



Database Management Systems, A.Y. 2019/2020
Master Degree in Computer Engineering
Master Degree in ICT for Internet and Multimedia Engineering

Homework 1 – Requirements Analysis

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Group BCCMLT	Project Vicentina Serramenti DBMS	
Last Name	First Name	Student Number
Bacchin	Alberto	1238166
Carta	Davide	1210702
Colotti	Giovanni	1237334
Lorenzi	Daniele	1237599
Michelon	Enrico	1210760
Trovò	Giacomo	1233438

Objectives of the System

Vicentina Serramenti s.r.l. is a company that deals with technical consultancy in the field of windows and doors installation and has over 100 new customers per year. The company has been active for over 30 years and needs the support of a computer system to manage the large amount of data deriving from the relationships with customers (which are estimated to be over 4000 since the start-up of the business). In particular, the company needs to keep track of information relating to customers and employees and to access it quickly in order to improve management, after-sales services, assistance, marketing and to calculate budget statistics more accurately. To achieve this goal, a Database Management System (DBMS) is required to enable efficient and effective storage of the data of interest so that it can be accessed in the future.

Interviews

To collect information, one of the company's founding partners and one of its secretaries were interviewed. After a preliminary interview a draft of this document was presented to get feedback before producing the final version.

Users and Stakeholders of the System

The database has been requested by the founding partners of the company to achieve the objectives listed above. The users of the such a system will be the administrative employees of the company who interface with other people within the company (such as vendors) and externals (such as customers and suppliers) in order to insert the relevant information into the database. This information will be described in detail below.

Natural Language Sentences

The company provides technical consultancy to customers and takes care of the commercial management for the installation of windows and doors. The company staff is made up of salesmen who interact with customers in order to produce the drafting of sales contracts and the administrative section that deals with relations with suppliers and some external collaborators.

There may be several suppliers that produce the products necessary to carry out a job order: for each of them it is important to store and update the list of products purchased and the amount paid, for statistical and budgetary purposes. Each purchased product is delivered and installed to the customer immediately, therefore for the purposes of the company no warehouse management is required.

The external collaborators are not employees of the company but work on its behalf. They are delegated the implementation of a specific job order, which may include both the installation of new windows and the possible removal of old ones. It is important to keep track of the work carried out by each collaborator in order to manage any future assistance services.

For commercial purposes and for technical support, it is important to store customer information (name, surname, address) and their contact details (email, telephone), so that they can be reached and contacted later; moreover, for the purposes of evaluating a possible generic or targeted marketing campaign, it is interesting to learn and store how the customer learned about the company or the possibility of doing a specific job.

The relationship with customers is managed by the seller through a consultancy and the stipulation of a quote. This is done after a technical site inspection by the company to estimate the costs and materials necessary and to better understand the customer requirements. The quote then contains the total expected cost and the description of the individual products required with the related costs.

If the customer accepts the quotation, a job order is drawn up describing the implementation of the work, including information on suppliers and materials to be purchased to carry out the work. The order is, then, assigned to one or more external collaborators who will take care of the installation phase. For statistical purposes, it is interesting to associate the number of quotes and orders with the respective sellers.

Once the work has been completed, information on the cost of hourly labour, the complete work invoice and the date of completion of the work, which is necessary to provide after-sales services, is provided. Also, when the work is completed the external collaborators deliver to the company administration a report containing the test guarantee signed by the customer, accompanied by pictures of the completed work and guarantee documents provided by the manufacturers.

Periodically the company starts generic advertising campaigns (e.g. TV advertising) and campaigns aimed at customers in the database, related to orders or quotes associated with them (e.g. proposal of a free annual coupon for the registration of windows, discount to a customer who brings another customer, gadgets to be collected at the store for advertising purposes). For each campaign, data is collected on the users response and the amount of investments that were made to support it, in order to calculate the economical return.

Periodically (every month and every year) it must be possible to draw up reports on the financial performance of the company containing information on the balance sheet and the number of quotes that have been converted into contracts.

Access to the database is reserved to the staff of the company that manages the data entry and their analysis through a suitable web application. External collaborators, suppliers and customers cannot access the database.

Filtered Sentences

Seller, a person, member of staff, who interfaces with the customer through the drafting of a quote and the possible conclusion of the order contract:

- each seller is defined by name and surname;
- each seller is associated with a list of quotes and a list of completed orders.

Supplier, an external company that supplies the material for the implementation of a job order:

- each supplier is defined by his VAT number and a name;
- each supplier is associated with contact details such as email address, telephone, local agent and contact details;
- each supplier is associated with a list of materials purchased for job executions.

Materials list, contains the materials purchased for the implementation of a job order:

- each list is associated with a supplier;
- each item in the list corresponds to a product with its purchase cost;
- each list is associated with an order.

External collaborator, a person in charge of the installation:

- each employee is defined by a first name, surname and VAT number;
- each collaborator is associated with the job orders that have been assigned to him (both those in progress and those completed).

Client, a person requests the realization of a work:

- each customer is identified by name, surname and address;
- each customer is associated with telephone and email addresses;
- each customer is associated with the information describing how he or she came to know the company;
- different quotes can be associated with each customer.

Quote, a document that describes the work and the final price for the customer, but is not binding for the implementation:

- each quote is defined by a numerical code;
- each quote contains a PDF describing the work;
- each quote contains a field for the total cost;
- each quote is associated with a seller;
- each quote is associated with a customer;

- each quote has an issue and expiration date, after which the customer must be contacted for confirmation or changes (e.g. new offer or new business proposal or extension of the deadline);
- each quote, if confirmed, is associated with an order.

Job order, describes the commissioning of an installation:

- each job is defined by a numerical code;
- each order is associated to a quote;
- each job order is associated with different lists of materials purchased and their respective costs;
- each order is associated with one or more collaborators carrying out the work and the related labour costs;
- each job contains the end date of the work (if not set the job is not yet finished)
- each order contains a PDF of the corresponding invoice and a payment date of the invoice;
- each completed job is associated with a warranty report.

Warranty report, a document that certifies the correct execution of the work by the external collaborator to guarantee the client:

- each report is identified by a code;
- each report is associated with an order;
- each report contains several PDFs with manufacturers' warranty certificates, test certificate and any photos of the work completed.

Marketing campaigns:

- each marketing campaign is defined by a symbolic name;
- each campaign contains the user response;
- each campaign is applied to a subset of users (e.g. all those who have executed an order in the last 2 years);
- each campaign has a certain cost (which may be zero).

Term Glossary

Term	Description	Synonyms	Connection
Seller	Person in charge of getting in touch with customers		Quote
Supplier	External company from which the products are purchased		Materials list
Materials list	Set of products purchased from a supplier for the implementation of an order	Products, materials	Supplier, Job order
External Collaborator	Person in charge of the implementation of a job order	Contributor, Installer,	Job order
Quote	Document describing the work and the final price for the client		Customer, Seller, Job order

Customer	Person who asks for information or commissions a job order		Quote, Marketing campaign
Job order	Confirmation of the estimate and execution of the work	Commissioning, Contract, Order, Job, Work	Quote, Material List, External Collaborator, Warranty Report
Marketing campaign	Advertising campaign for a group of customers	Advertising campaign	Customer
Warranty Report	Document certifying that the work has been carried out properly		Job order

Functional Requirements

The DBMS:

- Contains information of individuals or groups of customers: first name, last name, email, telephone.
- Contains the information of external collaborators: name, surname, VAT number.
- Allows to retrieve the list of jobs performed by a specific external collaborator.
- Contains supplier information: name and VAT number.
- Contains seller information: first and last name.
- Contains information related to quotes, job orders and marketing campaigns.
- Allows to recover the quantities of materials purchased from a supplier and the expenditure incurred (over a certain period of time variable).
- Allows to recover for each customer the quotes and associated orders.
- Allows to retrieve contact information to carry out corporate marketing campaigns aimed at a group of customers (e.g. all those who have requested a quote, but didn't confirm the job).
- Allows to get a statistical report of a marketing campaign or how many customers have been touched by the campaign and have requested a quote.
- Allows to retrieve data useful to draw up the periodic balance sheets of the company, i.e. expenditure on materials, labour (expenditure) and the price of the estimate paid by the customer (income).
- Allows to derive the number of contracts concluded by a seller.
- Allows to determine the number of customers who have come to know the company for a particular reason (e.g. TV advertising, word of mouth, etc.).
- Allows to obtain a list of people to contact for after-sales assistance, re-examination of an expired estimate.
- Allows to retrieve the warranty reports associated with a job order and also all those associated with a customer.

Non-Functional Requirements

The DBMS will have to meet the needs of a small company such as Vicentina Serramenti s.r.l. which, however, has a thirty-year history in the sector. Therefore:

- The system must guarantee the storage and integrity of data for decades.
- All data is accessible only to the administrative staff of the company.
- Must be able to run on an enterprise server in the cloud.
- The database must be easily accessible to an inexperienced user.
- Sustainable cost for a small company.
- It must have the capacity to store a data volume corresponding to 100-150 new customers per year.

Constraints

The DBMS will have to:

- Use PostgreSQL.
- Interface with a java server-side and client-side html, css and jquery web application.
- Have the ability to run on a Linux or Windows operating system.