Probability of Completing the Project within Given Time

A Project Evaluation and Review Technique (PERT) is a tool that project management uses to manage a project. The PERT chart contains information about subprojects and estimated completion times. Each subproject is assigned an estimated completion time, based upon probability distributions for the expected completion time for the subproject from start to finish. The probability distribution for expected time is calculated by the following equation: Expected time = (Optimistic Time + 4 x Most likely Time + Pessimistic Time) / 6.

Add the Optimistic Time for a subproject to the Pessimistic time for the same subproject. For example, if your subproject's optimistic time is one day, and Pessimistic Time is seven days, the total for this step is eight days.

Multiply the Most Likely Time by four. If the most likely time is two days, then two days times four is eight days.

Add your answer from Step one to your answer from Step two. For the example, eight days + eight days is 16 days.

Divide your answer in Step 3 by 6. For the example, 16 days / 6 is 2.67 days (rounded). 2.67 days is the expected time for this subproject.

Repeat Steps 1 through 4 for each subproject in your PERT Chart. When you finish, you'll have calculated expected values for each step of your entire project schedule.

An advantage of using probabilistic time estimates is the ability to predict the probability of project completion dates. We learned how to calculate the expected time for each activity with the three time estimates provided. Now we need to calculate the variance for each activity. The variance of the beta probability distribution for each activity is

$$\sigma^2 = \left(\frac{p - o}{6} \right)^2$$

Where

p = pessimistic activity time estimate

o = optimistic activity time estimate