student Workbook: Program assignment for Project Data Actuals

Personal Software Process for Engineers

# Program Requirements

Extend the program for the project data calculator:

* Complete the *Actual* portion of the task and schedule planning templates.
* Estimate the project completion day.

Your program should use the following as input:

* plan hours per day (assume the same number of hours are available each day)
* a task list (assume that tasks are provided in the order in which they are planned to be completed)
* the actual hours worked per day through the current day
* a list of completed tasks, including the day each task was completed

Thoroughly test the program. At a minimum, test your program with the following three test cases.

# Test Cases

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Case 1** | | Use the information in the table below as input for Test Case 1. | | | | | | | |
| **Task** | **Planned Hours** | |  | **Day No.** | **Actual Hours** |  | **Tasks Completed** | **Day of Completion** |
| Plan | 1.0 | |  | 1 | 2.1 |  | Plan | 1 |
| Design | 4.5 | |  | 2 | 0.0 |  | Design | 3 |
| Code | 5.0 | |  | 3 | 4.3 |  |  |  |
| Compile | 0.5 | |  |  |  |  |  |  |
| Test | 1.5 | |  |  |  |  |  |  |

On-task hours per day = 3.5

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Case 1 – Expected Results** | | | | For Test Case 1, your program should produce the results below in any similar format. | | | | | | | |
| **Task** | **Planned** | | | | | | **Actual** | | |
| **Hours** | **Planned Value** | | **Cumulative Hours** | **Cumulative Planned Value** | **Completion Day** | **Completion Day** | **Earned Value** | **Cumulative Earned Value** |
| Plan | 1.00 | 8.00 | | 1.00 | 8.00 | 1 | 1 | 8.00 | 8.00 |
| Design | 4.50 | 36.00 | | 5.50 | 44.00 | 2 | 3 | 36.00 | 44.00 |
| Code | 5.00 | 40.00 | | 10.50 | 84.00 | 3 |  |  |  |
| Compile | 0.50 | 4.00 | | 11.00 | 88.00 | 4 |  |  |  |
| Test | 1.50 | 12.00 | | 12.50 | 100.00 | 4 |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Day** | **Planned** | | | **Actual** | | |
| **Direct Hours** | **Cumulative Hours** | **Cumulative Planned Value** | **Direct Hours** | **Cumulative Hours** | **Cumulative Earned Value** |
| 1 | 3.50 | 3.50 | 8.00 | 2.10 | 2.10 | 8.00 |
| 2 | 3.50 | 7.00 | 44.00 | 0.00 | 2.10 | 8.00 |
| 3 | 3.50 | 10.50 | 84.00 | 4.30 | 6.40 | 44.00 |
| 4 | 3.50 | 14.00 | 100.00 |  |  |  |

Estimated day of project completion = Day 7

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Case 2** | | Use the information in the table below as input for Test Case 2. | | | | | | |
| **Task** | **Planned Hours** |  | **Day No.** | **Actual Hours** |  | **Tasks Completed** | **Day of Completion** |
| task1 | 1.5 |  | 1 | 3.2 |  | task1 | 1 |
| task2 | 2.2 |  | 2 | 4.4 |  | task3 | 2 |
| task3 | 3.9 |  | 3 | 3.7 |  | task2 | 3 |
| task4 | 5.1 |  | 4 | 2.3 |  | task6 | 6 |
| task5 | 4.8 |  | 5 | 4.9 |  | task5 | 6 |
| task6 | 3.5 |  | 6 | 2.9 |  |  |  |

On-task hours per day = 4

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Case 2 – Expected Results** | | | | For Test Case 2, your program should produce the results below in any similar format. | | | | | | | |
| **Task** | **Planned** | | | | | | **Actual** | | |
| **Hours** | **Planned Value** | | **Cumulative Hours** | **Cumulative Planned Value** | **Completion Day** | **Completion Day** | **Earned Value** | **Cumulative Earned Value** |
| task1 | 1.50 | 7.14 | | 1.50 | 7.14 | 1 | 1 | 7.14 | 7.14 |
| task2 | 2.20 | 10.48 | | 3.70 | 17.62 | 1 | 3 | 10.48 | 36.19 |
| task3 | 3.90 | 18.57 | | 7.60 | 36.19 | 2 | 2 | 18.57 | 25.71 |
| task4 | 5.10 | 24.29 | | 12.70 | 60.48 | 4 |  |  |  |
| task5 | 4.80 | 22.86 | | 17.50 | 83.33 | 5 | 6 | 22.86 | 75.71 |
| task6 | 3.50 | 16.67 | | 21.00 | 100.00 | 6 | 6 | 16.67 | 52.86 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Day** | **Planned** | | | **Actual** | | |
| **Direct Hours** | **Cumulative Hours** | **Cumulative Planned Value** | **Direct Hours** | **Cumulative Hours** | **Cumulative Earned Value** |
| 1 | 4.00 | 4.00 | 17.62 | 3.20 | 3.20 | 7.14 |
| 2 | 4.00 | 8.00 | 36.19 | 4.40 | 7.60 | 25.71 |
| 3 | 4.00 | 12.00 | 36.19 | 3.70 | 11.30 | 36.19 |
| 4 | 4.00 | 16.00 | 60.48 | 2.30 | 13.60 | 36.19 |
| 5 | 4.00 | 20.00 | 83.33 | 4.90 | 18.50 | 36.19 |
| 6 | 4.00 | 24.00 | 100.00 | 2.90 | 21.40 | 75.71 |

Estimated day of project completion = Day 8

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Case 3** | | Use the information in the table below as input for Test Case 3. | | | | | | |
| **Task** | **Planned Hours** | |  | **Day No.** | **Actual Hours** |  | **Tasks Completed** | **Day of Completion** |
| Planning | 1.66 | |  | 1 | 3.0 |  | Planning | 2 |
| Design | 4.87 | |  | 2 | 3.9 |  | Design | 2 |
| DesignReview | 2.37 | |  | 3 | 3.7 |  | DesignReview | 3 |
| Code | 10.33 | |  | 4 | 4.1 |  | Code | 6 |
| CodeReview | 4.5 | |  | 5 | 4.0 |  |  |  |
| Compile | 1.76 | |  | 6 | 4.5 |  |  |  |
| Test | 6.76 | |  | 7 | 2.9 |  |  |  |
| Postmortem | 1.25 | |  | 8 | 3.1 |  |  |  |

On-task hours per day = 5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Case 3 – Expected Results** | | | For Test Case 3, your program should produce the results below in any similar format. | | | | | | | |
| **Task** | **Planned** | | | | | | **Actual** | | | |
| **Hours** | | **Planned Value** | **Cumulative Hours** | **Cumulative Planned Value** | **Completion Day** | **Completion Day** | **Earned Value** | **Cumulative Earned Value** | |
| Planning | 1.66 | | 4.96 | 1.66 | 4.96 | 1 | 2 | 4.96 | 4.96 | |
| Design | 4.87 | | 14.54 | 6.53 | 19.49 | 2 | 2 | 14.54 | 19.49 | |
| DesignReview | 2.37 | | 7.07 | 8.90 | 26.57 | 2 | 3 | 7.07 | 26.57 | |
| Code | 10.33 | | 30.84 | 19.23 | 57.40 | 4 | 6 | 30.84 | 57.40 | |
| CodeReview | 4.50 | | 13.43 | 23.73 | 70.84 | 5 |  |  |  | |
| Compile | 1.76 | | 5.25 | 25.49 | 76.09 | 6 |  |  |  | |
| Test | 6.76 | | 20.18 | 32.25 | 96.27 | 7 |  |  |  | |
| Postmortem | 1.25 | | 3.73 | 33.50 | 100.00 | 7 |  |  |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Day** | **Planned** | | | **Actual** | | |
| **Direct Hours** | **Cumulative Hours** | **Cumulative Planned Value** | **Direct Hours** | **Cumulative Hours** | **Cumulative Earned Value** |
| 1 | 5.00 | 5.00 | 4.96 | 3.00 | 3.00 | 0.00 |
| 2 | 5.00 | 10.00 | 26.57 | 3.90 | 6.90 | 19.49 |
| 3 | 5.00 | 15.00 | 26.57 | 3.70 | 10.60 | 26.57 |
| 4 | 5.00 | 20.00 | 57.40 | 4.10 | 14.70 | 26.57 |
| 5 | 5.00 | 25.00 | 70.84 | 4.00 | 18.70 | 26.57 |
| 6 | 5.00 | 30.00 | 76.09 | 4.50 | 23.20 | 57.40 |
| 7 | 5.00 | 35.00 | 100.00 | 2.90 | 26.10 | 57.40 |
| 8 | 0.00 | 35.00 | 100.00 | 3.10 | 29.20 | 57.40 |

Estimated day of project completion = Day 14

# Earned Value Tracking

## Tracking the Plan

As each task is completed, it earns the planned value. On the task template

* enter the earned value (EV) for that task
* enter the day of task completion
* add the EV to date in the *Cumulative EV* column

In the schedule template, enter the cumulative EV for each day as it is completed.

Track earned value versus planned value by day.

## Projecting Project Completion

Assume that the project will continue to earn value at the rate it has in the past.

Calculate Average EV per day = Cumulative EV/Number of Elapsed Days (where the number of elapsed days is the number of days for which actual time data has been provided).

Extrapolate to project completion by linearly extending the EV line until it reaches 100%.

Remaining EV = 100 – Cumulative EV

Days to project completion = Remaining EV/Average EV per day (rounded up to the next day).

Document Markings

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