

Project Title

DESIGN DOCUMENT

Team Number

Client

Advisers

Team Members/Roles

Team Email

Team Website

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1 Introduction

1.1 PROJECT STATEMENT

Explain what the project is about. What are you trying to do?

Van Gorp Corporation is an Iowa based company that manufactures standard and customized pulley systems for clients. Since each pulley system they build must be specifically designed per customer, the price, including materials and labor, is different for each order. Currently, Van Gorp receives the specifications for each part, then must manually input the specifications into a complicated Excel spreadsheet that will output the quote for the parts. Since Van Gorp does not have any dedicated software developers, they have tried to build a simple application in MS Visual Basic to simplify the process, but would rather have actual developers build the application for them. The idea behind the project is to build a software application that will eliminate the current Excel driven system as well as integrate Van Gorp's current SQL database in order to quickly create, edit, and export quotations for the specific parts they are given the specifications of.

1.2 PURPOSE

Explain what is driving this project. Why is this work of benefit to the society?

The purpose of this project is to develop a standalone application to be used internally at Van Gorp to quickly quote a price on a part from their catalog when given specifications. The current method used to quote prices is a complex combination of Excel spreadsheets that negatively impacts the efficiency of the employees that are required to use them. With the final product of the application, the process for quoting a price will be streamlined, more user-friendly, and will improve the efficiency of the process for Van Gorp employees.

1.3 GOALS

- Improve our current programming skills
- Learn/apply project design/development practices
- Build an application that will benefit Van Gorp

2 Deliverables

These tie in with the goals. What deliverables are necessary to meet the goals outlined in the introduction?

3 Design

3.1 SYSTEM SPECIFICATIONS

Standalone Application
Developed in C#
Database Connectivity
No Excel Spreadsheet Dependency

3.1.1 Non-functional

User-friendly

The major reason that Van Gorp is so eager to get rid of those Excel sheets (they used to use them for calculating product quote) is because they are too hard to use. So to be user-friendly should be the first goal of this software. This includes ease of data input, either from keyboard or database; ease of switching between different parts (some products include different parts); and an aesthetic display of the final result (a summation with a total cost) for the user.

Good speed performance (calculating quote and accessing data in database)

Generally, the quote can be calculated with inputs running through a series of formulas. We'd like to get the final result for the user as soon as possible. Also, good performance to access database/manipulate data in database is one of our goals.

3.1.2 Functional

Calculate quote with given inputs for a specific product (main functional requirement)

The basic scenario that how Van Gorp would produce a product quote for their customer could be:

A customer orders a specific product from them, and the customer expects to get the quote for their order as soon as possible. In this case, the Van Gorp company needs to first, analyze the order, check how much each kind of raw material this order will consume, and calculate the cost; Second, they need to figure out how much labor work this order includes, and then calculate the cost for labors; Finally, they include some other minor costs and sum up the numbers to get the total cost for their customer. The calculation for the product quote involves too many inputs, so they expect the software that we are going to build can make this calculating process much easier.

Windows platform based, and C# preferred for their convenience to maintain this software

Since nearly all available computers in Van Corp is running on windows OS, it is expected that a windows based application will be developed. In addition, the software maintainer in Van Corp prefers the software is built in C#, so he can add new features or fix bugs when needed.

Database connection

The program will also need to manipulate data from SQL database, so to get access to SQL database, as a feature in our software is required.

3.2 PROPOSED DESIGN/METHOD

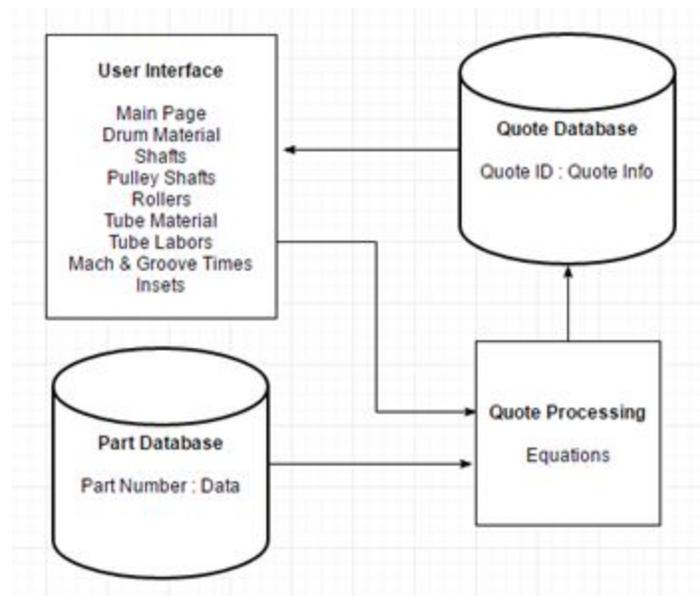


Fig. 1

Figure 1 displays the proposed system block diagram for this system. The main component will be the user interface, which will allow the user to enter inputs for each component of the quote. The user interface is connected to the Quote Processing module, as after inputs are entered, the system will compute a quote by retrieving part price information from the Part database. After calculation, the quote is stored in the Quote Database for retrieval by the User Interface.

The approach that will be taken in this project will be to extract all the equations and calculations from the quote Excel sheet and then create a standalone C# application that provides the same functionality of the spreadsheet by using the equations extracted from the spreadsheet. The current spreadsheet system references other spreadsheets to

retrieve part prices via product number; this application will access the part number database to retrieve that information, rather than rely on spreadsheets.

3.3 DESIGN ANALYSIS

There are three design principles in our Quick Quote Program: user-friendly, modularity, and sustainability.

3.3.1 User friendly

This software is designed to interact with our client from VanGorp. The primary objective of this program is to generate a quote from various data inputs, such as type of material, part dimensions, labor time, etc. Thus, the user interface of this software should be organized and easy to understand and utilize.

3.3.2 Modularity

The software is also designed with modularity in mind. Considering that VanGorp is a growing company, and may expand their list of products as they grow; hence, new products' quote will be implemented as new modules to this program. We also ensure the isolation and connection in between each module, so that an added new module will not accidentally change the structure or value of the older modules. In addition, modularity is very important as later on we integrate other components, such as SQL database and Excel sheets, as part of this program.

3.3.3 Maintainability

Last but not least, the software is suitable to be maintained by VanGorp. The program will be well-documented in order to prepare for future testing and expanding. Again, as mentioned above, the program will ensure isolation in between components, so that adding new modules will not affect the functions already implemented.

4 Testing/Development

4.1 INTERFACE SPECIFICATIONS

Discuss any hardware/software interfacing that you are working on for your project. This section is decided by team advisor/client.

4.2 HARDWARE/SOFTWARE

User Interface:

The first step to develop the Quick Quote program is to implement the user interface. The interface will use input boxes, drop down menus, tabs, buttons, etc. Each of these interface methods will be properly connected to appropriate backend variables. Input boxes may be restricted to accept a subset of pre-defined inputs, some input boxes may just accept numbers, some may not. For drop down menus, all menu values should be correct listed, etc.

Backend Logic:

This part is the major functionality of the program. The Quick Quote program will take the user input from the UI, and, according to different specifications, compute the expected output. One of the most important thing needed to be checked is the correctness of the outputs. This is going to be a very time consuming part, since there is a huge amount of specifications in this program. What's more, each of the variable that is used to save the inputs from the UI is needed to be checked to make sure they work properly.

Communication with Database:

There will be two databases used in the Quick Quote program. One for storing prices of different kinds of products, and the program will query it as needed. The other one for storing the quotation generated by the program, so the quotes can be retrieved and reused later on. The program is going to save the quotations into this second database. It is important to make sure the program uses the databases correctly.

4.2 PROCESS

Equation Accuracy:

We will test the equations by calculating a quote for each equation with the current excel sheet, by hand, and with our application. If all three match up, the application's output should be correct.

GUI:

Once we get a functioning GUI for the application, we will have people from Van Gorp test it to see what changes they would like to see for the final release.

5 Results

List and explain any and all results obtained so far during the testing phase. Include failures and successes. Explain what you learned and how you are planning to change it as you progress with your project.

6 Conclusions

Summarize the work you have done so far. Briefly re-iterate your goals. Then, re-iterate the best plan of action (or solution) to achieving your goals and indicate why this surpasses all other possible solutions tested.

7 References

List any references used in the document. These are an essential part of your review so far.

8 Appendices

If you have any large graphs, tables, or similar that does not directly pertain to the problem but helps support it, include that here. This would also be a good area to include hardware/software manuals used. May include CAD files, circuit schematics, layout etc. PCB testing issues etc. Software bugs etc.