Project Plan

For MVC Reporting Website Framework

(MVC RWF)

Version 1.1

Submitted in partial fulfillment of the Masters of Software Engineering Degree.

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CIS 895 – MSE Project

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Change Log

Version #	Changed By	Release Date	Change Description
1.0	Thaddeus Tuck	3/25/2018	Initial Release
1.1	Thaddeus Tuck	4/15/2018	Schedule Changes for Presentation 1

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1. Test Breakdown

1.1 Project Phases

This project is broken down into three distinct phases: Inception, Elaboration, and Production.

1.1.1 Inception Phase

The inception phase is the initial proposal and documentation phase. In this phase the scope of the project, diagrams, project requirements, project overview, design, risks in the project, and the preliminary project schedule are analyzed before beginning the project development. This proposal is documented in three different documents Vision Plan, Project Plan, and the Software Quality Assurance Plan.

The Vision Plan outlines the scope, purpose, goals, and functional requirements for the project. In this document effort estimation is established and the project schedule is detailed. The Software Quality Assurance Plan will establish the required documentation and effort necessary to ensure a quality final product.

The inception phase is complete when the developer delivers all of the required documentation and a prototype to the supervisory committee, the supervisory committee reviews the delivered items, and approves of the delivered items. The first presentation is given at the end of this phase.

1.1.2 Elaboration Phase

During the elaboration phase the architecture of the project will be finalized into an architectural design plan. All of the documents created for the inception phase will be updated with the input from the supervisory committee from the first presentation. The main objective of this phase is to capture system requirements using OCL diagrams, developing a testing plan, and developing a unit testing project to pair with the MVC Reporting Framework to test each component and the integrated system.

A second prototype will be created during this phase that will expand upon the first prototype and capture the requirements specified by the Vision Plan for demo during the second presentation. In addition, this prototype will demonstrate any features that are requested by the supervisory committee during the first presentation.

The elaboration phase is complete after the developer has delivered the second prototype, all required and requested documentation, and the supervisory committee has given its approval of the delivered items. The second presentation will be given at the end of this phase.

1.1.3 Production Phase

The production phase is dedicated to project implementation and testing. The developer will complete the coding of the project and produce the supporting documentation (User Manual, Project Evaluation, Test Logs, etc.)

This phase is complete when the developer can submit the executable version of the project and the required supporting documentation for the supervisory committee for review and approval. The final presentation will be given at the end of this phase with a demonstration of the completed project.

1.2 Project Schedule

The Gantt chart below presents the schedule for the MVC Reporting Framework project. A separate document is available on the project website for easier viewing.
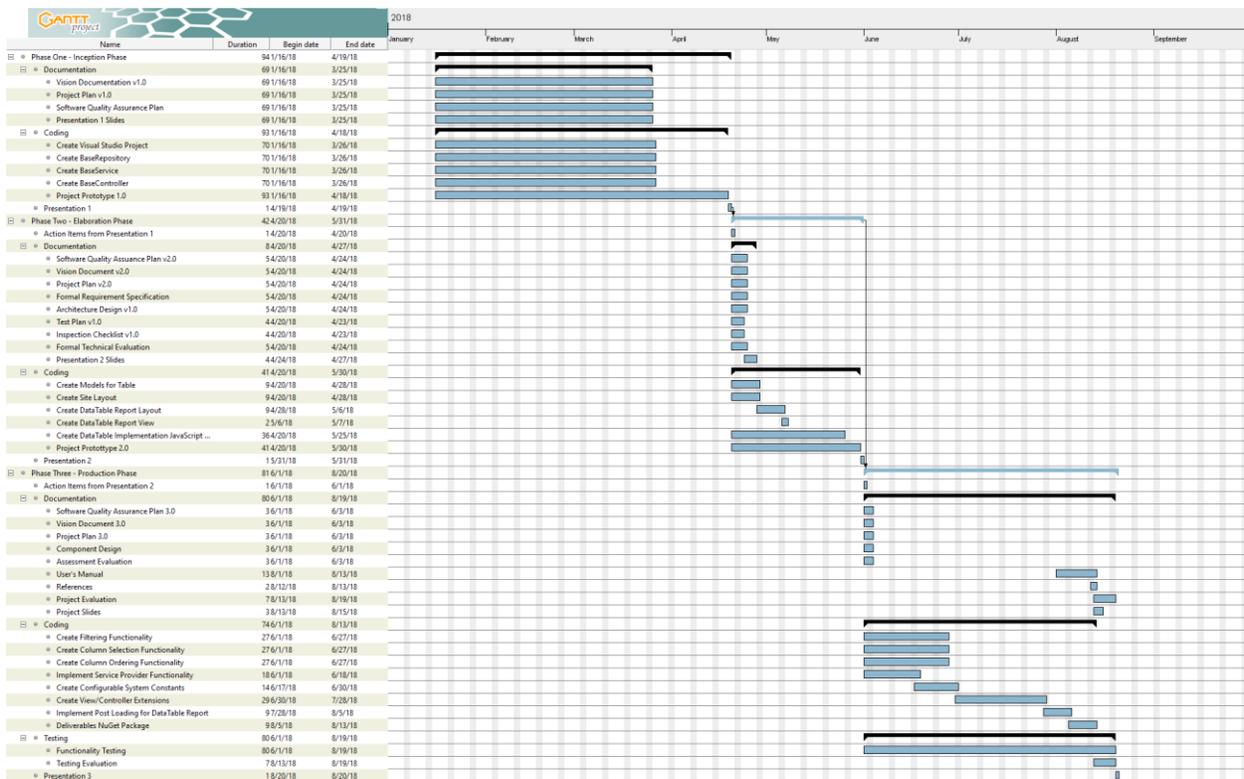

Figure 1: Project Schedule

2. Cost Estimate

To estimate the effort, cost, and schedule for this project the best method I have found so far during the creation of this documentation is the COCOMO II model.

2.1 COCOMO II

"The original COCOMO® model was first published by Dr. Barry Boehm in 1981, and reflected the software development practices of the day. In the ensuing decade and a half, software development techniques changed dramatically. These changes included a move away from mainframe overnight batch processing to desktop-based real-time turnaround; a greatly increased emphasis on reusing existing software and building new systems using off-the-shelf software components; and spending as much effort to design and manage the software development process as was once spent creating the software product.

These changes and others began to make applying the original COCOMO® model problematic. The solution to the problem was to reinvent the model for the 1990s. After several years and the combined efforts of USC-CSSE, ISR at UC Irvine, and the COCOMO® II Project Affiliate Organizations, the result is COCOMO® II, a revised cost estimation model reflecting the changes in professional software development practice that have come about since the 1970s. This new, improved COCOMO® is now ready to assist professional software cost estimators for many years to come." [1]

I will be using the following formulae for cost estimation:

$$\text{Effort} = 2.45 * EAF * (KSLOC)^{1.09}$$

$$\text{Time} = 2.5 * (\text{Effort})^{0.38}$$

Where in: Effort = the number of person months (PM)
            Time = Duration time in months for project
            KSLOC = Estimated number of source lines of code for the
                    project (expressed in thousands)
            EAF = Effort Adjustment Factor

There are 15 Effort Adjustment Factors and their values differ within a given range. Each factor may fall in one of six categories very low, low, nominal, high, very high, or extra high. EAF is the product of the values of the 15 factors shown in the below table:

Identifier	EAF	Possible Range of Values
RELY	Required Software Reliability	0.75 – 1.40
DATA	Size of Application Database	0.94 – 1.16
CPLX	Complexity of the Product	0.70 – 1.65
TIME	Run-time Performance Requirements	1.00 – 1.66
STOR	Memory Constraints	1.00 – 1.56
VIRT	Virtual Machine Volatility	0.87 – 1.30
TURN	Required Turnabout Time	0.87 – 1.15
ACAP	Analyst Capability	1.46 – 0.71
AEXP	Applications Experience	1.29 – 0.82
PCAP	Software Engineer Capability	1.42 – 0.70
VEXP	Virtual Machine Experience	1.21 – 0.90
LEXP	Programming Language Experience	1.14 – 0.95
TOOL	Use of Software Tools	1.24 – 0.82
MODP	Use of Modern Software Practices	1.24 – 0.83
SCED	Required Development Schedule	1.23 – 1.10

Table 1: COCOMO Effort Adjustment Factors

Based on the MVC Reporting Framework project these above defined factors can be assigned a value in the range specified above. In the table given below each identifier is classified, given a value, and provided with a reason why the value was chosen.

Identifier	Classification	Value	Reasoning
RELY	Low	0.88	This project is not safety critical, and does not have to be completely reliable.
DATA	Very Low	0.94	This project does not use a data-base.
CPLX	Very High	1.50	This project has a lot of interconnected components that rely on each other to work properly.
TIME	High	1.25	Response time is very important for the project in terms of rendering for reporting.
STOR	High	1.25	Storage and caching in relation to DataTables can affect browser performance.
VIRT	Low	0.87	Low complexity of the hardware and software.
TURN	High	1.00	The turnaround time for loading data for model construction to line rendering of the web page is important to the project.
ACAP	High	0.86	Developer has 4+ years of experience in Software Engineering.
AEXP	High	0.90	Developer has 4+ years of experience in the application area.
PCAP	High	0.82	Developer has 4+ years of experience in Software Engineering.
VEXP	Nominal	1.06	Developer has worked with virtual machines over the last 4+ years.
LEXP	High	0.90	Developer has worked with C# for 7+ years.
TOOL	High	0.90	Developer has worked the tools required for the project for the last 7+ years.
MODP	High	0.90	Developer has 4+ years of experience in Software Engineering.
SCED	Nominal	1.00	Project is tightly scheduled but is a bit flexible.

Table 2: Project Effort Adjustment Factor Values

EAF is the product of the values of the adjustment factors. From the above table EAFT is calculated as 0.83. Based on past experience I would estimate that the size of the project will be 2 KLOC.

Using these figures, Effort and Time can be calculated as:

$$\text{Effort} = 2.45 * 0.83 * 2.0^{1.09} = 4.33$$

$$\text{Time} = 2.5 * 4.33^{0.38} = 4.36$$

Based on the above calculations we can see that the COCOMO model estimates the effort to be 4.33-person months to complete the project. From the Time value calculation, the project should be taking around 4.36 months to complete it and is almost near to the project schedule shown in the Gantt chart.

There could be discrepancies in the calculated values due to misjudged EAF values.

3. Architecture Elaboration Plan

This section details all the documents that must be completed by the end of the Elaboration phase before the second presentation.

3.1 Vision Document

The vision document will be revised with suggestions from the supervisory committee after the first presentation. The document will include a complete requirements list. The requirements will be ranked and will have unique identifiers. The major professor will approve the changes to the document.

3.2 Project Plan Revision

The project plan will be revised with suggestions from the supervisory committee after the first presentation. The Gantt chart will also be updated with any necessary scheduling changes, as well as, the COCOMO II estimate will be updated based on any changes regarding the cost estimate. The major professor will approve the changes to the document.

3.3 Architectural Design

The architectural design document will use UML to create the architectural components. It will include all state, sequence, class, and data models for the projects. The major professor will approve the architectural design document.

3.4 Prototype Development

The prototype developed during the Inception Phase will be expanded upon during the Elaboration Phase. Additions will include suggestions from the supervisory committee during the first presentation. Features implemented for the prototype will be approved by the major professor.

3.5 Test Plan

A test plan shall be developed to ensure that all requirements specified in the Vision Plan are met. The document will contain instructions on how to evaluate the product and will be approved by the major professor.

3.6 Formal Technical Inspections

A formal inspection checklist will be produced during the elaboration phase for use in creating an inspection report of the project during the Elaboration Phase.

3.7 Formal Requirements Specification

At least one component of the project will be specified using OCL. The major professor will approve the formal requirements specification.

4. References

[1]"CSSE Website", *Sunset.usc.edu*, 2018. [Online]. Available: http://sunset.usc.edu/csse/research/cocomoii/cocomo_main.html. [Accessed: 25- Mar- 2018].