

# **TECHNICAL NORTH UNIVERSITY**



## **FACULTY OF APPLIED SCIENCE ENGINEERING**

### **ENGINEERING DEGREE IN COMPUTER SYSTEMS**

#### **PRE-DRAFT QUALIFICATION OF COMPUTER SYSTEMS ENGINEER**

**TOPIC:**  
**MANAGEMENT AND FINANCIAL CONTROL CENTER FOR  
COMPREHENSIVE AUTOMOTIVE REPAIR MEGA-AUTO**

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## 1 Introduction

In the complex world of business today is characterized by the globalization process in companies, financial information plays an important role in producing information essential to the administration and development of the economic system.

In addition, in response to factors such as expansion, new reporting requirements, the need to work toward greater self-sufficiency and providing quality systems implementation, have contributed to a growing number of organizations are adopting systems computerized accounting provide the data they need, this is the case of Mega-Auto, a company that has been in the need to manage, plan and adopt a computerized accounting system.

The accounting information system is intended to respond to the main concerns of the central administration of Mega-Auto, in the sense of laying the organizational groundwork to enable proper management and rational use of resources, together with the efficiency, to achieve targets.

### 1.1 Problem

Mega-Auto and management company dedicated to automotive repair area, today presents the difficulty of managing the financial process manually, posing as a priority need for the implementation of a computer system to control this area.

Currently the financial area of the company to not having an implanted computer system has the limitation of not knowing time economic movements that take place continuously in the company, plus the manual recording of information has led to instant drawbacks economic results are presented, same as human error sometimes not proved true, all this has prevented access to information when it is needed, and that it is current and accurate. Hence, the need arises to implement a computerized system to keep tight control of the Company financial information.

## 1.2 General Objective

- Automate financial control of the company Mega-Auto, to rule out errors caused by manual work currently being carried out by developing a computer system with Open Source tools.

## 1.3 Specific Objectives

- Define the requirements for the development of the computer system, to allow implementation of the Mega-Auto needs to improve financial control of the company.
- Define the system to develop the legal basis governing the country, to control all financial processes and maintain company information in these guidelines.
- Perform proper study of the software tools used in the implementation of the financial system.
- Develop and implement a financial control system quickly and efficiently, by using appropriate programming standards.
- Establish a control model of financial information that is accessible, friendly interface to facilitate the training phase of the end user.

## 1.4 Scope

The system to be developed must meet the following:

### 1.4.1 The Purchasing module should allow:

- Register and manage purchase vouchers.
- Returns on purchases Register.
- Controlling forms of payment (cash, check, credit card).

#### **1.4.2 The Sales module should allow:**

- Monitor sales of spare parts.
- Issue the bill for car repair.
- Controlling forms of payment (cash, check, credit card).

#### **1.4.3 The Accounts Payable module should allow:**

- Issuing exit vouchers.
- Manage partial or total payments to suppliers accounts.
- Controlling payment of purchases made.
- Check balances outstanding to suppliers.

#### **1.4.4 The Accounts Receivable module should allow:**

- Issuing entry vouchers.
- Manage Partial or total revenues the outstanding balances of customers.
- Check payment documents issued to customers.
- Managing customer's outstanding balances.

#### **1.4.5 The Accounting module should allow:**

- Manage and maintain the chart of accounts of the company.
- Automatically Record accounting entries in the journal by the processes of the various modules, with proper regard to the chart of accounts.
- Generate Ledger seats based on entered in the journal.
- Generate Balance, which will determine the balances of the ledger accounts and check the accuracy of records.
- Record and monitor settings seats.
- Generate Financial Statements.
- Close the accounting period, the same information can prepare for the next accounting period.

### **1.5 Justification**

Knowing that today's companies, for its wide hue of business management, through its unique and complex business plans in order to give the best services to their customers know that generic systems to manage your business does not meet your expectations of control, for this reason, their requirements can only be met with customized software, which is coupled to the specific and unique requirements of your company.

Mega-Auto has been proposed to improve the optimization of company resources. This has led to the idea of having as a fundamental, implementation of a computer system for continuous improvement of economic activities which could control the financial area, from registering and purchasing control, and the registration and control of sales, becoming real information for the accounting and all that implies, from the journal, older, statements of financial position and more, and likewise manage accounts receivable, accounts payable and these forms of payments accounts.

Thanks to this, the company will have adequate control of the financial area, allowing for timely and appropriate information when it is needed, thereby improving their productivity, and hence, reduce operating costs.

The system will be developed to implement using open source technology, based on the Java programming language, as the company has taken initiative eat oriented to the use of such systems, and will use the standard system development, through RUP methodology.

## **2 Definitions of Accounting System**

An accounting system is nothing more than a set of rules, guidelines, or procedures that control the operations and provide financial information of a company, all this means: the organization, classification and quantification of administrative and financial information to be supplied as product of the activities carried out.

### **2.1 Accounting Data Processing**

The accounting data processing is done following the general guidelines for obtaining information.



Fig. 1: Accounting data

The documentation supporting the economic events that occur in the company, is the entrance to the accounting system. With her processes are performed, which are tasks that integrate or transform information. Thus the outputs are produced, which is suitable for information processing and decision making.

Feedback is one component that closes and restarts the system. We analyze and compare the output with the expected results, and generate, if possible, new entries that improve the process.

## 2.2 Accounting System Processes

### 2.2.1 Accounting cycle

The life of a business or a company is divided into accounting periods, and each cycle<sup>1</sup> is a recurring accounting.

“The accounting cycle is an orderly and systematic accounting records, preparing vouchers from accounting and bookkeeping to preparation of Financial Statements.”<sup>[1]</sup>

Each accounting cycle includes all activities necessary to provide management, the quantified<sup>2</sup> information you need to plan, control and disclose the financial position and operations of the company.

In the process or accounting cycle is divided into the following phases or stages:

<sup>1</sup> **Cycle:** It consists of a series of events, changes or fluctuations that recur or that can end life newThe and presented a business or a company is divided into accounting periods, and each cycle is a recurring accounting.

[1] Gómez, G. E. (2002). El Ciclo Contable.

Retrieved from <http://www.gestiopolis.com/canales/financiera/articulos/31/ciclo.htm>

<sup>2</sup> **Quantified:** Convert certain information or data, numbers, or any type of data in the form of quantity.

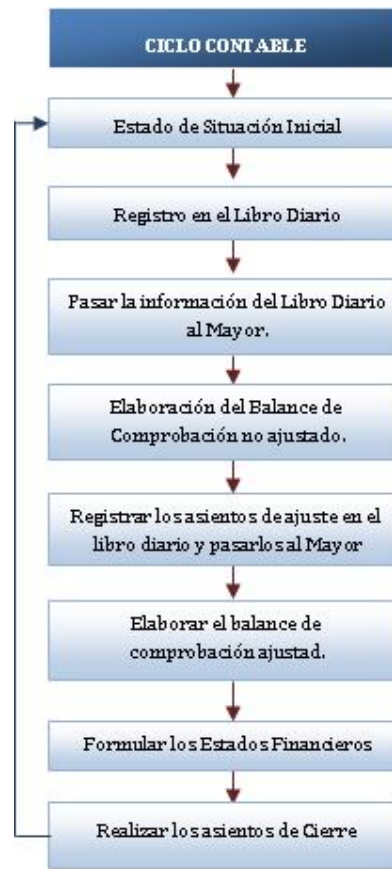


Fig. 2: Cycle and Accounting Processes

#### ▪ Initial Situation Status:

The accounting cycle begins with the creation of the initial inventory, a report containing a detailed list of all assets, rights and obligations of the company, on the first day of the fiscal year or the day of the beginning of its activity. In practice, they take the same data contained in the previous year end balance sheet.

#### ▪ Daybook:

As transactions are taking place, you must register them in the journal, in the respective seats. This stage is called daily<sup>3</sup>. Be considered prior to the source documents, which justify the transaction, ie, sales invoices, purchase invoices, customer payments, vendor payment, payment roles, etc.

#### ▪ Ledger:

Transactions recorded in the journal, ledger is passed to the corresponding values to be and to

<sup>3</sup> **Daily:** Corresponds to the record that is made in the journal transactions as they occur.

have each of the accounts. The Ledger includes movements of all the accounts of the company for a financial year.

- **Trial Balance:**

Once journal entries have been passed to the eldest, prepares the trial balance, in order to see if it holds that the total of the amounts (debit and credit) are equal and if the total of the balances (debtor and creditor) are equal.

- **Record adjusting entries in the journal and transfer them to greater:**

In the event of any entry errors must be corrected when discovered, adjusting the balances of the accounts, so that they are equal to the amounts that would have existed if it had made the correct record.

In order to obtain the actual financial information, if necessary make adjustments, the seats should be recorded in the journal. Then we proceed to such adjustments to ledger accounts to display accurate and current balances.

- **Prepare the adjusted trial balance.**

- **Make the closing entries:**

After adjustment accounts recorded in books and journal Mayor, will only balance the balance sheet. Then, proceed to settle them by an accounting entry called closing the books ending Diary and Mayor. This seat will reflect the final inventory of the company. After posting, you can not register as any other operations in fiscal.

The switch to a new accounting period closing the books is provided, which is an office procedure that transfers the balances of revenue and expenditure to the accumulated profits<sup>4</sup> and books prepared for the start of a new accounting cycle.

- **Formulating Financial Statements:**

Finally, accounting aims to meet the economic and financial situation of the company at the end of an accounting period or fiscal year, the same is achieved through the preparation of financial statements.

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<sup>4</sup> **Profits:** Profit or gain. Surplus of revenue, products, equivalent to the difference between total sales and related costs.

Whether the case of managers, administrators, investors, shareholders, partners, suppliers, banks, brokers, or government entities, financial statements allow information according to your needs, analyze it and, based on that analysis, make decisions.

Balance Sheet:

Is accounting document reports on a certain date the financial situation of the company, showing clearly the value of their property and rights, obligations and its capital, in accordance with generally accepted accounting principles.

Income Statement:

It is a companion document which detailed information was obtained and orderly as profit or loss (revenues minus costs and expenses<sup>5</sup>) of the accounting year, in a given period of time.

## 2.2 Automated Accounting System

The decision to automate accounting system generally depends on the need for accurate, consistent and timely in the time needed.

For a management information system to be truly useful, it must fully automate data management of a company, in addition to accounting processes.

Must be able to issue invoices, inventory processes organize, manage and control accounts receivable, and accounts payable, automate the payroll, issue: the Trial Balance, Income Statement and the Balance Sheet.

The different modules of an efficient accounting system allow obtaining numerous reports, giving managers the information necessary for decision making.

## 3 Development Tool

### 3.1 JAVA programming language

Java is a software platform developed by Sun Microsystems.

Language is a general purpose development, and as such is valid for all types of professional applications.

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<sup>5</sup> **Expenses:** It refers to all kinds of monetary or credit disbursements made by banks in each accounting period itself.

The Java development tools are known as Java Development Kit (JDK).

This toolkit features include a command line compiler javac, the Java virtual machine that can run java applications, javadoc documentation tool, and a tool to package jar project.

### 3.2 Swing:

It is a graphics library for Java. Includes widgets<sup>6</sup> for GUI such as text boxes, buttons, brochures and tables.

Swing is the set of classes, interfaces, resources, etc., for building graphics, also known as GUI (Graphical User Interface).<sup>[2]</sup>

Provides utilities to facilitate the creation of graphical applications.

### 3.3 Java Persistence API (JPA)

The handling of persistent objects from the business layer requires the use of an API that allows the programmer to perform the typical operations of creation. Updating, deleting and retrieving objects.

In addition to the API's specific to each framework, Sun Microsystems has been included in the edition Java EE a new specification, known as Java Persistence API (JPA) which includes an API for handling persistent objects, compatible with most engines persistence currently used.

Using JPA therefore allows abstracting the details of the persistence engine used, like, for example, JDBC provides complete independence on the type of database.<sup>[3]</sup>

#### 3.3.1 The JPA specification:

The JPA specification covers three areas:

- *The JPA API:* This is a set of classes and interfaces, included in the package that will be used by javax.persistence the business

layer to operate with persistent objects. It is estimated that the use of this API, instead of the classic instructions JDBC for data access can be obtained a saving of up to 40% in the code of the business layer.

- *Object-relational mapping:* Specify the persistence engine how objects must be mapped to tables database. JPA supports both XML configuration files as annotations to define this metadata.
- *Java Persistence Query Language (JPQL):* It is an object manipulation language, known as JPQL we can define the complex operations for treating objects. Its syntax is similar to the standard SOL language, but adapted to treating objects.

### 3.4 PostgreSQL 9.0 Database

PostgreSQL is a database manager object oriented data widely known and used in free software environments because it meets SQL92 and SQL99 standards, and also by the set of advanced features it supports, which places it at the same level or better many commercial DBMS<sup>7</sup>.

PostgreSQL can run on multiple platforms (generally in all modern Unix based) and from version 8.0, Windows also natively.

### 3.5 UML (Unified Modeling Language)

To understand what the UML, you can inspect each of its component words separately.

- **Language:** UML is, precisely, a language. This implies that it has a syntax and semantics. Therefore, to model a concept in UML, there are rules about how to group the elements of language and meaning of this group.
- **Modeling:** The UML is visual. By its syntax are modeled various aspects of the real world, which allow a better interpretation and understanding of this.

- **Unified:** unifies various modeling techniques in a single.

The UML comes from object-oriented techniques, is created with the strong intention

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<sup>6</sup> **Widgets:** Is a graphic element with which the user can interact.

<sup>[2]</sup> Joyanes Aguilar, L. & Zahonero Martínez, I. (2010). Programación C, C++, JAVA y UML. México D:F.: Mc.Graw-Hill

<sup>[3]</sup> Martín, A. J. JPA, Java Persistence API. Recuperado de <http://www.youblisher.com/p/153846-Persistencia-JPA/>

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<sup>7</sup> **DBMS:** Management System Database.

that this allows a proper object-oriented modeling.

### 3.6 Software Development Methodology RUP

These methodologies aim to guide developers to create new software, focus on the detailed definition of the processes and tasks, tools to use, and requires extensive documentation, as it seeks to anticipate everything beforehand.

RUP divides the process into four phases, in which several iterations are performed on the variable number depending on the project and that is greater or lesser emphasis on the various activities.

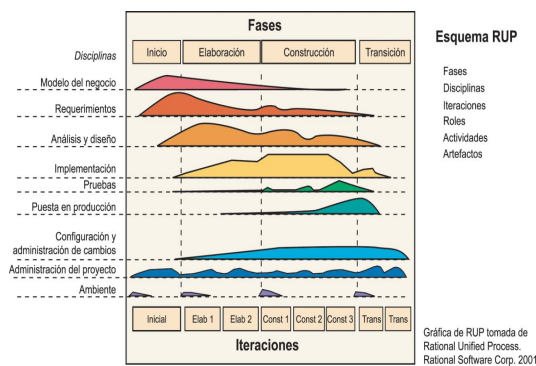


Fig. 3: RUP Life cycle

In the iterations of each phase are different efforts in different activities.

- **Start:** Make a plan of phases, identifies key use cases and identify risks. It defines the scope of the project.
- **Elaboration:** Is a project plan, completed use cases and eliminate risks.
- **Construction:** focuses on the development of a fully functional and efficient product and user manual.
- **Transition:** product is installed on the client and users are trained. As a consequence new requirements arise tend to be analyzed.

### 4 Conclusions

- The implementation of the Financial Management and Control for Automotive Repair Center for Integrated Mega-Auto, enabled automate and keep a tight check on all financial transactions that run in the company, providing solutions to the needs that have been raised by owners.

- The high availability of financial information organized under the current legal basis in the country serves as a basis for making business decisions.
- The proper study of the tools and their proper use allowed to create a reliable and ready for business use.
- The development methodology used for the implementation of the application, building software ensures quality and stability.
- The user interface has been designed to facilitate the use of the application, wherein the user can access the information in a quick and intuitive.
- The financial results of the process are reliable, accurate and timely, also can be interpreted, making it easier for administrators who can orient the course followed her business knowledge enabling stability, solvency and financial strength of the company.

### 5 Recommendations

- Who meets the auxiliary functions of accounting should be trained periodically in relation to accounting, so you can make the process efficient accounting system developed, and the results obtained in each period will be real and allow you to take the best decisions in the company.
- The process of buying, selling, accounts payable and accounts receivable should be made following a logical process of each activity required for entry of the same, only in this way will contribute to the improvement of the company's accounting system.
- Perform monthly analysis of the respective information generated in order to maintain the accounting system properly and in compliance with governing laws, rules and accounting standards in force.
- The proper and permanent record information in the system will be accurate, timely real and when it is needed.
- Consider the periodic updating in technology, as this will allow the company

automate processes successfully, thus increasing the performance of the company and their income levels.

- Conducting testing application must be executed by all users who will use the project. Additionally, you must test the operation of the entire project and that when put into production system development problems may not be detected in the test phase.

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