***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 “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 | 11 | 11 |
| 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 |  |  | 113 |

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 |
| 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 | Ankita, Hao, Athina | 460 | COCOMO 2.0 | Simple | (2.4\*0.46^1.05) | 23\* |
| Access Rights Setup for Customers/Business Users/Third Party Users | Ankita, Hao, Athina | 20 | COCOMO 2.0 | Simple | (2.4\*0.02^1.05) | 1 |
| Development of Registration Form (Mandate Registration) | Ankita, Hao, Athina | 50 | COCOMO 2.0 | Simple | (2.4\*0.05^1.05) | 2.2 |
| Development of Home Page | Ankita, Hao ,Athina | 20 | COCOMO 2.0 | Simple | (2.4\*0.02^1.05) | 1 |
| Development of Funding/Payment History Interface | Ankita, Hao, Athina | 50 | COCOMO 2.0 | Simple | (2.4\*0.05^1.05) | 2.2 |
| Development of Help component | Ankita, Hao, Athina | 20 | COCOMO 2.0 | Simple | (2.4\*0.02^1.05) | 1 |
| Development of Claim webpage | Ankita, Hao, Athina | 60 | COCOMO 2.0 | Simple | (2.4\*0.06^1.05) | 3 |
| Development of Dispute webpage | Ankita, Hao, Athina | 40 | COCOMO 2.0 | Simple | (2.4\*0.05^1.05) | 2 |
| Development of Search webpage | Ankita, Hao, Athina | 50 | COCOMO 2.0 | Simple | (2.4\*0.05^1.05) | 2.2 |
| Development of Query Page | Ankita, Hao, Athina | 50 | COCOMO 2.0 | Simple | (2.4\*0.05^1.05) | 2.2 |
| Development of Reporting webpage | Ankita, Hao, Athina | 20 | COCOMO 2.0 | Simple | (2.4\*0.02^1.05) | 1 |
| Development of Electronic Doc View Page | Ankita, Hao, Athina | 20 | COCOMO 2.0 | Simple | (2.4\*0.02^1.05) | 1 |
| Development of Contractual Requirement page | Ankita, Hao, Athina | 20 | COCOMO 2.0 | Simple | (2.4\*0.02^1.05) | 1 |
| Page for potential customers (Campaign Management) | Ankita, Hao, Athina | 30 | COCOMO 2.0 | Simple | (2.4\*0.03^1.05) | 1 |
| Oracle CRM Development | Ankita, Hao, Athina | 480 | COCOMO 2.0 | Simple | (2.4\*0.48^1.05) | 24 |
| Search/Query Management Module | Ankita, Hao, Athina | 70 | COCOMO 2.0 | Simple | (2.4\*0.07^1.05) | 3 |
| Registered customers, placeholders for potential customers | Ankita, Hao, Athina | 50 | COCOMO 2.0 | Simple | (2.4\*0.05^1.05) | 2.2 |
| Customer Service Request module | Ankita, Hao, Athina | 70 | COCOMO 2.0 | Simple | (2.4\*0.07^1.05) | 3 |
| Update third party data sources | Ankita, Hao, Athina | 60 | COCOMO 2.0 | Simple | (2.4\*0.06^1.05) | 3 |
| Campaign Management Module | Ankita, Hao, Athina | 60 | COCOMO 2.0 | Simple | (2.4\*0.06^1.05) | 3 |
| Customer Details Management | Ankita, Hao, Athina | 60 | COCOMO 2.0 | Simple | (2.4\*0.06^1.05) | 3 |
| Customer Correspondence Management Module | Ankita, Hao, Athina | 50 | COCOMO 2.0 | Simple | (2.4\*0.05^1.05) | 2.2 |
| Auditing changes to data | Ankita, Hao, Athina | 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 |
| Status Meetings | Angad, Ankita, Athina, Jyothsna, Thanos, Hao | NA | Delphi | All agreed | NA | 10 |