Estimation Model for the project: -

We have made use of a combination of Delphi and COCOMO 2.0 for estimating the effort required in person days in order to successfully implement this project within the deadline.

The Delphi model was used for tasks which did not require any kind of coding or which did not have any lines of code (LOC) associated with it. Using this estimation model, the project team developed a consensus about the estimates for different tasks which were required to be implemented for the project. The number of days estimated for every task which made use of Delphi model was agreed upon by all the team members of the project who were involved in the estimation meeting.

The other model which we used to estimate the number of person days for particular tasks was COCOMO 2.0. This model was utilized for tasks which had a certain number of LOC associated with it. The LOC of every task were decided by the team members in the estimation meeting. These estimates were as close to the real implementation. The numbers of LOC are the logical lines of code which we require in order to implement the functionality. Hence, they might be a bit lower in number than the actual LOC for implementation.

The estimates were proposed based on the knowledge, experience, capabilities, and shortcomings of the team members. Every task associated with certain number of LOC was further categorized based on the fact that we were a small team of experienced programmers specializing in a particular area. So, accordingly we decided to categorize our project under the “Simple” section of the COCOMO 2.0 model. Appropriate formulas were applied to find the estimated number of days required to implement the project. The formulas and the calculations are described in Table 2.

Table 1 gives an overview of the main tasks and their estimated time. The third column consists of person days required to perform that individual task; the fourth column clubs the number of days for tasks which can be done in parallel.

The project begins with the task of “Project Planning” which is done by the project manager and followed by the task of “Analysis & Preparation Phase” and “Design Phase” which are followed in sequence. The tasks of “Database Setup”, “Website Design” and “Oracle CRM Development” are expected to run in parallel with the ‘Test Plan Preparation’ phase. There will be status meetings arranged within every team on weekly basis to check on the progress. The status meeting will go along the period from the “Implementation Phase” to the beginning of “Bug fixing” phase.

The task of “Testing Phase” will be done in parallel with the “Bug Fixing” phase followed by all other tasks till “Project Documentation” in sequence. The following table just gives the reader a very brief idea of the time estimates for every important superficial task carried out in the project to successfully implement the project.

Tasks	Model	Person Days	Person Days when tasks are performed in parallel
Planning	Delphi	13	13
Analysis & Preparation Phase	Delphi	10	10
Design Phase	Delphi	23	23
Database Setup	COCOMO 2.0	5	29
Website Design	COCOMO 2.0	23	
Oracle CRM Development	COCOMO 2.0	24	
Test Plan Preparation	Delphi	20	
Status Meetings	Delphi	29	
Installation of Developed systems	Delphi	1	1
Testing Phase	Delphi & COCOMO 2.0	17	22
Bug Fixing	COCOMO 2.0	5 + 5	
Code Deployment	COCOMO 2.0	2	2
Customer Acceptance Testing and Bug Fixing	Delphi & COCOMO 2.0	10	10
Quality Assurance Check	Delphi	3	3
Project Documentation	Delphi	2	2
Total Number of days			115

TABLE 1: Estimation in terms of person-days

We have assumed a person month to be equal to 22 working days. So, according to this assumption, we came up to 132 working days in 6 months. This was the time duration we needed to deliver our project. After careful consideration and several hours of estimation, the project plan was scheduled over a time limit of 115 days. This is the critical path of the project. We have tried keeping a buffer time of few weeks in between the actual deadline and the estimated project completion date. This buffer will help us cover up in cases when there are unexpected delays during the project life-cycle.

The detail break up of every task with its estimated time is given in the following table below. The main tasks are listed first and then their detail break up follows. A brief summary of the entire table can be given as follows –

Note – * means the tasks are performed in parallel with the previous tasks and hence they are not considered while calculating the total for the main task.

TABLE2: Detail break-up of the tasks and their time estimates

TASKS	RESOURCES	LINES OF CODE	MODEL	DECISION	PERSON MONTHS	PERSON DAYS
Planning	Angad	N/A	Delphi	All agreed	NA	13
Prepare Project Plan	Angad	N/A	Delphi	All agreed	NA	5
Risk Analysis	Angad, Jyothsna, Athina	N/A	Delphi	All agreed	NA	3*
Submit and get approval for Project Plan	Angad	N/A	Delphi	All agreed	NA	5
Decide on hardware and software requirements	Angad	N/A	Delphi	All agreed	NA	2
Resource Planning	Angad, Jyothsna, Athina	N/A	Delphi	All agreed	NA	1*
Project Kick-off Meeting	Angad	N/A	Delphi	All agreed	NA	1
Analysis and Preparation phase	Ankita, Hao, Thanos, Jyothsna, Athina, Angad	N/A	Delphi	All agreed	NA	10

Create FRS from BRS	Jyothsna, Athina	N/A	Delphi	All agreed	NA	5
FRS signed and approved	Jyothsna, Athina	N/A	Delphi	All agreed	NA	5
Software and Hardware configuration	Ankita, Hao, Thanos, Athina	N/A	Delphi	All agreed	NA	2*
Design Phase	Ankita, Athina, Jyothsna, Thanos, Hao, Angad	N/A	Delphi	All agreed	NA	23
Design of HLD and LLD from FRS	Ankita, Athina, Angad	N/A	Delphi	All agreed	NA	15
Knowledge Transfer Sessions	Ankita, Athina, Jyothsna, Thanos, Hao, Angad	N/A	Delphi	All agreed	NA	8
Status Meetings	Angad, Ankita, Athina, Jyothsna, Thanos, Hao	NA	Delphi	All agreed	NA	29
Database Setup	Thanos	100	COCOMO 2.0	Simple	(2.4*0.1^1.05)	5*
Create and Initialize customized tables	Thanos	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2
DB Access Rights	Thanos	NA	Delphi	All Agreed	NA	1

Testing of DB Setup	Thanos	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2
Website Design for Customers/Business Users/Third Party Users	Hao, Athina	460	COCOMO 2.0	Simple	(2.4*0.46^1.05)	23*
Access Rights Setup for Customers/Business Users/Third Party Users	Hao, Athina	20	COCOMO 2.0	Simple	(2.4*0.02^1.05)	1
Development of Registration Form (Mandate Registration)	Hao, Athina	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2
Development of Home Page	Hao, Athina	20	COCOMO 2.0	Simple	(2.4*0.02^1.05)	1
Development of Funding/Payment History Interface	Hao, Athina	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2
Development of Help component	Hao, Athina	20	COCOMO 2.0	Simple	(2.4*0.02^1.05)	1

Development of Claim webpage	Hao, Athina	60	COCOMO 2.0	Simple	(2.4*0.06^1.05)	3
Development of Dispute webpage	Hao, Athina	40	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2
Development of Search webpage	Hao, Athina	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2
Development of Query Page	Hao, Athina	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2
Development of Reporting webpage	Hao, Athina	20	COCOMO 2.0	Simple	(2.4*0.02^1.05)	1
Development of Electronic Doc View Page	Hao, Athina	20	COCOMO 2.0	Simple	(2.4*0.02^1.05)	1
Development of Contractual Requirement page	Hao, Athina	20	COCOMO 2.0	Simple	(2.4*0.02^1.05)	1
Page for potential customers (Campaign Management)	Hao, Athina	30	COCOMO 2.0	Simple	(2.4*0.03^1.05)	1

Oracle CRM Development	Ankita, Angad	480	COCOMO 2.0	Simple	(2.4*0.48^1.05)	24*
Search/Query Management Module	Ankita, Angad	70	COCOMO 2.0	Simple	(2.4*0.07^1.05)	3
Registered customers, placeholders for potential customers	Ankita, Angad	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2
Customer Service Request module	Ankita, Angad	70	COCOMO 2.0	Simple	(2.4*0.07^1.05)	3
Update third party data sources	Ankita, Angad	60	COCOMO 2.0	Simple	(2.4*0.06^1.05)	3
Campaign Management Module	Ankita, Angad	60	COCOMO 2.0	Simple	(2.4*0.06^1.05)	3
Customer Details Management	Ankita, Angad	60	COCOMO 2.0	Simple	(2.4*0.06^1.05)	3
Customer Correspondence Management Module	Ankita, Angad	50	COCOMO 2.0	Simple	(2.4*0.05^1.05)	2.2

Auditing changes to data	Ankita, Angad	60	COCOMO 2.0	Simple	(2.4*0.06^1.05)	3
Test Plan Preparation	Thanos, Jyothsna	NA	Delphi	All agreed	NA	20*
Preparation of test plan	Thanos, Jyothsna	NA	Delphi	All agreed	NA	15
Verification and approval of test plan	Thanos, Jyothsna, Angad, Ankita, Athina	NA	Delphi	All agreed	NA	5
Installation of the Developed Systems	Ankita, Hao, Athina	NA	Delphi	All agreed	NA	1
Testing Phase	Thanos, Jyothsna	70	COCOMO 2.0 and Delphi	Simple, All agreed	(2.4*0.07^1.05)	17
Unit Testing	Thanos, Jyothsna	70	COCOMO 2.0	Simple	(2.4*0.07^1.05)	3
Regression Testing	Thanos, Jyothsna	NA	Delphi	All agreed	NA	3
Integration Testing	Thanos, Jyothsna	NA	Delphi	All agreed	NA	3
System Testing	Thanos, Jyothsna	NA	Delphi	All agreed	NA	5
Performance & Scalability Testing	Thanos, Jyothsna	NA	Delphi	All agreed	NA	3
Bug Fixing	Ankita, Hao, Athina	200	COCOMO 2.0	Simple	(2.4*0.2^1.05)	10*
Code Deployment	Ankita	40	COCOMO 2.0	Simple	(2.4*0.04^1.05)	2
Customer Acceptance Testing and Bug Fixing	Ankita, Hao, Athina, Thanos, Jyothsna	100	Delphi & COCOMO 2.0	Simple, All Agreed	(2.4*0.1^1.05)	10
Quality Assurance Check	Ankita	NA	Delphi	All agreed	NA	3
Project Documentation	Ankita	NA	Delphi	All agreed	NA	2