Time and Cost – MPM-02

PUTTING IT ALL TOGETHER EXAMPLE

The following example works as a summary of the main concepts studied along the course.

The example was developed as an adaptation, with some variations, of an example from the book: Successful project management from Jack Gido and James P. Clements, 6th edition.

The example represents a market study project with the following features:

1. The project should be finished in no more than 135 days.
2. There is a budget of no more than $40,000.00 to develop the project.
3. There are four human resources available for the project (Susan, Steve, Andy and Jim).
4. The work schedule is of 5 days (Monday to Friday) and 8 hours per day.
5. The main risk identified thus far is a potential delay, since there are past project experiences were there have been several delays.

Work Breakdown Structure (WBS):

The WBS showed on figure 1 is an input, and it is assumed to be correct for the effects of this example.

Notice that there are three levels on the WBS (0, 1, and 2) with two main deliverables (Questionnaire and Report) and four work packages (Design, Answers, Software, and Report).

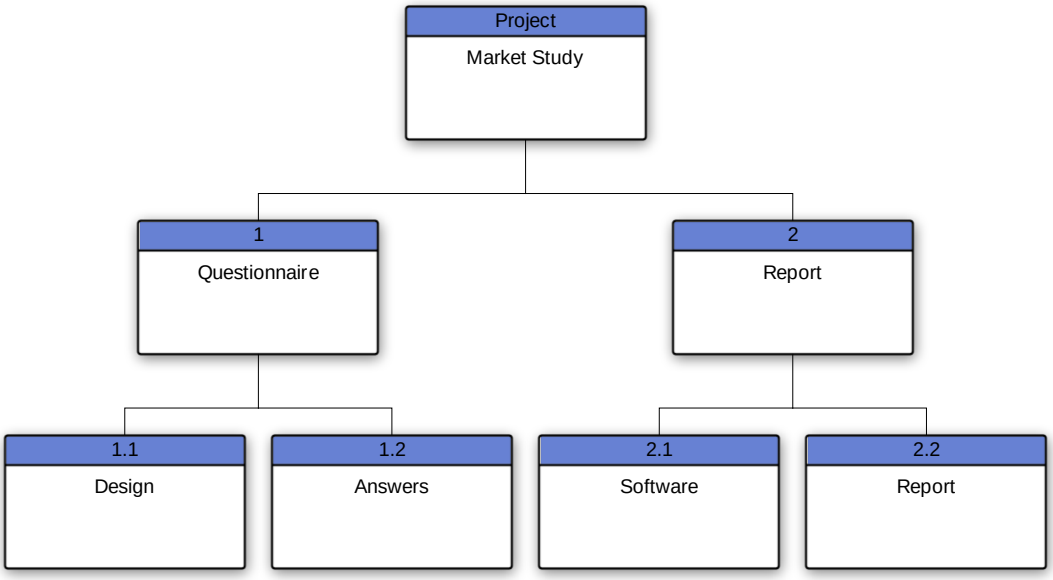


Fig. 1 Market Study WBS

1. Define activities process:

The first process corresponds to the activities definition, which is done by taking the work packages located on the lower branches of the WBS, as showed on figure 2, and as a result thirteen (13) activities are created.

1. Identify end users	1. Print questionnaire	1. Develop data analysis software	1. Input answer data
2. Develop preliminary questionnaire	2. Prepare mail labels	2. Test software	2. Results analysis
3. Pilot test	3. Mail questionnaire and obtain answers		3. Prepare report
4. Review comments and finish questionnaire			

5. Develop data test software			

Fig. 2 Work packages and activity definition

Besides the thirteen activities, 6 milestones are created as follows:

Milestones:

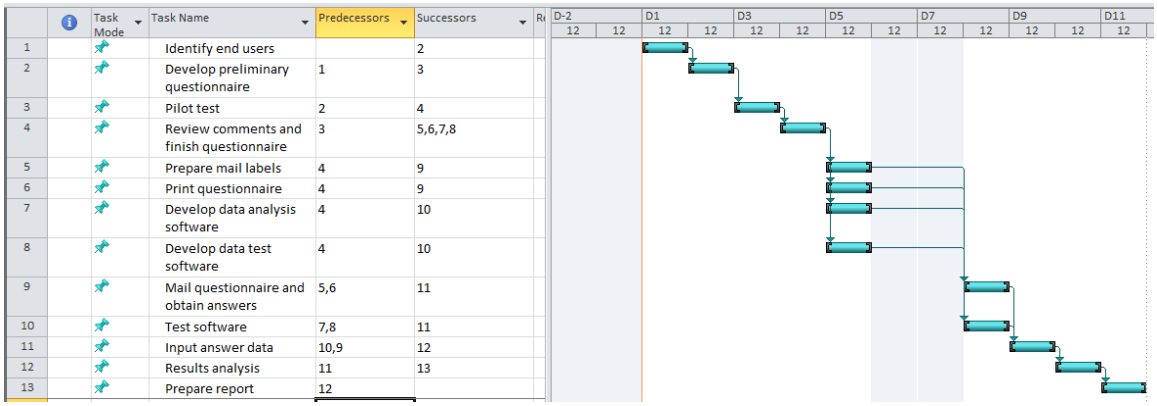
1. Project start
2. Design finish
3. Answers finish
4. Software finish
5. Report finish
6. Project finish

2. Sequence activities process:

The second process corresponds to defining the sequence to perform the activities defined on the first process. The logical order must be considered (obligatory dependencies), as well as the most convenient (discretionary dependencies). In figure 3, a table with the sequence is shown. Also, in figure 4, the same sequence is shown on a graphical network.

	Task Mode	Task Name	Predecessors	Successors
1		Identify end users		2
2		Develop preliminary questionnaire	1	3
3		Pilot test	2	4
4		Review comments and finish questionnaire	3	5,6,7,8
5		Prepare mail labels	4	9
6		Print questionnaire	4	9
7		Develop data analysis software	4	10
8		Develop data test software	4	10
9		Mail questionnaire and obtain answers	5,6	11
10		Test software	7,8	11
11		Input answer data	10,9	12
12		Results analysis	11	13
13		Prepare report	12	

Fig. 3 Sequence table



	Task Mode	Task Name	Predecessors	Successors
1		Identify end users		2
2		Develop preliminary questionnaire	1	3
3		Pilot test	2	4
4		Review comments and finish questionnaire	3	5,6,7,8
5		Prepare mail labels	4	9
6		Print questionnaire	4	9
7		Develop data analysis software	4	10
8		Develop data test software	4	10
9		Mail questionnaire and obtain answers	5,6	11
10		Test software	7,8	11
11		Input answer data	10,9	12
12		Results analysis	11	13
13		Prepare report	12	

Fig. 4 Sequence network

3. Estimate activity resources process:

The next process corresponds to the estimate activity resources process, in which the human resources, as well as materials, equipment and supplies for each activity, must be defined. To simplify this example, only human resources will be considered, as shown on figure 5 “Activity resources”.

	Task Mode	Task Name	Resource Names
1		Identify end users	Susan
2		Develop preliminary questionnaire	Susan
3		Pilot test	Susan
4		Review comments and finish questionnaire	Susan
5		Prepare mail labels	Steve
6		Print questionnaire	Steve
7		Develop data analysis software	Andy
8		Develop data test software	Susan
9		Mail questionnaire and obtain answers	Steve
10		Test software	Andy
11		Input answer data	Jim
12		Results analysis	Jim
13		Prepare report	Jim

Fig. 5 Activity resources

	Resource Name	Type	Initials	Max.	Std. Rate	Accrue At	Base Calendar
1	Susan	Work	Su	100%	$25.00/hr	Prorated	Standard
2	Steve	Work	St	100%	$35.00/hr	Prorated	Standard
3	Andy	Work	An	100%	$30.00/hr	Prorated	Standard
4	Jim	Work	J	100%	$40.00/hr	Prorated	Standard

Fig. 6 Activity resources and costs

Notice in figure 6 “Activity resources and cost”, the unit cost for each human resource. Also notice that the resource Steve is highlighted in red because this resource is overallocated (we will come back to this situation later on the example).

4. Estimate activity duration process

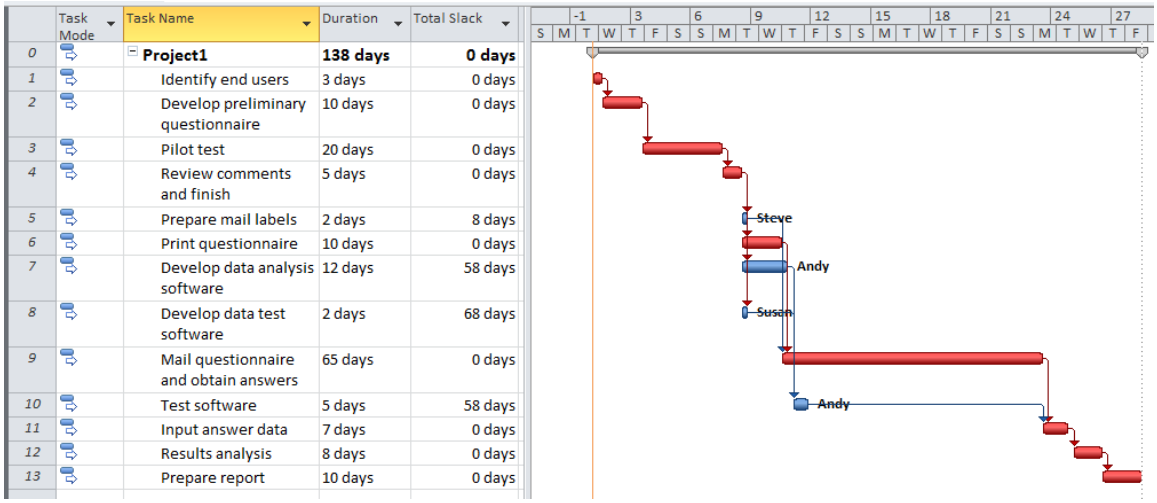
In order to perform this process, the amount of working periods required to do each activity, based on the assigned resources, should be determined. Now, let’s assume that, based on the resources available, the amount of work for each activity, and each activity nature, the duration is as shown on figure 7 “Activity duration”.

	Task Mode	Task Name	Duration
1		Identify end users	3 days
2		Develop preliminary questionnaire	10 days
3		Pilot test	20 days
4		Review comments and finish questionnaire	5 days
5		Prepare mail labels	2 days
6		Print questionnaire	10 days
7		Develop data analysis software	12 days
8		Develop data test software	2 days
9		Mail questionnaire and obtain answers	65 days
10		Test software	5 days
11		Input answer data	7 days
12		Results analysis	8 days
13		Prepare report	10 days

Fig. 7 Activity duration

5. Develop schedule process:

The final process for the time management planning corresponds to developing the schedule, which is done by integrating the previous processes in a way that the project schedule is created. The activity list, the sequence, the assigned resources, as well as the activities' duration are integrated to create the project schedule, as shown on figure 8 "Project schedule".



	Task Mode	Task Name	Duration	Total Slack
0		**Project1**	**138 days**	**0 days**
1		Identify end users	3 days	0 days
2		Develop preliminary questionnaire	10 days	0 days
3		Pilot test	20 days	0 days
4		Review comments and finish	5 days	0 days
5		Prepare mail labels	2 days	8 days
6		Print questionnaire	10 days	0 days
7		Develop data analysis software	12 days	58 days
8		Develop data test software	2 days	68 days
9		Mail questionnaire and obtain answers	65 days	0 days
10		Test software	5 days	58 days
11		Input answer data	7 days	0 days
12		Results analysis	8 days	0 days
13		Prepare report	10 days	0 days

Fig. 8 Project schedule

It must be noted that there is still a minor issue that needs to be solved. The resource Steve is over allocated, as shown on figure 9 "Resource graph".

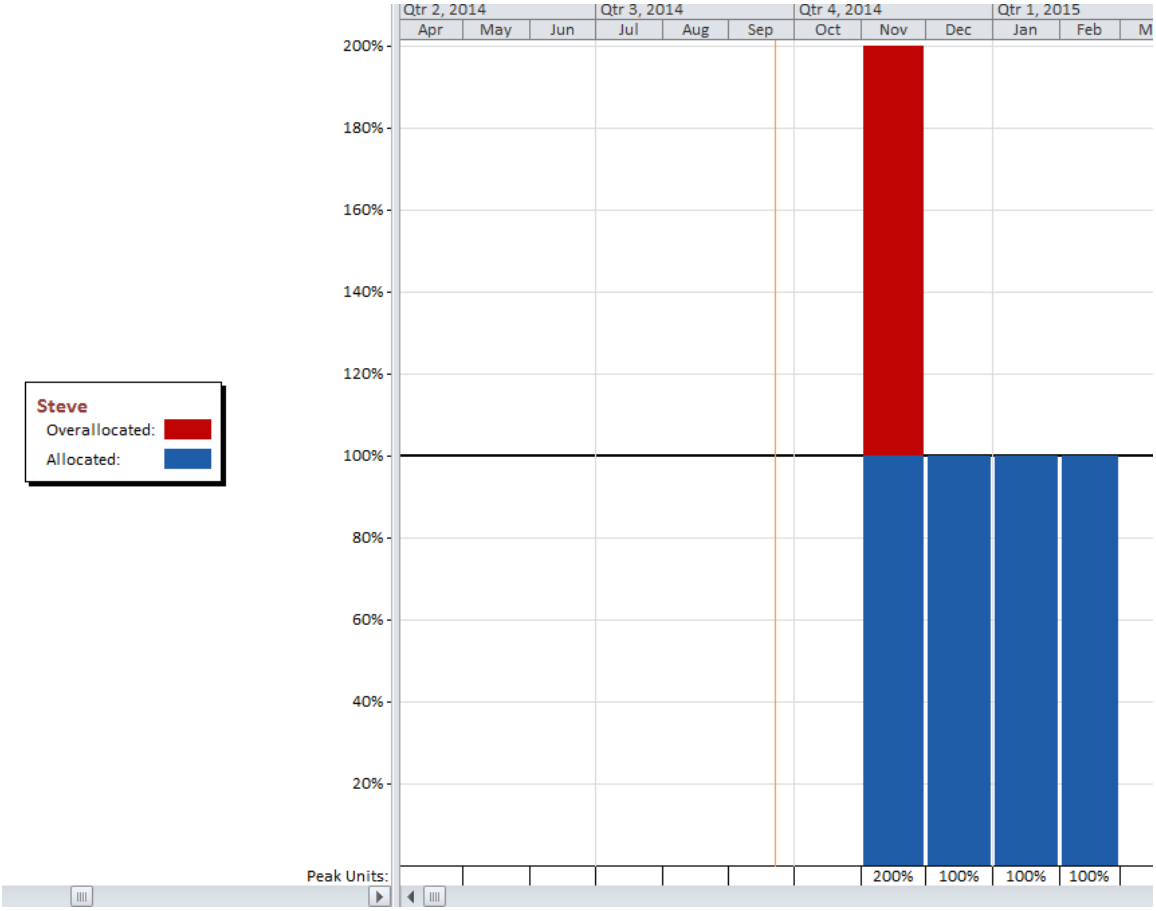
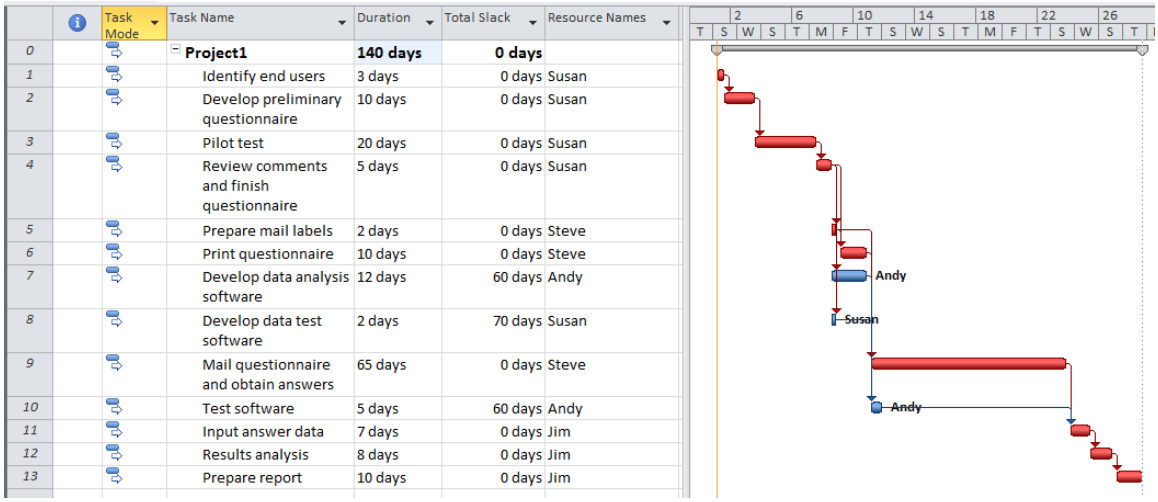


Fig. 9 Resource graph

To finalize the example, an easy way to solve the overallocation is to include a sequential dependency between activities 5 and 6, which solves the issue, but increases the project duration in two days. The final schedule is shown on figure 10 “Final project schedule”.



	Task Mode	Task Name	Duration	Total Slack	Resource Names
0		**Project1**	**140 days**	**0 days**	
1		Identify end users	3 days	0 days	Susan
2		Develop preliminary questionnaire	10 days	0 days	Susan
3		Pilot test	20 days	0 days	Susan
4		Review comments and finish questionnaire	5 days	0 days	Susan
5		Prepare mail labels	2 days	0 days	Steve
6		Print questionnaire	10 days	0 days	Steve
7		Develop data analysis software	12 days	60 days	Andy
8		Develop data test software	2 days	70 days	Susan
9		Mail questionnaire and obtain answers	65 days	0 days	Steve
10		Test software	5 days	60 days	Andy
11		Input answer data	7 days	0 days	Jim
12		Results analysis	8 days	0 days	Jim
13		Prepare report	10 days	0 days	Jim

Fig. 10 Final Project Schedule