

**THE REQUIREMENT MODEL OF PLOUGHING INCENTIVE INFORMATION
SYSTEM**

A project submitted to the Dean of Postgraduate Studies and Research in partial
fulfilment of the requirement for the degree
Master of Science of Information Technology
Universiti Utara Malaysia

By
Norfazlin Rashid

Copyright © 2012 Norfazlin Rashid. All rights reserved

**DEAN OF AWANG HAD SALLEH GRADUATE SCHOOL
OF ARTS AND SCIENCES**

PERMISSION TO USE

In presenting this project in partial fulfilment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this project in any manner in whole or in part, for scholarly purposes may be granted by my supervisor, or in their absence, by the Dean of Awang Had Salleh Graduate School of Arts and Sciences. It is understood that any copying or publication or use of this project or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my project.

Requests for permission to copy or to make other use of materials in this project, in whole or in part, should be addressed to

Dean of Awang Had Salleh Graduate School
of Arts and Sciences
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman
Malaysia

ABSTRAK

Kajian ini bertujuan untuk mencadangkan sebuah model keperluan yang boleh dijadikan sebagai asas untuk membangunkan sebuah sistem maklumat penerima insentif bajak. Insentif bajak merupakan bantuan yang diberi oleh Kerajaan Malaysia kepada pesawah bagi meringankan tanggungan kos penyediaan atau pembajakan sawah. Pengagihan insentif ini dilaksanakan oleh Badan Pembangunan Pertanian Muda (MADA) dan jentera-jenteranya iaitu Pertubuhan Peladang Kawasan (PPK). Pesawah-pesawah akan diberikan kupon bagi setiap lot tanah yang layak mendapat insentif. Kerja-kerja membajak hanya boleh dilakukan oleh penyedia perkhidmatan atau pemilik traktor yang berdaftar dengan PPK. Kerja-kerja akan diatur oleh PPK, tetapi bayaran akan diberi terus kepada pemilik traktor oleh MADA berdasarkan laporan tuntutan yang disediakan oleh PPK. Penyediaan laporan yang dilakukan secara manual adalah lambat dan renyah, dan seringkali menyebabkan timbulnya masalah seperti lewat pembayaran dan maklumat yang tertinggal. Justeru, sebuah sistem maklumat secara berkomputer perlu dibangunkan bagi mengatasi masalah tersebut. Oleh kerana belum ada sebuah sistem berkomputer sebegini, maka keperluan sistem tersebut perlu disediakan terlebih dahulu. Keperluan ini akan dikenalpasti daripada pengguna di sebuah PPK di Kedah melalui analisis dokumen dan temuramah. Akhirnya, sebuah model keperluan yang mempunyai dua aktor dan 17 *use case* dihasilkan dan disahkan oleh pengguna menggunakan prototaip dan skrip ujian.

ABSTRACT

The aim of this study is to propose a requirement model that serves as a basis in developing a system to manage ploughing incentive recipients' information. Ploughing incentive is given by the Malaysian Government to paddy growers to help ease the cost of land preparation or ploughing. The distribution of incentive is done via agencies such as Muda Agricultural Development Authority (MADA) and its mechanism which are the district farmers association or Pertubuhan Peladang Kawasan (PPK). Eligible farmers would be given coupons for each of their land plots that are entitled to receive the incentive. Ploughing work can only be done by registered ploughing service providers which are in effect tractor owners. The assignment of ploughing work is done by the PPK. MADA would then disburse payment of the incentive directly to the tractor owners based on the claims and reports furnished by PPKs. The current manual practice of reporting provides the opportunity of issues such as late payment and omission. A computerized system that would cater the information of ploughing incentive receivers would be the answer to such problem. Since there is currently no such system, a requirement model will be produced which will then be a blueprint in developing the system. The requirement of the system will be gathered from one PPK in Kedah through observation, document analysis and interviews. Finally, the requirement model which comprises of two actors and 17 use cases is validated by users using a prototype and test scripts.

ACKNOWLEDGMENT

In the name of Allah, the Most Gracious and the Most Merciful. Peace be upon His beloved Prophet Muhammad (S.A.W) and his family.

All praises to Allah, with His grace and benevolence, this project is finally completed. I would like to extend my gratitude to all the people who have given me support and enlightenment, throughout the journey of my studies. First and foremost, to my dear family: Hizam Abdul Sukor, whose loving support makes it possible for me strive while being a student, a mother, a wife and holding a job; My parents, who eternally have me in their prayers; My parents-in-law who are always there to care for my three darlings in all those times of absence.

I am also extremely grateful to my supervisor, Dr Mohd Syazwan Abdullah, for his continuous insights, guidance and thoughtfulness given in completing this project. This project would also be meaningless without the cooperation of all the staff in PPK Sanglang, especially Mr. Asynurulhisham Abdul Razak, Ms. Yati Yusuf, Busra Abu Bakar dan Yang Baizura Yusoff who are ever so willing to assist and provide feedback for this project. Thank you so much.

Finally, thank you to all my friends, colleagues and lecturers who have been very helpful during my days of study, directly or not. May all of us be granted a marvellous life, here and in the Akhirat.

Norfazlin Rashid

January 30, 2012.

TABLE OF CONTENTS

PERMISSION TO USE	ii
ABSTRAK.....	iii
ABSTRACT.....	iv
ACKNOWLEDGMENT.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS.....	xii
CHAPTER ONE INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	4
1.3 Research Questions	5
1.4 Project Objectives	5
1.5 Scope of Project	5
CHAPTER TWO LITERATURE REVIEW	7
2.1 Overview of Requirement Model Development	7
2.2 Existing work on agricultural information system.....	8
2.2.1 The Management of Public Sector Record Project (MPSR)	8
2.2.2 Agricultural Information Application System (SAMP).....	9
2.2.3 Agro-investment Application and Information System (SIAPP)	10
2.2.4 Kenyan Agricultural Knowledge and Information System (AKIS)	11
2.2.5 Indian Agriculture Information System Network Project (AGRISNET)	12
2.3 Summary	13
CHAPTER THREE PROJECT METHODOLOGY	14
3.1 Proposal Phase.....	14
3.2 Planning Phase	15
3.2.1 Document analysis	15
3.2.2 Interviews.....	16
3.2.3 Object-oriented approach to model requirement	16
3.3 Execution Phase	17

3.4	Validation Phase.....	18
3.5	Summary	19
CHAPTER FOUR FINDINGS AND RESULTS		20
4.1	Introduction	20
4.2	User Requirement List	21
4.3	Use Case Diagram.....	22
4.3.1	Actors.....	23
4.4	Use Case Specifications	23
4.5	Sequence Diagram.....	24
4.6	COLLABORATION DIAGRAM.....	39
4.7	SUMMARY	52
CHAPTER FIVE VALIDATING THE REQUIREMENTS.....		53
5.1	Introduction	53
5.2	System Prototype.....	53
5.2.1	Prototype Interface.....	54
5.3	Test Scripts.....	63
5.3.1	Test Script for System Administrators.....	63
5.3.2	Test Script for Clerks	66
5.4	Summary	68
CHAPTER SIX CONCLUSION AND RECOMMENDATION		69
6.1	Research Contribution.....	69
6.2	Challenges and Limitations	70
6.3	Future Work	70
REFERENCES		71
APPENDIX A Use Case Specifications		75
APPENDIX B Project Gantt Chart		93
APPENDIX C User Test Scripts.....		95

LIST OF TABLES

<u>Table No.</u>	<u>Name of Table</u>	<u>Page</u>
4.1	User requirement list of Ploughing Incentive Information System	21
4.2	List of Use Case Specifications	24
5.1	Test Script for System Administrator – Login	63
5.2	Test Script for System Administrator – Manage System Users and Company’s Profile	64
5.3	Test Script for System Administrator – Manage Tractor Providers, Assign Work, View Report and Logout.....	64
5.4	Test Script for Clerks.....	66

LIST OF FIGURES

<u>Figure No.</u>	<u>Name of Figure</u>	<u>Page</u>
1.1	Parties involved in implementing the ploughing incentives	2
2.1	Login page of SAMP	10
2.2	Login page of SIAPP	11
3.1	Phases of project methodology	14
4.1	Use Case Diagram	22
4.2	Sequence Diagram for Use Case Login Basic Flow	25
4.3	Sequence Diagram for Cancel Login	25
4.4	Sequence Diagram for Username and Password does not match	26
4.5	Sequence Diagram for Basic Flow of Use Case Manage System users	27
4.6	Sequence Diagram for Use Case Manage System Users: Delete User	28
4.7	Sequence Diagram for Use Case Manage System User : Reset Password	29
4.8	Sequence Diagram for Manage System User: Cancel Operation	30
4.9	Sequence Diagram for Viewing and Editing Company's Profile	31
4.10	Sequence Diagram for Use Case Manage Company's Profile: Mandatory Field is Empty	32
4.11	Sequence Diagram for Basic Flow of Managing Tractor Providers	33
4.12	Sequence Diagram for Use Case Manage Tractor Providers: Delete Tractor Provider	34
4.13	Sequence Diagram for Editing Tractor Provider details	35
4.14	Sequence Diagram for Use Case Assign Ploughing Work – Basic Flow	36
4.15	Sequence Diagram for Deleting Work Assignment	37
4.16	Sequence Diagram for Use Case View Reports Basic Flow	38
4.17	Sequence Diagram for Use Case Log Out: Basic Flow	39
4.18	Collaboration Diagram for Use Case Login Basic Flow	40
4.19	Collaboration Diagram for Cancelling Login	40

4.20	Collaboration Diagram for Username and Password Not Match	41
4.21	Collaboration Diagram for Use Case Manage System Users: Basic Flow	42
4.22	Collaboration Diagram for Use Case manage System Users: Delete Users	43
4.23	Collaboration Diagram for Use Case Manage System User: Reset User's Password	44
4.24	Collaboration Diagram for Use Case Manage System User: Cancel Operation	44
4.25	Collaboration Diagram for Use Case Manage Company's Profile Basic Flow and Edit Profile	45
4.26	Collaboration Diagram for Use Case Manage Company's Profile: Exception Flow Mandatory Field is Empty	46
4.27	Collaboration Diagram for Use Case Manage Tractor Provider: Basic Flow	47
4.28	Collaboration Diagram for Use Case Manage Tractor Provider: Delete Tractor Provider	48
4.29	Collaboration Diagram for Use Case Manage Tractor Provider: Edit Tractor Provider	49
4.30	Collaboration Diagram for Use Case Assign Ploughing Work: basic Flow	50
4.31	Collaboration Diagram for Use Case View Assign Ploughing Work: Alternative Flow A1 Delete Work Assignment	51
4.32	Collaboration Diagram for Use Case Log Out	51
4.33	Collaboration Diagram for Use Case View Reports: Basic Flow	52
5.1	Login Form	54
5.2	Username and password does not match	54
5.3	Main Page after Login	54
5.4	Add New Tractor Provider	55
5.5	List of Registered Tractor Owner	56
5.6	Details of Tractor Owner	56
5.7	Deleting a tractor Owner.....	57
5.8	List of Available Work Assignments.....	58
5.9	One Work Assignment (Form 4)	58
5.10	Print Preview of Form 4.....	59
5.11	List of Work Assignments of a Tractor Owner (Form 5a)	59
5.12	Print Preview of Form 5a.....	60
5.13	Summary of Work of All Tractor Providers (Form 5b)	60

5.14 Summary of Work of All Tractor Providers (Form 5b)
 Print Preview 61

5.15 Deleting a Work Assignment..... 62

5.16 Manage Company’s Profile 62

LIST OF ABBREVIATIONS

AGRISNET	Indian Agriculture Information System Network Project
AKIS	Kenyan Agricultural Knowledge and Information System
IC	Identity Card
KADA	Kemubu Agricultural Development Authority
LPP	Lembaga Pertubuhan Peladang (Farmers Association Authority)
MADA	Muda Agricultural Development Authority
MoA	Ministry of Agriculture and Agro-based Industry
MPSR	Management of Public Sector Record
OO	Object-Oriented
PIIS	Ploughing Incentive Information System
PPK	Pertubuhan Peladang Kawasan (District Farmers' Association)
SAMP	Agricultural Information Application System (SAMP)
SIAPP	Agro-Investment Application and Information System
UML	Unified Modelling Language
UNDP	United Nation Development Programme

CHAPTER ONE

INTRODUCTION

1.1 Background

Modern governments are utilizing information technology to fulfil their basic duties in better serving the public interest. Although some researchers such as Davenport (1994) and Thornton (2001) say that information technology may not necessarily be beneficial to an organization's performance (as cited in Quintas, 2005), it is a common perception that information technology provides us with the ability to work on large amount of data in less amount of time. This implicitly suggests that incorporating computerized information system will help organizations work better. Using computerized information systems, decisions can be made faster and in many cases, service efficiency is increased, routine tasks are done automatically and data analysis are quicker and more accurate (Roper & Millar, 1999). The International Council of Archives (1997) also stresses the importance of managing government information and record electronically to increase governments' accountability.

Malaysia is also moving towards establishing a modern government. Computerized information system is increasingly used to facilitate services provided to the mass public. Initially conceptualized in 1996 under the Multimedia Super Corridor (MSC), Malaysia is envisioned to be a knowledge-based society by the year 2020. One of the flagships under MSC is the e-Government which aims to transform administrative process and service delivery through the use of ICT. However, not much focus has been given to the agricultural sector yet. As an effort to contribute in this area, this study aims to come up with the requirement model of a system to manage ploughing incentives for paddy farmers.

The contents of
the thesis is for
internal user
only

REFERENCES

- Akotia, P. (1996). *The management of public sector financial records: the implications for good governance*. Retrieved October 31, 2011 from <http://www.acarm.org/documents/financial.pdf>
- Alipour, M., Akhavan, A., & Salehi, M. (2009). An empirical study determinant of successful knowledge management programs: A lesson for Iran. *International Journal of Business and Management*, 4(3), 26 – 35.
- Allee, V. (2001). 12 principles of knowledge management. *American Society for Training and Development*. Retrieved from <http://www.comp.dit.ie/dgordon/Courses/ResearchMethods/Countdown/12Principles.pdf>
- Ambler, S.W. (2005). *The elements of UML 2.0 style*. New York: Cambridge University Press.
- Bahill, A.T, & Henderson, S.J. (2004). Requirements development, verification, and validation exhibited in famous failures. *Wiley Interscience*. Retrieved online on November 30, 2011 from www.interscience.wiley.com, DOI: 10.1002/sys.20017
- Bansal, G.S., Choubey, A.K., Gupta, M.B. & Bansal, D. (2007). *Agricultural Resources Information System (AgRIS) – A Step Towards e-Agriculture in Haryana*. India.
- Blaha, M. & Rumbaugh, J. (2005). *Object-oriented modeling and design with UML*. New Jersey: Pearson Prentice Hall.
- Cain, P. & Millar, L (1996). *The implications of electronic records. Proceedings of Making the Transition to the Electronic Age: Information as a Strategic Resource for Good Government*. Nairobi, Kenya. Retrieved online on November 2, 2011 from <http://www.acarm.org/documents/implications.pdf>
- Chonoles, M.J. & Schardt, J. A. (2003). *UML 2 for dummies*. New Jersey: Wiley Publishing.
- Cornwell Management Consultants (2001). *Model requirements for management of electronic records (moreq)*. Retrieved on 27 September 2010 from <http://www.cornwell.co.uk/moreq.pdf>
- Grady, J.O. (2006). *System Requirements Analysis*. California: Elsevier Inc.
- Hay, D.C. (2003). *Requirements analysis: from business views to architecture*. New Jersey: Prentice Hall.

- Heitmeyer, C.L. (2007). Formal methods for specifying, validating and verifying requirements. *Journal of Universal Computer Science*,(13)(5), 607 – 618, Retrieved online on December 2, 2011 from <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA480106>
- Hull, E., Jackson, K. & Dick, J. (2011). *Requirements Engineering*, 3rd Ed. London: Springer-Verlag
- Indian Department of Agriculture, The (2007). *Brief Note on Agrisnet*. Retrieved October 2011 from <http://agricoop.nic.in/PolicyIncentives/BRIEF%20NOTE%20ON%20AGRISNET.htm>
- International Council on Archives, The (1997). *The Management of Public Sector Records in Developing Countries*. Paris, France.
- Kendall, K.E. & Kendall, J.E. (2008). *Systems Analysis and Design*, 7th Ed. New Jersey: Pearson Prentice Hall.
- Kimmel, P. (2005). *UML demystified*. California: McGraw Hill Osborne Media.
- Kotonya, G. & Sommerville, I. (1998). *Requirements engineering: processes and techniques*. Michigan: John Wiley & Sons.
- Macaulay, L. (1996). *Requirements engineering*. London: Springer.
- Lamsweerde, A.V. (2009). *Requirements Engineering: From System Goals to UML Models to Software Specifications*. West Sussex, England: John Wiley.
- Laucopolos, T. & Karakostas, V. (1995). *System requirement's engineering*. Berkshire, UK: McGraw-Hill Book Co.
- Laudon, K. & Laudon, J. (2008). *Management information system: Managing the digital firm* (11th ed.). New Jersey: Prentice Hall.
- Lecky-Thompson, G. (2005). *Corporate software project management*. Charles River Media. Available from UUM ebrary repository.
- Leithbridge, T & Laganieri, R. (2001). *Object-oriented software engineering practical software development using uml and java*. England: McGraw Education.
- Lembaga Pertubuhan Peladang (2008). *Manual pelaksanaan insentif pengeluaran padi (bantuan input pertanian)*. Retrieved on 20 June, 2011 from http://www.lpp.gov.my/html/themes/moa_lpp/pdf%20files/panduan/MPIPP%20%28BIP%29%20x.pdf

- Malaysian Ministry of Agriculture And Agro-based Industry. (2010). Sistem Aplikasi Maklumat Pertanian(SAMP). In the Official Web Portal of the Malaysian Ministry of Agriculture. Retrieved October 30, 2011, from <http://www.moa.gov.my/web/guest/samp>.
- Malaysian Ministry of Agriculture And Agro-based Industry. (2011). Sistem Informasi dan Aplikasi Pelaburan Pertanian. In Sistem Informasi dan Aplikasi Pelaburan Pertanian. Retrieved October 30, 2011, from <http://siapp.moa.gov.my/user/login>.
- Miles, R. & Hamilton, K. (2006). *Learning UML 2.0*. California: O'Reilly Media.
- Miller, R. (2003). Practical UML: a hands-on introduction for developers. In *Embarcadero Developer Network*. Retrieved October 30, 2011, from <http://edn.embarcadero.com/article/31863>
- Munyua, H. & Stilwell, C. (2010). A mixed qualitative-quantitative-participatory methodology: A study of the agricultural knowledge and information system (AKIS) of small-scale farmers in Kirinyaga district, Kenya. *Library Management*, (31), p 5 – 18
- OneWorld Foundation India (2011). *Agrisnet – information network for farmers: documentation of best practice*. Retrieved November 2, 2011 from http://indiagovernance.gov.in/download.php?filename=files/Agrisnet_final.pdf
- Quintas, P., Lefrere, P. & Jones, G. (1997). Knowledge management: A strategic agenda. *Long ranging planning*, 30(3), 385 – 391. Great Britain: Elsevier Science Ltd.
- Quintas, P. (2005). The nature and dimensions of knowledge management. in Anumba, C.J., Egbu, C., & Carrillo, P., *Knowledge Management in Construction*. Blackwell Publishing Ltd.
- Rees, David., et. al. (2000). *Agricultural knowledge and information systems in Kenya – implications for technology dissemination and development*. London: Agricultural Research and Extension Network Paper.
- Roper, M. & Millar, L, ed. (1999). *Managing public sector records: a study programme*. London: International Records Management Trust.
- Rosenberg, D. And Stephens, M. (2007). *Use-case driven object modeling with UML: theory and practice*. New York: Springer.

- Sanginga, P.C., Waters-Bayer, A. & Kaaria, S. (2009). *Innovation Africa: enriching farmers' livelihood*. London: Earthscan Dustan House
- Scherpenzeel, R. (1996). Key issues in introducing information technology in criminal justice: united nations assistance to member states. *United Nations crime and justice information network: providing information to and from developing countries, A Resource Book*. Retrieved on September 10, 2011 from <http://www.uncjin.org/Other/korebo/chapter3.pdf>
- Skyrme, D. J. (2002). *Knowledge Management: Approaches and policies*. Retrieved from http://www.providersedge.com/docs/km_articles/KM_-_Approaches_and_Policies.pdf
- Sommerville, I. (2001). *Software Engineering* (6th ed.). Harlow, England: Addison-Wesley.
- Sommerville, I. & Sawyer, P. (1997). *Requirements engineering: a good practice guide*. London: John Wiley & Sons.
- Tamilnadu Department of Agriculture (2009). AgrisNet Website. Retrieved October 30, 2011, from <http://www.tnagrisnet.tn.gov.in/website/index.php>
- Times of India, the (2011, July 25). AGRISNET to empower farmers. Retrieved November 2, 2011 from http://articles.timesofindia.indiatimes.com/2011-04-25/india/29470937_1_portal-e-governance-initiative-farmers
- Whitten, J.L., Betley, L.D. & Diltman, D.C. (2001). *System analysis and design method*. Boston: McGraw Hill Education.
- Zhang, J. & Wang, Z. (1999). NDHORM: an OO approach to requirement modeling. *ACM SIGSOFT Software Engineering Notes*. 21 (5), 65 – 69.