CALCULATIONS

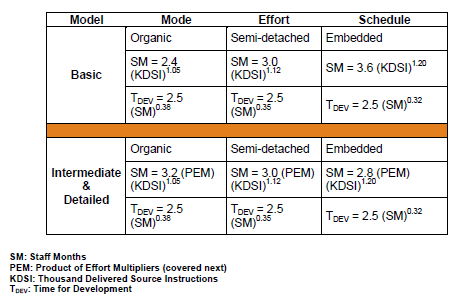
Based on the above assumptions of COCOMO parameters, we can map the effort multiplier ratings into the effort multiplier chart. Each selected value is highlighted and the effort multiplier value is shown in the rightmost column.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Attributes | Very Low | Low | Nominal | High | Very High | Extra High | Multiplier |
| RELY | .75 | .88 | 1.00 | 1.15 | 1.40 |  | .88 |
| DATA |  | 0.94 | 1.00 | 1.08 | 1.16 |  | 1.00 |
| CPLX | .70 | .85 | 1.00 | 1.15 | 1.30 | 1.65 | 1.00 |
| TIME |  |  | 1.00 | 1.11 | 1.30 | 1.66 | 1.00 |
| STOR |  |  | 1.00 | 1.06 | 1.21 | 1.56 | 1.00 |
| VIRT |  | .87 | 1.00 | 1.15 | 1.30 |  | 1.00 |
| TURN |  | .87 | 1.00 | 1.07 | 1.15 |  | .87 |
| ACAP | 1.46 | 1.19 | 1.00 | .86 | .71 |  | 1.00 |
| AEXP | 1.29 | 1.13 | 1.00 | .91 | .82 |  | 1.00 |
| PCAP | 1.42 | 1.17 | 1.00 | .86 | .70 |  | 1.00 |
| VEXP | 1.21 | 1.10 | 1.00 | .90 |  |  | 1.00 |
| LEXP | 1.14 | 1.07 | 1.00 | .95 |  |  | .95 |
| MODP | 1.24 | 1.10 | 1.00 | .91 | .82 |  | .91 |
| TOOL | 1.24 | 1.10 | 1.00 | .91 | .83 |  | 1.00 |
| SCED | 1.23 | 1.08 | 1.00 | 1.04 | 1.10 |  | 1.00 |

*Table N: Mapping COCOMO parameters to Effort Multiplier Ratings*

To get the total effort multiplier rating for the project we can simply take the product of each effort multiplier rating. We can use this effort multiplier rating to compute staff months and time to develop for each of the three builds, since the multipliers will likely not change much between the three builds. The result of the product of all of the effort multipliers is 0.66.

As discussed in the above sections, we are using the organic development model and we are using the detailed model for each of the three builds. We can consult the following lookup table to determine the equations to use for the staff months and time for development, as well as the average staffing for the duration of each build.



*Table N+1: Equation lookup table*

Using the organic model and the detailed equations we see that we can use the following two equations to compute staff months and development time. The equation for computing the average staffing is trivial, but is shown below as well.

The only remaining item to collect is the lines of code to write for each of the builds. We can take each of the tasks provided in the case study and sum the lines of code for each task into a total lines of code for each build. This information was also collected in the SDP. The total lines of code for each build is shown in the table below:

|  |  |
| --- | --- |
| Build | Lines of Code |
| 1 | 11000 |
| 2 | 13200 |
| 3 | 7800 |

*Table N+2: Summary of lines of code to be delivered for each build*

With the above information we can compute the number of staff months, the time to develop, and the average staffing for each of the builds. The results for each of the builds are shown in the below table:

|  |  |  |  |
| --- | --- | --- | --- |
| Build | 1 | 2 | 3 |
| SM | 26.27 | 31.81 | 18.31 |
| TDEV | 8.66 | 9.31 | 7.55 |
| Avg. Staff | 3.03 | 3.42 | 2.43 |

*Table N+3: Tabulated results for staff months, development time and average staffing*

APPROACH

The approach taken to compute the effort, schedule and staffing profile for the BOE was to use the COCOMO Model. The process for the COCOMO model was discussed in the first three sections, however a more generalized approach can be written as:

1. Tabulate effort multipliers and produce project effort multiplier
2. Select a development model (organic, semi-detached, and embedded)
3. Choose an equation mode (basic, intermediate, advanced)
4. Collect lines of code estimate for project (or each build if using advanced equation mode)
5. Compute applicable parameters

As a team we met to discuss the input parameters to the COCOMO model (organic/semi-detached/embedded, basic/intermediate/advanced, effort multipliers, etc.). Each of the input parameters was debated and each team member shared their own understanding to get an appropriate value for each of the parameters. Once the parameters were determined, a spreadsheet was created to automatically compute the product of the effort multipliers and the staffing parameters. Finally the team split up to write a human-readable document to summarize the results.