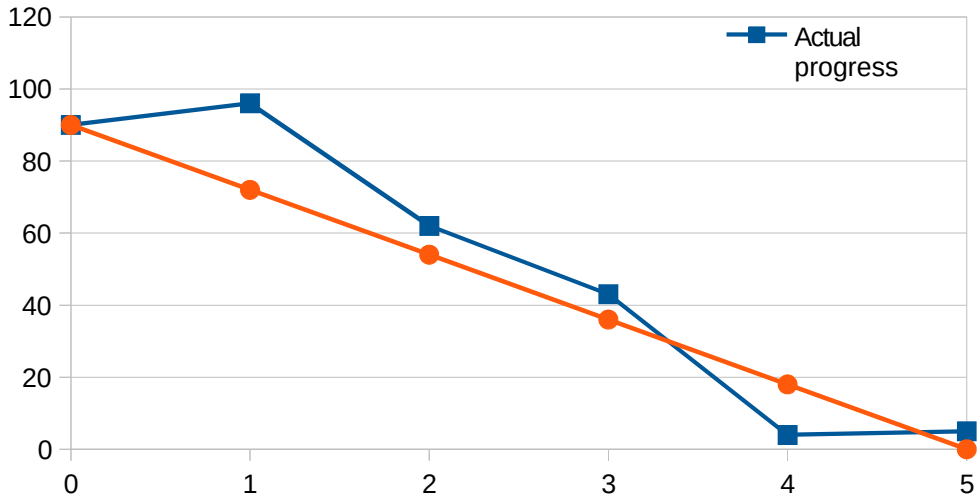
Exercise on Assessing the Status of an Agile Project (www.spmbook.com)

Q1. Consider the following sprint, dedicated to implementing three user stories. The duration of the sprint is 5 weeks and each column shows the remaining points at the end of the week. Column 0 is the initial estimation.

	0	1	2	3	4	5
The user shall be able to reserve a seat	20	15	10	10		
The user shall be able to cancel a seat	30	30	20	10		
The user shall be able to view list of movies	10	0	0	0		

1. What is the ideal burndown rate?
2. Is the project early or late, at the end of week 3?
3. Is the project early or late, at the of week 2?

Q2. Consider the following graph, in which we plot the actual progress and the ideal burndown of an hypothetical sprint of a software development project. Notice that the actual progress is non-monotonic (e.g., it increases on day 2 and 6) and above the ideal burndown. The end of the sprint is at day 5.



1. Could the graph represent an actual SCRUM sprint?
2. Under what conditions the actual progress in a SCRUM sprint could increase?
3. Is the project early or late at day 4?
4. Is the project early or late at day 5?

Q3. Use Agile EVA to assess the following project, which is organized with five sprints of five days each. The table on the left reports on estimation and progress, while the one on the right reports on the actual expenditure.

	Points	**Status**
User Story 1	25	
User Story 2	50	completed on week 3
User Story 3	100	completed on week 1
User Story 4	50	in progress
User Story 5	75	in progress
User Story 6	50	completed on week 2
User Story 7	50	
	400	

Project Budget	$20,000
Actual Costs	
Week 1	$5,000
Week 2	$5,000
Week 3	$2,000
Week 4	$2,000
Week 5	

Solution

Q1

1. Ideal burndown rate. The ideal burndown rate is the number of points that need to be burned each reporting period in order to complete the sprint on time.

In our case, we have 60 points to burn during the sprint. The sprint lasts 5 weeks. The ideal burndown rate, therefore, is 60/5 = **12 points per week**.

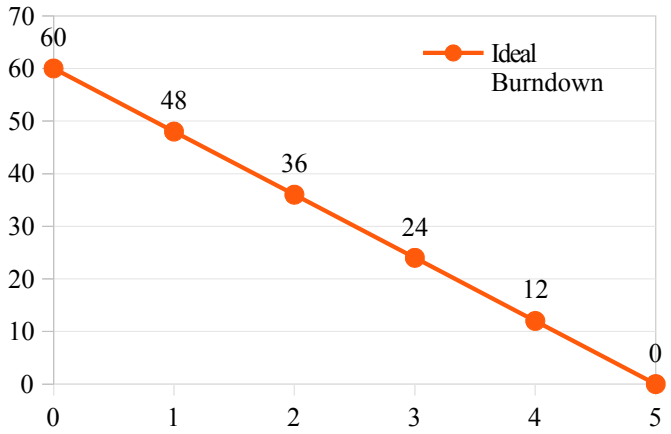
The ideal burndown rate provides the baseline for assessing whether development in a sprint is early or late and it can be plotted as a line connecting the following points:

(start, number of points) - (end, 0)

In our example:

(0, 60) - (5, 0)

as shown in the following graph:



2. Is the project early or late, at the end of week 3? To assess whether the project is early or late at the end of week 3, we need to compare the **actual burdown** (= how many points we have actually burned) with the **ideal burndown** (= how many points we should have burned to finish the sprint on time). If the actual burndown is above the ideal burndown, the project is late, while if the actual burndown is below the ideal burndown, the project is early.

In our case, the ideal burdown at the end of week 3 is 60 – 3 * 12 = 24, where 12 is the ideal burndown rate (as also shown in the graph above).

The actual burndown is the sum of the points to be burned at the end of week 3, namely 10 + 10 = 20.

Therefore the project is early.

3. Is the project early or late, at the end of week 2? By reasoning similarly to the previous point, the project is early also at the end of week 2 (since the ideal burndown is 36 and the actual burndown is 30).

Q2.

1. Could the graph represent an actual SCRUM sprint?

Yes: the actual burndown can be non-monotonic and above the ideal burndown. (The ideal

burndown is also at zero points at the end of the sprint, as one should expect.)

2. Under what conditions the actual progress in a SCRUM sprint could increase?

In some situations the actual burndown can increase, when the remaining points assigned to one or more story are increased during the sprint.

The most common situations for this to happen include:

1. The implementation of a story turns out to be wrong and points which we thought we had burned, need, in fact, to be reimplemented.
2. The implementation of a story requires more work than initially estimated (in the form of more points or additional tasks).

3. Is the project early or late at day 4?

Similar to the previous question, the assessment requires to evaluate the relative position of the ideal and actual burndown at the end of the assessment period.

At the end of day 4, the actual burndown is below the ideal burndown; hence the project is early.

4. Is the project early or late at day 5?

At the end of day 4, the actual burndown is above the ideal burndown; hence the project is late. (See above for the explanation.)

Q3. Use Agile EVA to assess a project.

Agile Earned Value Analysis is explained in: http://www.spmbook.com/downloads/slides/pdf/C03-09-AgileMonitoringAndControl.key.pdf

To briefly recap:

1. The technique requires to have an estimation of the total number of points to be burned (= a complete specification of the system to build), the total number of sprints, and the total budget allocated to the project.
2. The analysis is based on three values: **planned value** (based on the number of points expected to be burned at the end of each period), **actual costs** (based on the cash actually spent at the monitoring point), and **earned value** (based on the number of points actually burned).
3. To make the three values comparable, everything is expressed in terms of **percentages;** for instance earned value is the percentage of points burned with respect to the total number of points to burn. Similarly for the other values.
4. The way in which values are interpreted is similar to the traditional earned value analysis.

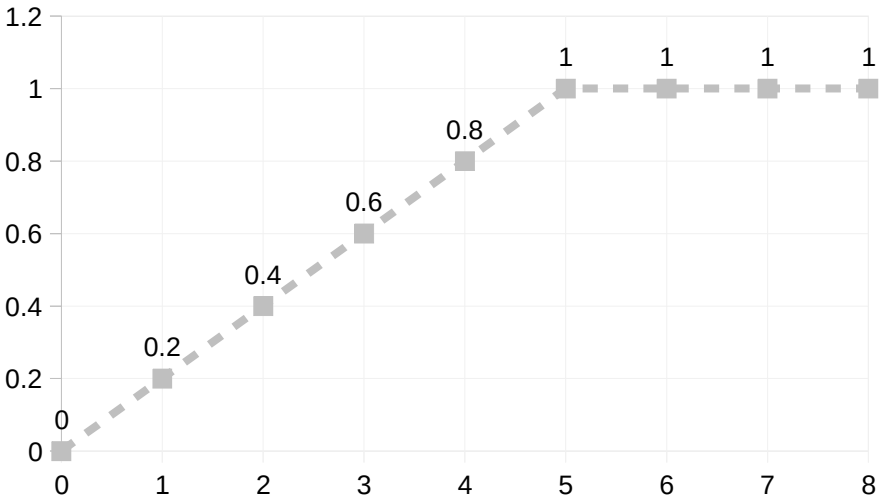
To perform the analysis, we start by plotting the **planned value**. This is computed as follows: since we have 5 sprints, we need to burn

$$\frac{100\,\%}{5} = 20\,\%$$

of the points at each sprint.

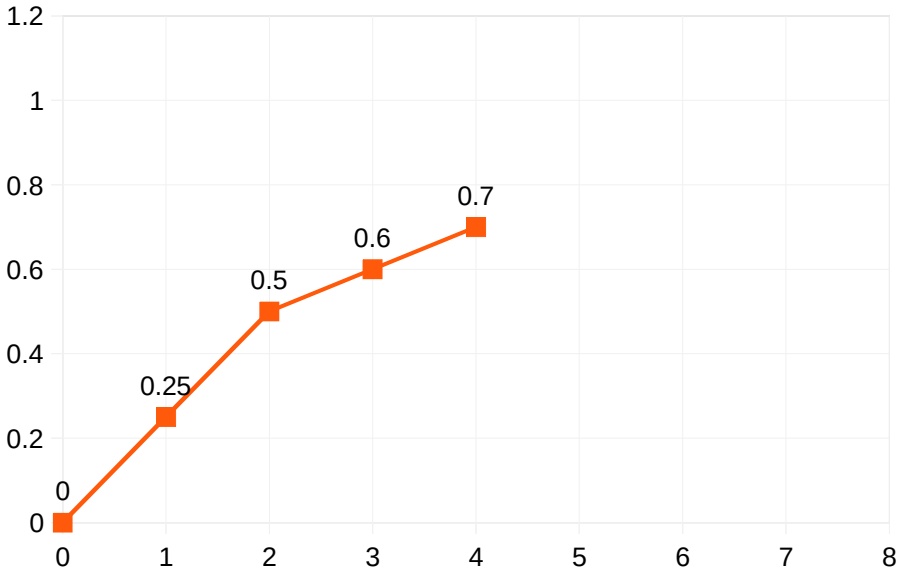
(If you want to repeat the calculation in a different way: we expect to burn all 400 points at the end of the fifth sprint. Therefore, we expect to burn: 400/5 = 80 points at each sprint, namely 80/400 = 20% of the total points at each sprint.)

The planned value, therefore, looks as follows:



Concerning the actual costs, we need to compute the percentage of cash "burned" (= spent) at the end of each period.

By looking at the second table, we can easily get the values. For instance, at the end of week 1, we have spent 25% of the project budget (5000/20000). Similarly for other sprints. By cumulating the values, we get the following graphs:



A similar reasoning can be performed concerning earned value. In this case we need to look at the product backlog to determine the percentage of points burned at the end of each sprint. This is summarized by the following table:

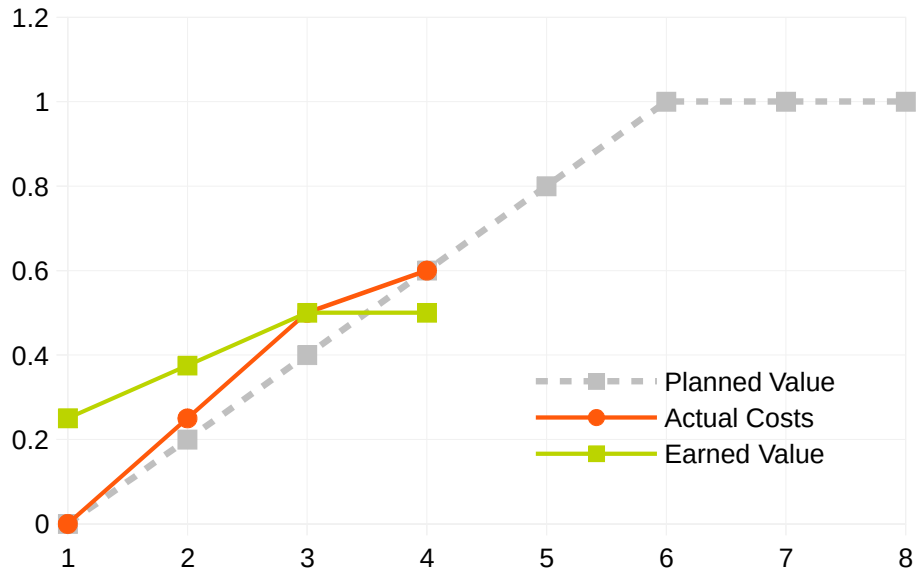
Sprint	Burned	Cumulative	Earned Value
1	100	100	25%
2	50	150	38%
3	50	200	50%
4	125	200	50%
5			
6			
7			
8			

Notice that the technique applies a 0-100% rule. Therefore the points being worked on do not count as "earned".

This applies to the 125 points marked as "in progress", which we assume to be in the current sprint (sprint 4).

The percentage is computed with respect to the number of total points to be burned (400).

We can now plot all three values in the same graph, to compare relative measures:



We can now compare relative values, similar to what we do with EVA. More in details:

1. Comparing **Planned Value with Earned Value** allows us to understand whether we are **late** or not. Since, at week 4, the earned value is below the planned value, we are late. (Matter of fact, if we look in more details at earned value, after an excellent start we gradually degraded our performances.)
2. Comparing **Earned Value and Actual Costs** allows us to understand whether we are under or **over** budget. Since, at week 4, the earned value is below the planned value, we are over budget, that is, for each percentange point we gain in earned value, we consume more than one percentage point in budget.

Notice also that if we compared actual costs with the planned value, we would arrive to the (wrong) conclusion that the project is on budget, since the values are the same, at week 4. This shows one of the advantages of Earned Value Analysis.