**Aim**

Distributed System for ‘MSc Properties’.

Develop and implement a distributed system for MSc Properties to manage their business data and meets the required functionality and performance desired by MSc Properties, and ensuring it is maintainable, dependable, and usable.

* Explore the different techniques that support program specification, design, validation and evolution of software

Word Count = 53

**Objectives**

**Core Objectives**

Complete a literature search and literature review of existing data management systems, identifying where possible the software engineering models, methodologies, tools and metrics used in the development process by week 9 of my project.

Set out ‘MSc Properties’ functional and non-functional requirements for the proposed development within the requirements document and have signed off by week 11 of my project.

Develop a suitable data management system model that meets the requirements defined by ‘MSc Properties’ model for ‘MSc Properties’ to manage its business data, and have signed off by week 17 of my project.

Write test scripts to test the implementation of the data management system for ‘MSc Properties’ distributed system outlined in the development model, and have signed off by week 19 of my project.

Develop a suitable search facility so ‘MSc Properties’ can search for information stored in the ‘MSc Properties’ database, and should be implemented by week 24 of my project.

Develop reporting functionality so ‘MSc Properties’ senior members of staff can report on business performance indicators (void period for properties, profit/loss for properties, etc.), allowing reports to be produced and should be implemented by week 24 of my project.

Develop a log in facility so ‘MSc Properties’ users (Employees, Customers and Suppliers) can log in to the distributed system, allowing for limited access to ‘MSc Properties’ system for users who have been granted limited access, and prevent unauthorised access and should be implemented by week 26 of my project.

Evaluate the data management system using the test scripts created, ensuring the test results are above the acceptable failure rate defined in the requirements and have signed off by week 35 of my project.

Complete the final project report to detail the entire project development and outline what went well and what could have been done better during the development, and submit to ‘MSc Properties’ by 11th January 2016.

**Advanced Objectives**

Develop a website to advertise ‘MSc Properties’ property portfolio to potential customers. ‘MSc Properties’ members of staff will be able to amend the properties being advertised and customers will be able to register and submit interest for a property through the website. This should be implemented by week 25 of my project.

‘MSc Properties’ would like a website to advertise their letting service for potential suppliers, so ‘MSc Properties’ members of staff will be able to update the services provided and suppliers will be able to register and submit properties they would like ‘MSc Properties’ to manage on their behalf. This should be implemented by week 25of my project.

‘MSc Properties’ would like a document management system that allows for documents (Customers ID, Suppliers lease contracts, tenancy agreements etc.) to be stored electronically, so ‘MSc Properties’ members of staff can view these documents from any computer that has access to the ‘MSc Properties’ system. This should be implemented by week 30 of my project.

‘MSc Properties’ would like a reset password facility, so ‘MSc Properties’ users are able to reset their password if they have forgotten it allowing users to establish access to the ‘MSc Properties’ system. This should be implemented by week 30 of my project.

Word Count = 524

**Background**

‘MSc Properties’ is a fictional estate agent with a number of sites nationwide across England. Due to recent legislation changes resulting in local councils being able to house homeless families outside of the local borough and welfare caps in benefits meaning families are having to move out of their local borough due to not being able to afford local rents, ‘MSc Properties’ has required the need to be able to transfer customers from one site to another site, meaning the transfer of data across sites that could be 100’s of miles apart. For my MSc dissertation I am going to develop a distributed system that allows employees of ‘MSc Properties’ to create and manage the property portfolio and the customer accounts for the business, as well as creating and managing both tenancies and rent accounts for ‘MSc Properties’, meaning 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 also allow managers of the ‘MSc Properties’ sites to manage their employee accounts from their own site, and will have a login facility, which will work across all the different sites of ‘MSc Properties’.

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Word Count = 202 – Needs to be between 300 and 500 words (403)

**Methods/Methodology**

To assist me in designing the distributed system, I’m going to use the unified modelling language (UML) to develop diagrams which will allow me to virtualize the design of the structure, behaviour and interaction of the distributed system. When designing the distributed system I’m going to use programming techniques to ensure my program has high cohesion, strong encapsulation, and low coupling. This means the components in my program will be designed to match a well-defined idea, the related components in my program will be kept together in one place and the encapsulated component will be insulated from the outside world using techniques such as interfaces and abstract classes, and lastly components will be as less dependent on each other as possible.

For the implementation of the distributed system, I will use more programming techniques such as sockets or remote method invocation (RMI), this will allow me to develop a distributed system that can communicate between hosts and a server on the same or different networks. I will also use Java GUI frameworks such as AWT and Swing to develop the Java interface. I will also use JDBC or ORM to provide a common interface (API) to the MySQL database, allowing the distributed system to interact with the database. During the development I will use a concurrent version system to track the evolution of files in the development, allowing me to keep track of updates made and a rollback facility to go back to a previous working version if necessary.

For the testing of my program source code I am going to use a number of testing strategies to ensure my program developed has no faults or errors at runtime and the program works as set out by the requirements. I am going to do unit testing using the white box testing strategy as this will allow me to test individual components as a single to ensure each of these work alone and find defects with my program source code as early as possible in the development. White box testing will mean the test script developers know how the source code is written so will mean they can write strict tests that the units must pass using boundary values to test the system and get the best results. I am also going to do integration testing and system testing using the black box testing strategy as this will allow me to take the individual components of my program tested in the unit tests and test them as a group to ensure the components of my program work together as intended. Black box testing will mean the test script developers do not know how the source code is written so test scripts will be developed on the basis of the project requirements and therefore if the programmer has got the logic incorrect but the system works, these tests will identify if the system conforms to the actual requirements. To allow me to control the execution of my tests and compare actual outcomes against predicted outcomes, I am going to use a bug tracking and testing tool.

Word count = 515 – Needs to be between 300 and 500 words

**Project Plan**

As this is a large project consisting of the development of a piece of software, it is very important that I plan, monitor, manage, and control the project smoothly from start to finish. I have used a fundamental planning tool called 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 to 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 [6], 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.

Gantt chart here

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

1. I will write a project document outlining the details of the project, which will define the project objectives, scope, risks and approaches, which I can constantly refer to, to allow the project to continue in the correct direction.
2. I will write a work plan outlining the project objectives, with deadlines for each objective.
3. I will define relevant resources for the project, outlining decisions made on technology (methods and methodologies), 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 development work.
4. I will keep an eye on the project plan ensuring that objectives do not overrun past their competition date.
5. I will 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 the project deadlines. Examples of warning signs are the quality of work reducing or demotivation.
6. I will safe guard against my project creeping outside of scope, so as new requirements are introduced during the development process, I need to ensure these are all still within available resources and overall aims of the project.
7. I will manage risks as the project goes through the development process, and as new risks unfold, I will evaluate these risks to ensure they do not cause a major problem to the project.
8. I will keep project supervisor informed of any major problems occurring during the project, and seek advice where necessary, to resolve major problems as early as possible.

Word count = 472

**Relation to target Award (Software Engineering)**

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 explore the different software engineering techniques and decide which are best suited to tackling a software engineering task set out by MSc Properties, and then develop and implement a piece of software that successfully meets the requirements of MSc Properties outlined in the task.

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 the software engineering models I have studied during my course such as the waterfall model and 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.

Word count = 236

**Required resources and skills**

**Hardware**

* Operating System – Windows, Solaris, Linux or OS X;
* Processor – Intel® Core™ i5-4288U CPU @ 2.60GHz (or similar);
* Memory – 8.00 GB (or similar)

**Software**

* Platform – Windows XP or higher (or similar);
* A JDK for Java 5 or later
* A Integrated Development Environment (NetBeans or similar)
* A concurrent version system (Git or similar)
* A bug tracking and testing tool (Bugzilla or similar)

**Access**

I will require access to the following:

* MySQL database

**Skills**

* Research skills
* Project management skills
* Report writing skills
* Ability to use Unified Modelling Language to model the distributed system
* Ability to write code in Java, HTML, Java Script, PHP and SQL.
* Ability to implement design patterns such as Observer
* Ability to use frameworks and API’s such as Spring and JRC respectively

I am planning to meet these resource and skill requirements, by ensuring I have the required hardware in pace before development work begins, I will then download the required software resources and test these to ensure they work appropriately. Once I have carried out a literature review of the required skills, methods and methodologies I can employ to meet the project aims and objectives, I will then undertake exercises to ensure that I have understood these methods and methodologies before development work begins and if any problems arise I will seek assistance from my project supervisor to overcome these issues.

Word Count = 227

**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” [6].

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 ‘MSc Properties’ business data which includes personal information, I will use dummy information which replicates the personal information throughout the development of my project.

Word Count = 95

**Bibliography**

1. Ian Sommerville. (2011). Introduction. In: Horton, M. and Hirsch, M. and Goldstein, M. and Holcomb, J. *Software Engineering*. 9th ed. Boston: Pearson. p1-26.
2. University of Hertfordshire. (2015). *Assignment 1 - Project Proposal.*Available: http://assignments.herts.ac.uk/assignmentsV2-war/getAssignmentFile?assID=68036&file=A1\_PP\_Briefing\_1415CA.doc. Last accessed 23rd Jun 2015.
3. University of Hertfordshire. (2015). *Assignment 2 - Extended Project Proposal.* Available: http://assignments.herts.ac.uk/assignmentsV2-war/getAssignmentFile?assID=68038&file=A2-EPP-Briefing-1415CA.doc Last accessed 23rd Jun 2015.
4. University of Hertfordshire. (2015). *Assignment 3 - Interim Progress Report.* Available: http://assignments.herts.ac.uk/assignmentsV2-war/getAssignmentFile?assID=68039&file=A3-IPR-Briefing\_2014-15\_CA.doc Last accessed 23rd Jun 2015.
5. University of Hertfordshire. (2015). *Assignment 4 - Final Project Report.* Available: http://assignments.herts.ac.uk/assignmentsV2-war/getAssignmentFile?assID=68041&file=A4\_FPR\_Briefing\_2014-2015\_CA.doc Last accessed 23rd Jun 2015.
6. Cockburn, A, Highsmith, J and Bohem, B. (2001). Agile Software Development: The Business of Innovation. *Computer*. 1 (1), p131-133