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The Development of a Payroll System Prototype

JALAL SHAH

A project report submitted in partial fulfillment of the
Requirements for the award of the degree of
Master of Software Engineering

Advanced Informatics School
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AUGUST 2012

I declare that this thesis entitled “The Development of A Payroll System Prototype” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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To my beloved mother, father and my
family

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ABSTRACT

A well established firm has two main aspects, firstly an employment service and a well structured accounting system. Management expects improvement in payment method of the company. The best possible way to handle this problem is to keep a proper track on all the transaction made to staff of a company. Payrolls are mainly offered under extreme care of account's department of major companies. In accounting sector, payroll refers to the amount paid to the employees for service they use to provide during a certain period of time. In this project the author develops a Payroll system that allows the employees to check their weekly and monthly reports and submit their timecards. The administration will be responsible for adding, updating or deleting an employee’s data. The main responsibility of the payroll system is to keep a proper record of overall transaction.

ABSTRAK

Sebuah syarikat yang mantap mempunyai dua aspek utama, pertamanya perkhidmatan pekerjaan dan sistem perakaunan dan berstruktur. Pengurusan menjangkakan peningkatan di dalam kaedah pembayaran syarikat. Cara terbaik untuk menangani masalah ini adalah dengan menyimpan trek yang betul ke atas semua transaksi yang dibuat kepada kakitangan syarikat. Kebanyakan senarai gaji adalah di bawah seliaan jabatan yang menjaga akaun syarikat. Di dalam sektor perakaunan, gaji merujuk kepada jumlah yang dibayar oleh syarikat kepada pekerja untuk perkhidmatan yang mereka gunakan dalam tempoh masa tertentu. Dalam projek ini, penulis membangunkan sistem penggajian yang membolehkan pekerja memeriksa laporan mingguan, bulanan dengan mengemukakan kad masa mereka. Pentadbiran juga akan bertanggungjawab untuk menambah, mengemaskini atau memadam data pekerja. Tanggungjawab utama sistem penggajian adalah untuk menyimpan rekod yang betul untuk keseluruhan transaksi sesebuah syarikat.

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LIST OF ACRONYMS

SRS	Software Requirements Specifications
SDD	Software Design Document
AIS	Advanced Informatics School
UTM	Universiti Teknalogi Malaysia
PS	Payroll System
PSP	Payroll System Prototype
IEEE	Institute of Electrical and Electronics Engineering
IPS	INFONETICS Payroll System
eNET PS	eNET Payroll System
PPS	PenSoft Payroll System
AIS UTM PS	AIS UTM Payroll System
URS	User Requirements Specifications
GUI	Graphical User Interface
SDLC	Software Development Lifecycle
RUP	Rational Unified Process
SRM	Software Research Methodology
SDP	Software Development Plan
SPP	Software Project Plan
MVS	Microsoft Visual Studio

UML	Unified Modeling Language
C#	C Sharp
SQL	Structured Query Language

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CHAPTER 1

1.1 INTRODUCTION

The payroll system is useful for maintaining employees overall record in a company. It makes easy to retrieve and manipulate the employee's information and maintains the database for employees. The database payroll system uses are related with employee's academic as well as personal information. This software helps the employees to easily access their record in order to check their reports and maintain timecard. It uses different authentication level to access and manipulate the information, in this way it also acts as secure software. To maintain the security of database, this software provide different authentication to different users. If a user wants to access the personal information of any other employee, he/she is not provided with this kind of authority. Employees can maintain their timecard, and can check and print their reports.

The proceeding of this chapter comes with the background of the company and background of this project as well. In addition, this chapter also mentions about the problem statement, the objectives of project, the scope of the study, the deliverable items, and the project plan, coherently.

1.2 Company Background

The Universiti Teknologi Malaysia is one of the largest engineering-based Universities in Malaysia offering different educational programs in the field of

engineering science. UTM also offers different full/part-time educational programs in social sciences as well (SPACE, 2012). The Advanced Informatics School (AIS), formerly known as the Centre for Advanced Software Engineering (CASE), is school of excellence in the field Software Engineering & Information Security education.

The AIS was established in collaboration between Universiti Teknologi Malaysia and University Thales (formerly known as Campus Thompson), France in the year 1996 (AIS, 2012).

1.3 Background of the problem

Payroll is an integral part of a company's operations. The federal and state governments require employers to comply with wage and hour standards to ensure that employees are paid accurately and on time. The internal revenue service and the state department of revenue have employment tax requirements that employers must comply with. All of these factors play collective role in giving importance to the payroll system (Grace).

The AIS UTM needs a new system to allow employees to record timecard information electronically and automatically generate pay checks based on the number of hours worked in the company. This new system will be state of the art and will have a Windows-based desktop interface to allow employees to enter timecard information, change employee preferences (such as payment methods) and create various reports. The system will run on individual employee desktops throughout the entire company. For ensuring issues related to security and auditing, employees are restricted to only access and edit their own timecards.

1.4 Problem Statement

The author was asked by AIS UTM to build a new payroll system to replace the existing one, which is expected to be out of date. AIS UTM needs a new system to allow employees to record timecard information electronically and automatically generate pay checks based on the total number of hours they have worked. Following are some of the characteristics of this user interference software:

1. The new system will be Windows-based desktop interface that would allow employees to enter timecard information and create various reports.
2. The system will run on individual employee's desktop throughout the entire company. For security reasons of preserving information and auditing, employees can only access their own timecards.
3. The employees who work on hourly basis are paid at hourly rate. They submit timecard that records the date and number of hours they work for a particular charge number.
4. Some employees are paid on a flat salary. Even though they are required to submit timecard in order to record the date and hours worked in the company. In this way the system can track the working hours of employees against particular charge numbers.
5. The payroll application will run automatically on every first day of the month, and it will issue payments to the employees on the basis of their timecard record. The date needs to be specified in the system on employee's payment, and in this way the system will generate payments for records from the last time the employee was paid. This new system basically is designed in a way that the payroll generates automatically, without any manual intervention.

1.5 Project Objectives

The study comes with following objectives with intention of executing this project:

1. To conduct an analysis of studies on existing payroll systems.
2. To propose new features and services for payroll system.
3. To develop a new payroll system based on the requirements and proposed features.
4. To perform informal test of the system.

1.6 Project Scopes

The project scope defines the description of the work that is required in delivering payroll system. The scope of this project includes following point:

1. To construct the Software Development Plan (SDP).
2. To understand the features of payroll system by comprehending existing payroll systems.
3. To construct the Software Requirement Specification (SRS) document.
4. To construct the Software Design Document (SDD).
5. To development of the payroll system.
6. To test the payroll system.

1. 7 Project Deliverables

This project will end-up with some deliverables, which will be produced as a result of the project throughout the period of its execution:

1. Software Requirement Specification (SRS) document.
2. Software Design Document (SDD).
3. Source code.
4. Thesis report.
5. Industrial attachment log book.

1.8 Software Project Plan

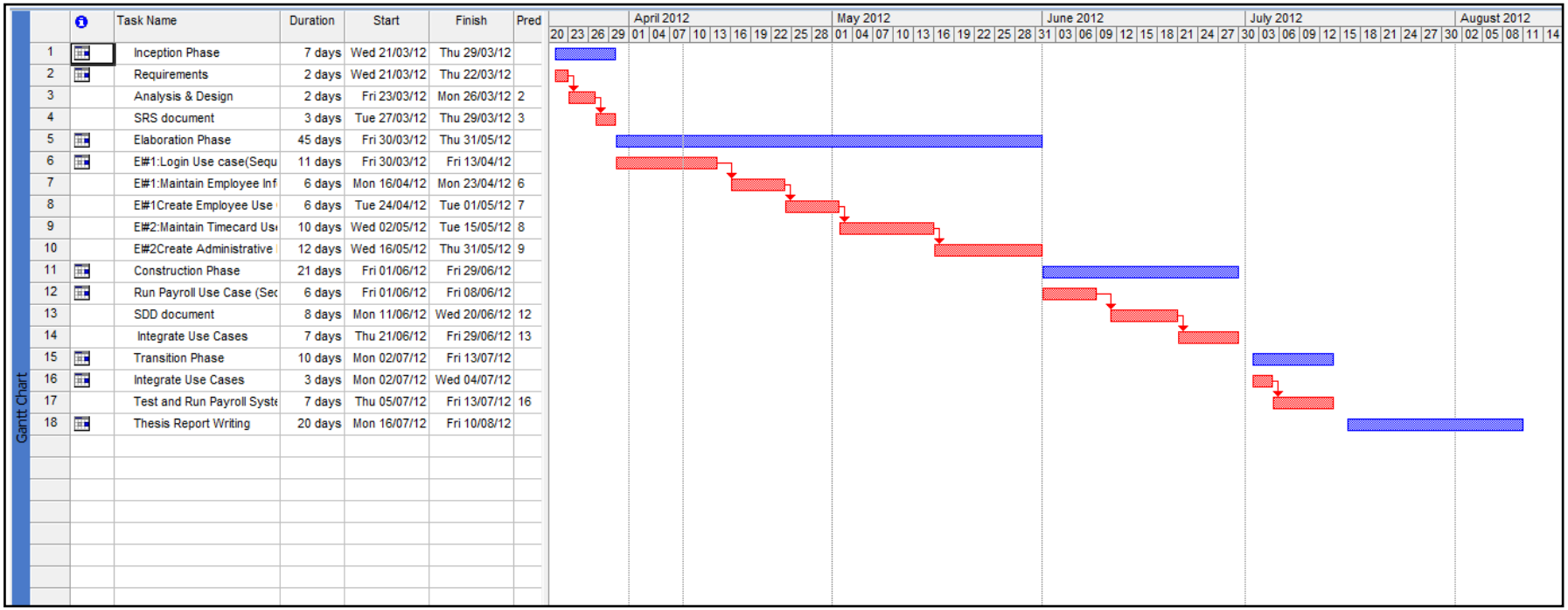

Figure 1.1: Software Project Plan

REFRENCES

Alain Abran, J. W., & editors, P. B. (2004). *wikipedia the free encyclopedia.* Retrieved from wikipedia the free encyclopedia: http://en.wikipedia.org/wiki/Software_engineering

Best Payroll Software Programs . (2010, Dec 28). Retrieved 2012, from chen Nanyang: http://suite101.com/article/best-payroll-software-programs-download-reviews-a325239

Bohner, S. a. (1996). *Software Change Impact Analysis.* Retrieved from Wikipedia free Encylopedia: http://en.wikipedia.org/wiki/Change_impact_analysis#cite_note-0

businessdictionary. (n.d.). Retrieved July 2012, from businessdictionary.com web site: http://www.businessdictionary.com/definition/technique.html

CMMI_SW_Project_Docum.

eNET Payroll. (2004). Retrieved 2012, from http://www.enetpayroll.ca/demos.html#

Every Spec. (2012). Retrieved 2012, from www.everyspec.com: http://www.everyspec.com/MIL-STD/MIL-STD-0300-0499/MIL-STD-498_25500/

IBM Rationail Rose. (2006). Retrieved 2012, from public.dhe.ibm: ftp://public.dhe.ibm.com/software/rational/web/datasheets/rose_ds.pdf

Institute, S. E. (November 2010). *CMMI for Development, Version 1.3.*

Kay, R. (2002). *System Development Life Cycle.*

Kharytonov, B. S. (2009, 10 22). *ebiz.* Retrieved 06 26, 2012, from www.ebizq.net: http://www.ebizq.net/topics/dev_tools/features/11821.html?page=2

Kilpinen, D. M. (2004). *Change Impact Analysis at the Interface of Systems Engineering and Software Design* . Retrieved from Engineering Designe Center: https://www-edc.eng.cam.ac.uk/projects/softwaresystems/

Kilpinen, M. (2008). *The Emergence of Change at the System Engineering and Software Design Interface.* Retrieved from wikipedia the free encyclopedia: http://en.wikipedia.org/wiki/Change_impact_analysis#cite_note-0

Laplante, P. (2007). *wikipedia free encyclopedia.* Retrieved from wikipedia free encyclopedia: http://en.wikipedia.org/wiki/Software_engineering

Mehta, V. (2010). *Wikipedia, the free encyclopedia.* Retrieved 2012, from wikipedia.org: http://en.wikipedia.org/wiki/Microsoft_Visual_Studio

Payroll System. (2006). Retrieved 2012, from www.infonetx.com/lit/prslit.pdf: http://www.infonetx.com/lit/prslit.pdf

Pen Soft Business Solutions. (2008). Retrieved 2012, from www.pensoft.com: http://www.pensoft.com/

Rumbaugh, J. &. (2011, July). *Wikipedia, the free encyclopedia.* Retrieved July 2012, from wikipedia.org: http://en.wikipedia.org/wiki/Unified_Modeling_Language

Torgersen, M. (2008, October). *Wikipedia, the free encyclopedia.* Retrieved July 2012, from wikipedia.org: http://en.wikipedia.org/wiki/C_Sharp_%28programming_language%29

Wisegeek. (2012, 06 24). Retrieved from www.wisegeek.com: http://www.wisegeek.com/what-is-payroll.htm