Estimate Activity Durations: Tools and Techniques

There are several tools that can be used to help in estimating activity durations. Each is different from the other and depending on the accuracy needed for the estimates, one may be used over another or in combination.

[1]**Analogous estimating** is also known as top-down estimating and is based on another similar project in the organization. It's important to note that when comparing to another project, it has to be apples to apples for the best estimates.

- This type of estimate is usually quick and easy and is made by management or a subject matter expert familiar with the activity or project.
- It may not be as accurate as other types of estimating, like bottom- up.

[1]**Parametric estimating** is an estimating technique in which an algorithm is used to calculate cost or duration based on historical data and project parameters.

- It's best used for activities that are linear. For example, if a team paves 1 mile of road per hour, then it stands to reason 10 miles would be paved in 10 hours.
- This type of estimating is not good for activities that are unknown or haven't been done previously.

Bottom-up estimating is the most accurate of the estimates and is when an estimate is applied to each activity, starting from the bottom and working its way to the top. The estimates are then aggregated up for a total duration. This process can be time consuming, but it's more accurate.

Three-point estimating is also called program evaluation and review technique (PERT) and is where you use the following three data points to make an estimate.

- **P**essimistic: worst-case scenario
- **R**ealistic: most likely
- **O**ptimistic: best-case scenario

There are two ways of calculating three-point estimates. Each depends on the level of accuracy needed:

Beta distribution is more accurate and puts a weight on the realistic value to come up with a more accurate estimate. Let's say a team member gives you the following estimates for completing an activity: realistically 5 days, optimistically 2 days, and pessimistically 8 days.

You then apply this formula to calculate the estimate: P+(4)R+O/6.

- 8+(4)5+2/6 = 8+20+2/6 = 30/6 = 5 days is the estimate for this activity.

Triangular distribution uses the same three points and the formula is much easier to use, but it's not as accurate; P+R+O/3.

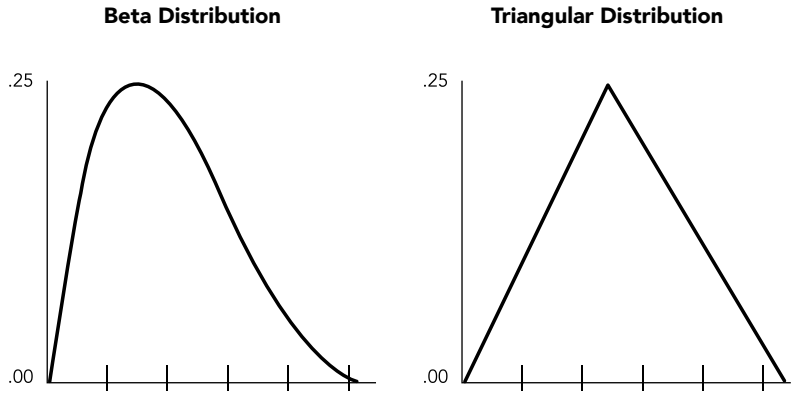
- 8+5+2/3 = 15/3 = 5 days is the estimate for this activity.

In this particular example, the values happen to be the same, but that won't always be the case. Let's look at the following example:

- **Beta:** 15+(4)7+3/6 = 46/6 = 7.67 days
- **Triangular:** 15+7+3/3 = 25/3 = 8.33 days

The values are different by a little less than a day. If you have a project where you need more accurate estimates, then you probably want to choose the beta distribution formula.

Tip: If you see the picture of a triangular distribution on the exam, it's easy to remember which one it is, it has three points and looks like a triangle. Here's a picture of what the two look like:



Another important formula to calculate is **standard deviation for PERT analysis**. The standard deviation formula is Pessimistic– Optimistic/6.

- 8-2/6 = 6/6 = 1 standard deviation from the estimate
- For the beta calculation, 5 days +/- 1 day

Tip: A good way to always remember the order of the PERT three-point estimate formula is to think of the word PRO. Just remember the R is multiplied by 4. By the time you finish practicing these formulas, you'll be a PRO: Pessimistic, Realistic(4) + Optimistic. See if that works for you.

[1]These definitions are taken from the Glossary of Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Sixth Edition, Project Management Institute Inc., 2017.