**UNIVERSITY OF HERTFORDSHIRE**

**Faculty of Engineering and Information Sciences**

**Modular MSc Honours in Computer Science (Software Engineering)**

**7WCM0031 Software Engineering MSc Project (Online)**

**Final Project Report**

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***Development of a distributed data and document management system for ‘MSc Properties’***

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Abstract

Acknowledgements

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1. Introduction
   1. Introduction to the project

For my MSc Computer Science Dissertation (Software Engineering), I decided to solve the problem of data and document management through the implementation of a distributed system for a fictional estate agent called ‘MSc Properties’.

The reason for me undertaking this project is that there is an ever increasing demand for private rented accommodation due to changes in the social housing market, social benefits offered, and unemployment rates, resulting in less social housing being available and reduced benefits for people on a low income, who would normally need to make use of social housing and/or benefits offered by the government.

* + 1. **Report Structure**

During this report I will document the problem background in more detail, looking at the different factors that contribute to the problem identified, and then document the aim and objectives of my project.

I will then document the research and literature review I carried out in order for me to identify the different software engineering techniques and technologies available to solve the problem.

I will then go on to document the design of the distributed system, outlining the different software engineering techniques and how these were used to enable me to structure and manage the project, and just as importantly allow me to produce diagrams that virtualized the structure, behaviour and interaction of the distributed system.

Furthermore, I will document the implementation and testing of the distributed system, explaining which techniques and technologies I chose, and why they were the best solution for this project, given the available resources. I will then go on to provide an analysis of the test results to draw some conclusions on the validity of the software produced.

Lastly I will document my evaluation of the project as a whole, outlining what went well, what didn’t go so well, and what I would do different if I was to do the project again. I will then go on to stating whether or not I have successfully achieved the project aim and objectives.

* 1. Project Aim

The aim of this project is to tackle the issues of data and document sharing across the Internet by developing a distributed data and document management system for a fictional estate agent called ‘MSc Properties’.

The distributed system should allow ‘MSc Properties’ to share business data and documents across the Internet, whilst providing data security and integrity. ‘MSc Properties’ requires the distributed system to be maintainable, dependable and usable, which means I will explore the different techniques that support program specification, design, validation and evolution of software.

* 1. Project Objectives
     1. Core Objectives
     2. Advanced Objectives
  2. Project Background

‘MSc Properties’ is a fictional estate agent with a number of sites nationwide across England. Due to the current unemployment rates and recent legislation changes resulting in local councils being able to house homeless families outside of the local borough [25] and benefit caps [23] meaning families have to move out of their local borough due to not being able to afford local rents [25], ‘MSc Properties’ require the need to be able to transfer customers between sites, meaning the transfer of data across sites that could be 100’s of miles apart.

‘MSc’ Properties currently have a paper filing system, where customers and/or the landlords of properties fill out an application form to request a service from ‘MSc Properties’. Customers will have to provide their personal information, along with the properties they have an interest in letting. Landlords will have to provide their personal information, along with the property information for the property they would like managed. Part of the landlord/customer sign up process is to bring in a number of documents confirming their information, and once customers have agreed on a property to let, and once ‘MSc Properties’ have agreed to manage a property for a landlord, contracts will be drawn up and signed respectively and all documents stored on file.

‘MSc Properties’ currently advertise their property portfolio through pictures in their store windows for properties for that area, and store managers carry out a revenue monitoring exercise each month, going through each file for the store and carrying out budget monitoring and cash flow forecasting, along with reports for the months business activity. Also there is a staff hierarchy within ‘MSc Properties’ where specific tasks and responsibilities are assigned to certain staff roles meaning that not all staff can carry out each task due to privileges.

For this project I am going to develop a distributed system for ‘MSc Properties’ to create and manage their property portfolio and their customer accounts, as well as creating and managing both tenancies and rent accounts. This means that data can be stored on a server or locally and all the different sites of ‘MSc Properties’ will be able to access this data. The system will have a login facility to provide restricted access for users, and will also allow managers of ‘MSc Properties’ stores to manage their employee accounts. The system will also allow ‘MSc Properties’ managers to report on business data.

NEED TO EXPAND ON MY BACKGROUND TO ENSURE I HAVE ALL OF THE BACKGROUND INFO WHICH I AM GOING TO REFER BACK TO WITHIN MY DESIGN, IMPLEMENTATION AND CONCULSION.

* 1. Literature Review

As previously outlined, I will now document the literature review I undertook to allow me to understand the different options available to me to enable me to successfully achieve the project aim and objectives.

* + 1. **Design Methodologies**
       1. **Software Development Approach**
       2. **Design Patterns**
    2. **Development Methodologies**
       1. **Networking**
    3. **Testing Methodologies**
  1. Project Plan

As this is a large project, it is very important that I plan, monitor and manage the project smoothly from start to finish. I have used a Gantt chart, which provides a graphical illustration of the schedule of the project, broken down by project objectives, with completion dates for each objective, which will help me track the activities in the project and make changes to work being carried out if necessary. This tool will be used to manage my time and allow me to stay on schedule as there is a lot of tasks that need to be completed in a limited time frame. This is outlined in a software management article [5], where the article identifies “a recent update of the Chaos Report from the Standish Group, outlines a recipe for success that includes 10 items. The first three items are executive support, user involvement, and experienced project management.”, so project management is one of the 3 key factors to successful projects.

My project Gantt chart is below:

ADD GANTT CHART

I am now going to explain how the project objectives will be completed by the project deadline date of 11 Jan 2015.

1. Write a project document outlining the details of the project, defining project objectives, scope, risks and approaches. I can constantly refer to this document to ensure the project progresses in the correct direction.
2. Write a work plan outlining the project objectives, with deadlines for each objective.
3. Define relevant resources for the project, outlining decisions made on technology, equipment and software applications to use, ensuring that I have tested equipment and software applications, and am competent with the use of the selected technologies, prior to the start of the development.
4. Keep an eye on the project plan ensuring that objectives do not overrun past their completion date.
5. Stay vigilant and alert for early warning signs of problems occurring in the project that could result in the project being delayed and not meeting project deadlines.
6. Safeguard against my project creeping outside of scope, so as new requirements are introduced during the development process, I should ensure these are all still within available resources and overall aims of the project.
7. Manage risks as the project progresses, and as new risks unfold, evaluate them to ensure they do not cause a major problem to the project.
8. Keep my project supervisor informed of any major problems occurring during the project, and seek advice where necessary, to resolve major problems as early as possible.
   1. Relevance to target award

Software Engineering is defined by Ian Sommerville as an engineering discipline concerned with all aspects of software production (specification, development, validation and evolution), and goes on to say it is concerned with the practicalities of developing and delivering useful software [1].

My project aim is to develop a distributed data and document management system, and to do this I had to explore the different software engineering techniques and decide which are best suited to tackling the software engineering task, and then develop and implement a piece of software that successfully meets the aim and objectives of the project.

This means the work I am planning to do during this project fits in with my target award MSc Computer Science (Software Engineering), because I will be applying software engineering models I have studied during my course such as agile to my software development. I will also be applying software engineering methodology I have studied during my course such as Inheritance and Interfaces to my software development. I will also be applying the software engineering tools I have studied during my course such as unified modelling language (UML) to my software development. Lastly I will be applying metrics such as cohesion, coupling, bugs etc. to my software development. By me exploring and applying these different software engineering techniques it will allow me to deliver useful software to ‘MSc Properties’ which in essence is Software Engineering.

* 1. Project Deliverables
  2. Ethics Approval

Ethics Approval is when a committee of University of Hertfordshire staff approve “any student undertaking a study involving the use of human participants which is undertaken as part of a programme of work for which the University of Hertfordshire is responsible for” [25].

My project will not require ethics approval because I am not undertaking research that involves collecting data from human participants, and although my system will store business data which includes personal information, I will use dummy information which replicates the personal information throughout the development.

1. Design
   1. Introduction
   2. Software Lifecycle
   3. Modelling System Behaviour
      1. Use Case Diagrams
      2. Data Flow Diagrams
      3. Class Diagram
      4. Enhanced Entity Relationship Diagram
      5. Sequence Diagrams
      6. Storyboard
2. Implementation
   1. Introduction