Project Plan 1.0
Airline Reservation System

Submitted in partial fulfillment of the requirements of the degree of Master of Software Engineering

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TABLE OF CONTENTS

1. TASK BREAKDOWN

1.1 INCEPTION PHASE

The Inception Phase is the first phase of a software development life cycle. The main objective of the inception phase is to establish the business case for the system and define the scope of the system. The inception phase of the Airline Reservation System project mainly focuses on defining the project requirements. The primary documents created in the inception phase consist of the Vision document, Software Quality Assurance Plan and the Project Plan.

The Vision document, which is one of the outcomes of the inception phase, mainly focuses on core project requirements and the key features. It also discusses the main features of the project along with the interfaces of the project. The next document which is an outcome of the inception phase is the project plan document. The project plan document as the name says is mainly used to document the schedule of the project as well as the time required for each phase of the project. This plan, gives us an estimate of when the project will be completed. The Software Quality Assurance Plan, which is also an outcome of the inception phase documents the standards and conventions that need to be followed in order to ensure good quality of the end product.

At the end of the inception phase, the developer will give a presentation to the supervisory committee after submitting all the documents necessary. This phase will be marked complete, once all the documentation for the phase I is reviewed and approved by the committee.

1.2 ELABORATION PHASE

The next phase in the software development lifecycle is the elaboration phase. The main purpose of the elaboration phase is to establish a strong architectural foundation for the Airline Reservation System project. It is the most critical phase of all the phases of the software development lifecycle. The entire architectural design of the Airline Reservation System will be documented using the appropriate UML diagrams. In this phase, revisions on the initial versions of the Vision document, Project Plan document will be made based on the suggestions made by the Supervisory Committee members. In the elaboration

phase, each component in the Airline Reservation System architecture will be documented at the interface level. Another deliverable of this phase is the Test Plan which documents all the testing activities that will be carried out on the project and also states how to report and track the test results. The two technical inspectors of the project also perform an architectural review on the project and provide feedback by submitting the formal technical inspection letters which are based upon their findings.

At the end of this phase, the developer will demonstrate an executable prototype of the project and submit all the documentation required for the phase II of the project. The deliverables of this phase can be stated as follows:

- Vision Document 2.0
- Project Plan 2.0
- Formal Requirement Specification
- Architecture Design
- Test Plan
- Formal Technical Inspection – submitted by two individual MSE students
- Executable Architecture Prototype

Once all the above documents and the prototype is reviewed and accepted by the Supervisory Committee, the Elaboration phase is said to be complete.

1.3 PRODUCTION PHASE

The production phase of the Airline Reservation System project mainly focuses on the implementation and testing of the project. In this phase, the entire working code for the project will be constructed and all the documentation pertaining to the project is completed. In this phase, the entire code for the Airline Reservation System project will be tested to ensure that it has met all the requirements. All the test results will also be analyzed and documented. A user manual is also produced for the project which describes how to install, run and use the tool efficiently.

At the end of the production phase, the developer of the project will give a presentation to the supervisory committee and will also demonstrate the entire working of the software product. This presentation is the last presentation, and this phase of the project will be completed once the committee members have reviewed and approved all the

documentation and the working code of the Airline Reservation System project. Once this phase is said to complete, then the MSE project is also said to be complete.

2. COST ESTIMATE

2.1 COCOMO MODEL

The Constructive Cost Model known as the COCOMO Model, has been designed in 1981 by Barry Boehm, to give an estimate of number of man months it will take to develop a software product. The model also estimates the development schedule for the project in months and gives us a schedule distribution for all the major phases of a project.

The COCOMO models are developed for three classes of software projects. They are as follows:

- **Organic Projects** - These are relatively small and simple software projects in which small teams with good application experience work towards a set of less than rigid requirements.
- **Semi – Detached Projects –** These are intermediate size software projects in which teams with mixed experience levels must meet a mix of rigid and less than rigid requirements.
- **Embedded Projects –** These are software projects that must be developed within a set of tight hardware, software and operational constraints.

The Airline Reservation System project has an average complexity and fair flexibility. Thus, this project is classified as an organic project under the COCOMO model.

The equations as they are modified for the organic projects are as follows:

Effort = 3.2 * EAF * (Size) ^ 1.05

Time = 2.5 * (Effort) ^ 0.38 where

Effort = number of staff months (PM)

EAF = effort adjustment factor

Size = number of lines of code for completed product. It is measures in KLOC (thousands of lines of code)

Time = total number of months

The Effort Adjustment Factor mentioned above is the product of 15 adjustment parameters. Each adjustment parameter is categorized as very low, low, nominal, high or very high. Each adjustment factor along with the range of values it lies within is shown in the following table:

IDENTIFIER	EFFORT ADJUSTMENT FACTOR	RANGE
RELY	Required Reliability	0.75 – 1.40
DATA	Database Size	0.94 – 1.16
CPLX	Product Complexity	0.70 – 1.65
TIME	Execution Time Constraint	1.00 – 1.66
STOR	Main Storage Constraint	1.00 – 1.56
VIRT	Virtual Machine Volatility	0.87 – 1.30
TURN	Computer Turnaround Time	0.87 – 1.15
ACAP	Analyst Capability	1.46 – 0.71
AEXP	Applications Experience	1.29 – 0.82
PCAP	Programmer Capability	1.42 – 0.70
VEXP	Virtual Machine Experience	1.21 – 0.90
LEXP	Language Experience	1.14 – 0.95
MODP	Use of Modern Practices	1.24 – 0.82
TOOL	Use of Software Tools	1.24 – 0.83
SCED	Required Development Schedule	1.23 – 1.10

The adjustment factors for the Airline Reservation System are as follows :

- RELY as nominal with a value of 1.00
- DATA as nominal with a value of 1.00
- CPLX as low with a value of 0.75
- TIME as nominal with a value of 1.00
- STOR as low with a value of 1.00

- VIRT as nominal with a value of 1.03
- TURN as low with a value of 0.88
- ACAP as high with a value of 0.9
- AEXP as nominal with a value of 0.9
- PCAP as nominal with a value of 0.9
- VEXP as nominal with a value of 1.00
- LEXP as nominal with a value of 1.00
- TOOL as high with a value of 0.9
- SCED as nominal with a value of 1.00

With the help of above stated values, the EAF for the Airline Reservation System project is calculated as EAF = 0.45. Also by estimating the size of the project we have the value 3.0.

Since we already have the formulae for Effort and Time, we can calculate the values as follows:

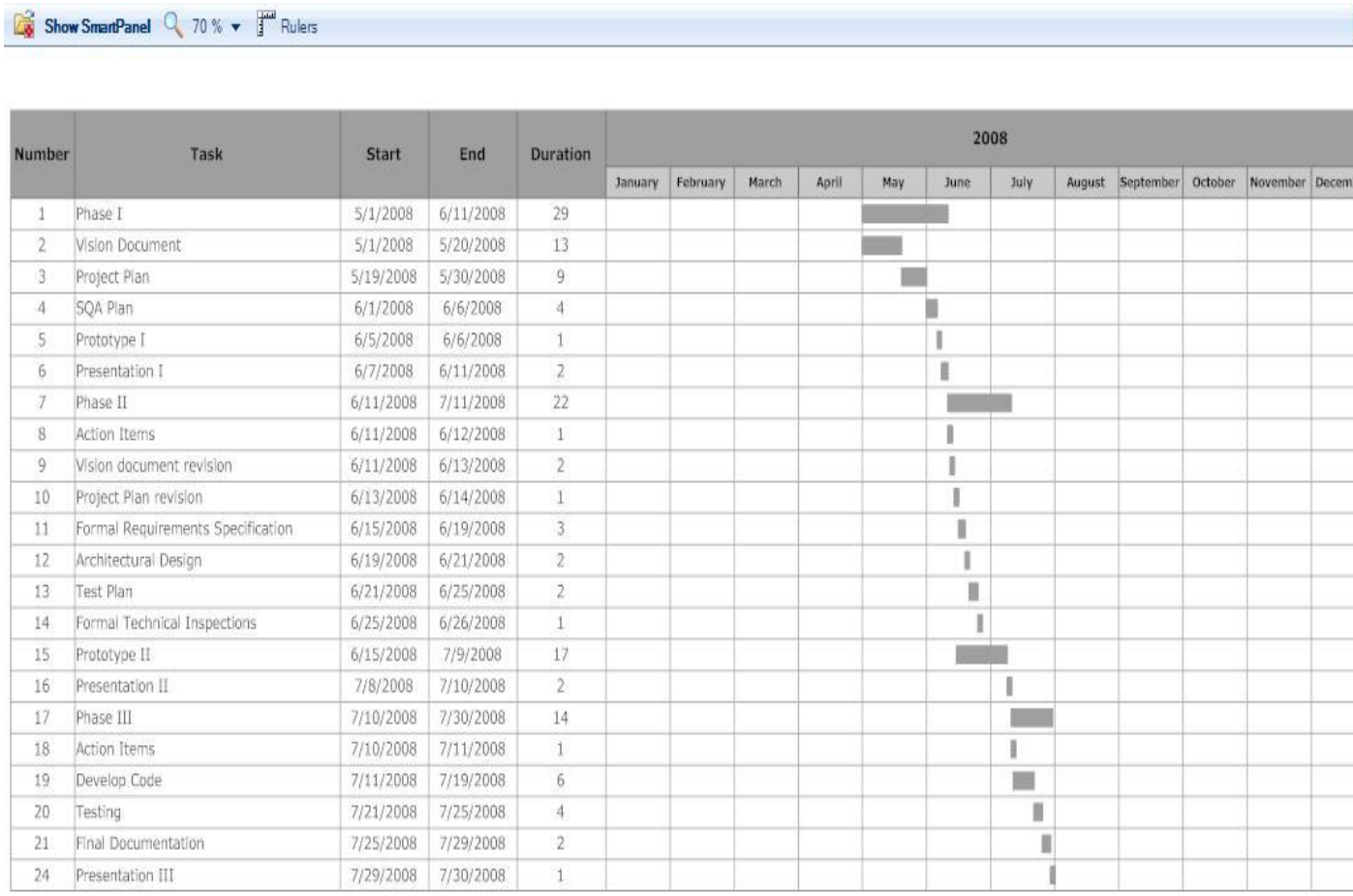
Effort = 3.2 * 0.45 * 3.0 ^ 1.05 = 4.56 staff months

Time = 2.5 * 4.56 ^ 0.38 = 4.44 months (development time)

2.2 GANTT CHART

The Gantt chart for the Airline Reservation System project can be depicted as follows:

Figure: Gantt chart for the Airline Reservation System project



Number	Task	Start	End	Duration
1	Phase I	5/1/2008	6/11/2008	29
2	Vision Document	5/1/2008	5/20/2008	13
3	Project Plan	5/19/2008	5/30/2008	9
4	SQA Plan	6/1/2008	6/6/2008	4
5	Prototype I	6/5/2008	6/6/2008	1
6	Presentation I	6/7/2008	6/11/2008	2
7	Phase II	6/11/2008	7/11/2008	22
8	Action Items	6/11/2008	6/12/2008	1
9	Vision document revision	6/11/2008	6/13/2008	2
10	Project Plan revision	6/13/2008	6/14/2008	1
11	Formal Requirements Specification	6/15/2008	6/19/2008	3
12	Architectural Design	6/19/2008	6/21/2008	2
13	Test Plan	6/21/2008	6/25/2008	2
14	Formal Technical Inspections	6/25/2008	6/26/2008	1
15	Prototype II	6/15/2008	7/9/2008	17
16	Presentation II	7/8/2008	7/10/2008	2
17	Phase III	7/10/2008	7/30/2008	14
18	Action Items	7/10/2008	7/11/2008	1
19	Develop Code	7/11/2008	7/19/2008	6
20	Testing	7/21/2008	7/25/2008	4
21	Final Documentation	7/25/2008	7/29/2008	2
24	Presentation III	7/29/2008	7/30/2008	1

3. ARCHITECTURE ELABORATION PLAN

The following tasks have to be completed by the end of Phase II of the Airline Reservation System project.

3.1 REVISE OF VISION DOCUMENT

The vision document which is produced at the end of Phase I will be revised in order to make sure that all the requirements for the project have been represented. All the requirements will be ranked in order of their importance. At the end of phase I of the project, the supervisory committee members will provide suggestions to the developer regarding improving the vision document. All the changes mentioned by the committee will be made in the revised document and the correct document will be submitted at the end of Phase II for approval.

3.2 REVISE PROJECT PLAN

Similar to the vision document, the project plan document, submitted at the end of Phase I, will also be reviewed by the supervisory committee and the updated document will be submitted by the developer at the end of Phase II. This updated document will provide us with an updated estimate of cost, size and effort required for the project. Finally, this document will be submitted to the major professor for approval.

3.3 ARCHITECTURE DESIGN

The complete project design of the Airline Reservation System project, will be documented using the UML diagrams.

3.4 DEVELOPING PROTOTYPE

The architecture executable prototype of the Airline Reservation System project will be built to illustrate that all the requirements stated in the project's vision document have been met.

3.5 TEST PLAN

A test plan will be developed at the end of the Phase II, which documents all the testing activities that will be performed on the Airline Reservation system project, to ensure that

the project has satisfied all the requirements that have been mentioned in the vision document. This test plan will also include evaluation criteria for all the critical use cases of the project.

3.6 FORMAL TECHNICAL INSPECTORS

The architecture design of the Airline Reservation system project will be inspected by two other MSE students, Sandhya Bathini and Srunokshi Neelakantan.

3.7 FORMAL REQUIREMENTS SPECIFICATION

The Object Constraint Language will be used to define and verify the formal specification of the product.

References:

- Smart Draw software for the Gantt Chart
- http://www.geekinterview.com/question_details/57205
- http://www.mhhe.com/engcs/compsci/pressman/information/olc/COCOMO.html
- Wikipedia