. For instance, the following are valid SKUs: A1B2C3, X12YA, or 123ABC.
9. A ticker is a string that uniquely identifies an order. They consist of six digits, then a dash, and six additional digits or capital letters. The first six digits must represent a valid date in format “yymmdd” and the remaining characters are random. Tickers are generated automatically by the system and cannot be modified at all. For instance, the following are valid tickers: 000101-ABCDEF, 180102-123456, or 201231-A1B2C3.

Warehousing requirements

10. The system must compute a cube of the form “MCAP(c, a, p)”, which given a customer “c”, article “a”, and period “p”, it provides the total amount of money that customer “c” has spent on article “a” during the last period “p”. Article refers to an item or a category and

period refers to a period of time that can be either “DAY-01” .. “DAY-07”, “WEEK-01” .. “WEEK-04”, or “MONTH-01” .. “MONTH-12”.

11. The system must compute the following indicators:
    1. The customers who have placed more non-cancelled orders (top 10%).
    2. The customers who have placed less non-cancelled orders (bottom 10%).
    3. The clerks who have served and delivered more orders (top 10%).
    4. The clerks who have served and delivered fewer orders (bottom 10%).
    5. The ratio of orders that have been cancelled during the current month.

Functional requirements

12. A user who is not authenticated must be able to:
    1. Authenticate as a registered actor.
    2. Register to the system as a customer. His or her account is activated immediately.
    3. Register to the system as a clerk. His or her account is de-activated until an administrator validates it.
    4. List the catalogue of items grouped by their categories.
    5. Search for an item using some keywords that must appear in its SKU, its name, or its description.
    6. Comment on the items.
    7. Manage his or her shopping cart, which includes displaying it, adding items to it, deleting items from it, changing the quantity of a particular item, and adding, modifying, or deleting a comment.
    8. Start checking his or her shopping cart out. Note that it will not be actually checked out until he or she authenticates to the system as a customer. Note that any existing items in that customer’s shopping cart will be merged into the shopping cart that he or she is going to check out.
13. A user who is authenticated must be able to:
    1. Do the same as a user who is not authenticated, but registering to the system.
    2. Update his or her profile data.
14. A user who is authenticated as a customer must be able to:
    1. Check his or her shopping cart out and place the corresponding order.
    2. Cancel an order, as long as it is not delivered.
15. A user who is authenticated as a clerk must be able to:
    1. List the orders that are not assigned to any clerk.
    2. Self-assign an order that is not assigned to other another clerk.
    3. Set a delivery moment to an order that he or she’s self-assigned.
    4. List the orders that he or she has self-assigned but have not been delivered, yet.
    5. List the orders that he or she has already delivered.
16. A user who is authenticated as an administrator must be able to:
    1. List the clerks of the system. The listing must include a hint on whether his or her account is validated or not.
    2. Validate a clerk who has registered to the system.
    3. Manage the catalogue of items, which includes creating, listing, updating, uncataloguing, and recataloguing them. Uncatalogued items must not be shown in listings to actors other than the administrators.
    4. Manage the catalogue of categories, which includes creating, listing, updating, and deleting them. Note that a category can be deleted as long as there are not any items in that category.
    5. Configure how often the warehouse must be re-built so as to keep it as up-to-date as possible.

6. Consult the MCAP cube in the warehouse to list the of customers “c” such that “MCAP(c, a, p) θ m”, where “a” refers to an article, “p” refers to a period, “m” refers to an amount of money, and “θ” can be either “>”, “$\geq$”, “<”, “$\leq$”, “=”, or “$\neq$”:
7. Display a dashboard with the indicators in the warehouse.

Non-functional requirements

17. The system must be available in English and Spanish, but it must be ready to support additional languages as easily as possible. (The data themselves are not required to be available in several languages, only the messages that the system displays.) The languages must be encoded using the standard ISO 639-1 language codes.
18. The system must comply with the current regulations regarding e-commerce systems.
19. Payments must be managed by means of PayPal.
20. Wherever a listing of items is shown, the user must be able to sort it according their names, categories, prices, or stars in both ascending and descending order.
21. Actors must be offered a map to select the addresses in their profile data.
22. The system must provide an API so that administrators can upload as many items as necessary to the catalogue.
23. The system must be as efficient and scalable as possible.
24. The system is expected to manage 10,000 actors, 1,000,000 items, and 10,000,000 orders per year.
25. Typically, it’ll be serving 500 concurrent customers; during the Christmas season, it must be able to scale to up to 1,000 concurrent customers; on the Black Friday and Christmas Eve, it must be able to scale to up to 5,000 concurrent customers.