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JUDUL: SPARE PARTS INVENTORY MANAGEMENT SYSTEM

SESI PENGAJIAN: 2004/2005

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SPARE PARTS INVENTORY MANAGEMENT SYSTEM

GAN CHUN HOU

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Information and Communication Technology (Software Development)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
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DEDICATION

I am as ever, especially indebted to my parents, Gan Cheong Seong and Tey Siew Tuan for their love and support throughout my life.

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ABSTRAK

Semasa menjalani latihan industri di Intel Technology Sdn Bhd, laman Web Spare Parts Inventory System telah dilaksanakan untuk Tester Interface Unit Tracking System dalam kilang pembuatan bagi memastikan unit dikawal dengan baik, tiada komponen yang rosak, menjimatkan kos dan mengurangkan masa mesin rosak dan meningkatkan produktiviti. Sistem ini dilaksanakan bagi menyediakan satu sistem kawalan dengan komputer pangkalan data untuk mengatasi masalah, pemulangan, mengawal semua Tester Interface Unit komponen. Manakala, sistem yang telah dilaksanakan mengalami masalah seperti kelajuan untuk proses data, menyatukan barkod modul dan kelemahan yang seterusnya serta cadangan lain untuk membaiki laman yang sedia ada. Perisian yang dibangunkan ini akan menggantikan sistem yang sedia ada disebabkan masalah-masalah tertentu. Syarikat Intel akan memperoleh keuntungan misalnya meningkatkan pendapatan tahunan, menjimatkan kos dengan perlaksanaan perisian yang dibangunkan ini. Model Waterfall bagi pembangunan perisian telah digunakan semasa membangunkan perisian untuk menyelesaikan masalah yang dihadapi berdasarkan metodologi yang sesuai dengan keperluan sistem. Akhirnya, peluang antara kerjasama Kolej Universiti Teknikal Kebangsaan Malaysia dengan Syarikat Intel amat dihargai semasa pembangunan perisian bukan sahaja dapat mempertingkatkan produktiviti syarikat tetapi juga dapat memperkenalkan nama dan imej Kolej Universiti melalui kerjasama akademi dengan industri.

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ABSTRACT

During the industrial training at **Intel Technology Sdn Bhd**, the Spare Parts Inventory Management System tool web-based application has been implemented for Tester Interface Unit Tracking System in the manufacturing production floor in order to ensure the units handling process in control, no damage to components, cost saving and reduce unnecessary downtime, man hour to repair and improve the productivity. The implementation actually is to set up one central location with Personal Computer database to manage issuing, returning, maintaining and close monitoring of all the Tester Interface Unit components. More inputs need to be gathered for improvement on system, process, cost, productivity and others. Based on the feedbacks throughout the verification, there are some concerned areas about the Spare Parts Inventory Management System that need to be improved such as the network speed, barcode printing integration, inefficiency of the existing system; some proposed key features and others. The enhanced software project will be developed to replace the existing web-based application due to some issues that always brought inconveniences and problems, which have been affecting the current system as well as the productivity. Intel Corporation can achieve typical benefits such as increase annual sales, realize annual cost savings and reduce inventory costs through the improved software project. The Waterfall Software Development Model has been applied on the developed software project that will address those inefficiency issues effectively according to the right project methodology and system requirements. Finally, this is a precious dream-come-true opportunity collaboration between Kolej Universiti Teknikal Kebangsaan Malaysia and Intel Corporation working closely on this project not only for Intel's manufacturing production floor enhancement but also to boost up University College reputation and bring out the best public image. This will certainly make University College a good fame for improving Intel Corporation manufacturing production floor system.

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LIST OF ACRONYMS

ADO	–	ActiveX Data Objects
ASP	–	Active Server Page
ATL	–	Active Template Library
CASE	–	Computer-Aided Software Engineering
COM	–	Component Object Model
CPU	–	Central Processing Units
DBMS	–	Database Management System
ERD	–	Entity Relationship Diagram
FTMK	–	Fakulti Teknologi Maklumat dan Komunikasi
GUI	–	Graphical User Interface
IDE	–	Integrated Development Environment
IE	–	Internet Explorer
IIS	–	Microsoft Internet Information Service
IS	–	Information Services
KUTKM	–	Kolej Universiti Teknikal Kebangsaan Malaysia
LAN	–	Local Area Network
MFC	–	Microsoft Foundation Classes
MS	–	Manpower Staffing Services
NCO	–	Network and Communication Chipsets Organization
NTFS	–	New Technology File System
OLE	–	Object Linking and Embedding
OMT	–	Object Modelling Technique
OOP	–	Object-Oriented Programming
RAM	–	Random Access Memory
RM	–	Routine Maintenance
ROI	–	Return On Investment
R&D	–	Research and Development
SDLC	–	Software Development Life Cycle
SIMS	–	Spare Parts Inventory Management System
SQL	–	Structured Query Language
TIU	–	Tester Interface Units
UML	–	Unified Modelling Language
WIP	–	Work-In-Process
WWID	–	Worldwide ID

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CHAPTER I

INTRODUCTION

1.1 Overview

The Spare Parts Inventory Management System (SIMS) will be developed to handle Intel Corporation manufacturing production floor. This chapter briefly discusses about the introduction, problem statements, objectives, scopes, contributions, and expected output of the project.

1.1.1 Project Background

Inventories include goods purchased for resale, internal usage, or consumption. Inventory management is a complex matter, involving governing laws, operating rules and regulations, administrative law rulings, recommended practices, designated procedures, and specific conflict-of-interest provisions. In addition to all of these compliance issues, the entity must also ensure that "enough but not too much" inventory is available. Management controls over the recording, reporting, and safeguarding of inventory items are necessary.

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During the industrial training at Intel Technology Sdn Bhd (assigned under the Network Communication Chipsets Operation Six (NCO6) Assembly, Test and Backend Engineering's Tester Engineering Group supervised by the Intel Corporation's PG6 group leader Chin Weng Wai), among the given tasks the SIMS tool web-based application for Tester Interface Units (TIU) tracking system has been implemented in the PG6 manufacturing production floor. TIU serves as an interface between tester and units being tested which becomes the most important feature of tester for chipsets manufacturing at Intel Corporation production floor.

The system was implemented in order to ensure the TIU handling process in control, no damage to components, cost saving and reduce unnecessary downtime, man-hour to repair and improve the productivity. Actually, the SIMS tool is a web-based application called Spare Parts Inventory Management System developed by NCO automation group to manage test hardware inventory such as Tester Interface Units, Standard Units, load boards, conversion kits and hand clamps. The SIMS tool currently only manages TIU module. The SIMS tool consists of four main modules:

1) Transaction
2) Search
3) Super user Login
4) Logout

The SIMS tool will scan the barcode sticker on each TIU for tracking purposes such as location and inventory. After the implementation, there were some instant feedback about the SIMS tool implementation such as the speed of network slow, the barcode printing portion was not integrated into the web-based application, the user interface design is not easy to use, no email triggering, no auto keeps track of pogo pin counter due.

Based on the feedback, the idea of the Final Year Project is to duplicate the functionality of Intel's existing proprietary SIMS tool web-based application to

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SIMS tool stand-alone simulation software and added desired enhancements in some key areas in order to improve the existing SIMS tool to be more effective.

1.1.2 Project Description

SIMS tool stands for Spare Parts Inventory Management System. Actually the develop SIMS tool is a stand alone software that contains Tester Interface Units (TIU) module tracking system. The SIMS tool consists of five main modules:

1) Transaction - perform basic check in, check out, routine maintenance (RM) and repair of TIU.
2) Search - search TIU information by transaction and inventory.
3) Super user Login - accessible only to super users. From there, the users can add/update/delete user, add/update/delete supplier, and add/update/delete TIU and print barcode for TIU.
4) Barcode Printing – print out barcode sticker for the new TIU using the printer.
5) Generate Report – generate out the transactions report to be printed using report wizard.

There are some proposed key features of the system to solve the problems that occurred in the existing SIMS web-based application:

1) Capture every transaction operations such as check in, check out, RM (Routine Maintenance) and Repair.
2) Search by transaction and inventory.
3) Super user login for database administration such as add/ update/ delete of users, suppliers and products as well as barcode printing.
4) Email triggering to notify staffs or suppliers to replenish items.
5) Display interactive graph as an indication for product inventory.
6) Auto keeps track of the pogo pin counter due.

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7) Integrate barcode printing portion into the stand-alone software.
8) Generate out the transaction report to be printed out using report wizard.
9) Telephony function that enable super user to call the supplier directly without using the phone but using modem and microphone to communicate.

The inventory modules are designed to provide up-to-date information to Intel Corporation in order to improve decision making, reduce inventory levels, and maintain tight operating and auditing controls over its operation. These modules allow the manufacturing to plan effectively for future purchases by analyzing problem areas.

1.2 Problem Statement

During the implementation of the Spare Parts Inventory Management System (SIMS) web-based application, the training session has been provided to the users. Among the feedback, the speed of network at the production floor is slow estimated around five mega byte per second. The SIMS web-based application is not a stand-alone software application; it needs to connect to the server. Therefore, the application is slow to load the Active Server Pages (ASP) pages to run the transaction operations. In addition to that, the speed of network is slow at the production floor has also become the issue of inefficiency in processing the transaction operations.

There is no email triggering to notify staffs or suppliers to replenish the items in the existing SIMS web-based application. When the stock inventory has been checked, there will be issue lack of stock when the device owner does not replenish

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the items. The lack of stock will certainly affect the productivity and the cost savings.

The SIMS web-based application need to add auto keep track of pogo pin counter due feature. When the pogo pin counter due has reached 150000 units, it indicated that the specific item needs to change the pogo pin. If the pogo pin counter due has more than 150000 units without any knowledge, the items will easily encounter components damaged issue. Damaged components definitely will cause the machine down and affect the productivity as well.

When the new items have been transferred into the production floor, they need to have the barcode sticker as their unique product name. This barcode ID will make the transaction operations more effective. However, the barcode printing portion is not integrated into the web-based application. The printing barcode function needs additional software to support. This has caused inefficiency of printing the barcode.

1.3 Objective

The goal of the SIMS tool will be developed to automate the spare part for Tester Interface Units (TIU) tracking process at Intel Corporation manufacturing production floor.

The main objective of the SIMS tool implementation is to set up one TIU central location with Personal Computer database to manage issuing, returning, maintaining and close monitoring of all the TIU. This will assist the TIU handling process in improving control of spare parts used in preventive maintenance, no

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damage to components and cost saving. The software application also will ensure the entire TIU get proper repair to reduce the risk of TIU components damage.

Actually, the SIMS tool is to prevent unnecessary down time and man hour to repair when spare part such as TIU not available issue. This develop software is used to achieve zero missing TIU and it will certainly save a lot of expense as one TIU costs amount of money around RM38000. Therefore, the system will automatically report to personnel in charge when the TIU trigger duration is reached. It has become an automated reporting tool for managers and paperless recording system.

There are some proposed key features of the system added into the develop software. The purpose of the added key features will be developed to replace the existing SIMS tool web-based application due to the less effective of the transaction operations.

1.4 Scopes

Manufacturing today is becoming increasingly competitive. Production processes have been squeezed for the last pound per hour, for one more component per shift. The production equipment itself is one of the few remaining areas in plant operation where significant gains can be made.

To maintain the manufacturing leadership, it is necessary to move from a defensive strategy of maintaining the status quo to a proactive, aggressive plan to improve plant reliability and capacity. Therefore, the Spare Parts Inventory

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