Foundations of Databases A.Y. 2021-2022
Homework 1 – Requirements Analysis

Master Degree in Computer Engineering
Master Degree in Cybersecurity
Master Degree in ICT for Internet and Multimedia

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Objectives of the System

Interviews

Natural Language Sentences

A major international food and beverage company is investing in a new set of technologies to increase profits. The company produces and distributes an average of X products every year, including drinks, juices, beers and snacks of various kinds.

The company's goal is to develop a new information management system that will help reduce excess and shortages of inventory. Furthermore, it is required to keep in memory as much information as possible about the commercial activity so that it is also possible to make analytics to monitor sales and expenses.

In this system:

- technical employees manage products in the inventory, invoices, and employees;

- sellers, on the other hand, have to deal with customers, orders, shipments, and payments;

- managers are in charge of managing suppliers and contracts;

- data analysts have access to the acquired data for inventory, cost and profit analysis;

- a system administrator will be responsible for managing the access privileges for each user on the system.

The figure of the Manager is important for the management of relationships (and therefore of contracts) with suppliers. The latter are intended to supply raw materials to the company. For example, if the company produces sugary drinks, suppliers will provide ingredients such as sugars, additives, artificial colors, water and natural flavors. In addition to these elements, there will be suppliers who will provide different types of packaging, such as glass, aluminum latins, or double corrugated cardboard boxes. Suppliers must be registered in the system, along with their name and contact details. Managers stipulate and maintain contracts with suppliers. These contracts are characterized by the following parameters: type of contract, duration of the contract, monetary agreement, quantity requested, and an identification for both the supplier and the raw material the first provides. It will therefore be possible for managers to inspect, for example through a list, all the contracts stipulated with the different suppliers. Furthermore, through the identification of the raw materials, managers have the possibility to filter contracts based on the type of product. Therefore, it is possible that the company can purchase the same type of product from different suppliers. Contracts stipulated between managers and suppliers are of different types:

- Joint venture;

- Partnership;

- Collaboration-type network agreement;

- Network contract for joint operation.

A customer should be able to register to a website in order to search for products to buy, view and manage its orders, and to write reviews – made of a rating and some comments – about products. Upon registering, it must specify its name, contact details, and delivery address. The customer receives an invoice with all the

details when it places an order and can track it with a dedicated tracking number provided when the shipment is assigned to the courier. To ensure small orders to be evaded in an efficient manner, some products can be produced in advance, which means that the inventory should have a little stock of them, acting as a "buffer". If instead an order requires more products than how many are already in stock, the first is held pending until the requested goods are manufactured and packaged for the shipping. Of course, products – as well as items – that are expired, must be removed from the inventory as soon as possible and disposed of, as they cannot be sold anymore.

In the inventory, items are stored with name, relative quantity, and expiration date. In particular, when there is a shortage of one or more items, the supplier providing it will be immediately notified with an automatic e-mail. Also, when a product is manufactured but has not been purchased yet, it should be stored in the inventory as well, with name, quantity, and expiration date. When a shipment that contains a specific product leaves the factory, the latter must be deleted from the inventory.

OLD TEXT:

The company objective is to optimize costs by having only the bare minimum item quantities. In this way, there should be no waste of resources. The company produces and sells food and beverages. Each product has details, such as name and brand.

The objective of the company is to implement an IMS to address overstocking and outages of items. To accomplish this, each item is stored in the system with name, relative quantity, and expiration date. In particular, when there is a shortage of one or more items, the supplier providing it will be immediately notified with an automatic e-mail. Also, when a product is manufactured but has not been purchased yet, it should be stored in the system as well, with name, quantity, and expiration date. When a shipment that contains a specific product leaves the factory, the latter must be deleted from the inventory.

Some products can be produced in advance, which means that the inventory should have a little stock of them, acting as a "buffer", to be able to evade small orders smoothly. If an order requires more products than how many are already finished, the first is held pending until the requested goods are not manufactured and packaged for the shipping. Of course, products, as well as items, that are expired, must be removed from the inventory as soon as possible as they cannot be sold anymore.

A customer should be able to register to a website in order to search for products to buy, view and manage its orders, and to write reviews – made of a rating and some comments – about products. Upon registering, it must specify its name, contact details, and delivery address. The customer receives an invoice with all the details when it places an order and can track it with a dedicated tracking number provided when the shipment is assigned to the courier. Suppliers must also be registered in the system, along with their name, contact details, and the agreement made with the factory stating which types of items the supplier will be responsible to provide.

In the described system, the manufacturing and shipment of products is performed by simple workers, who are supervised by a manager. The latter is also responsible for finding and making agreements with suppliers for the replenishment of the inventory. Another important figure is the salesman, which is responsible for interacting with customers, advertising products and ensure that they are satisfied. In the end, there is the analyst, which is in charge of performing analyses and predictions on various Key Performance Indicators (KPIs), such as revenues, generated income for each product, and products rating, in order to determine which are the popular products and, on the contrary, which of them should be decommissioned. Each employee must be registered in the system

with name, surname, contact details, the department in which he or she is working, and his or her role.

Filtered Sentences

Term Glossary

Term	Description	Synonyms	Connection
Inventory	A tidy collection of items with relative quantities	Catalogue, register, list	Parts, Orders, Product
Parts	The item needed for the manufacturing of final products	Items, objects	Inventory, Product
Orders	Requests of specific products by customers		Invoice, Inventory
Product	The final good	Merchandise, food	Parts, Inventory
Invoice	Bill issued to customers	Bill, payment proof	Orders, Customer
Customer	The company requesting for products	Company, client, buyer	Invoice, Employee
Employee	Whoever is working for the factory	Worker, staff member, operator	Customer, Roles, Departments
Roles	The several roles each employee plays as		Employee
Departments	The several divisions in which each employee works	Divisions, Branches, Units, Sectors	Employee
Supplier	The company which restocks items		Product, Manager

Table 2: Describe in this table the terms of your system

Functional Requirements

Non Functional Requirements

Constraints

The Database Management System application should satisfy the following additional constraints:

- Be implemented to run on Windows operating system;

- Be implemented with PostgreSQL;

- Client side implemented as a Web application, to guarantee easy management through different devices (Html, css and javascript will be used);

- Server side implemented using Tomcat, java servlet, and REST web service.