Problem 6-20

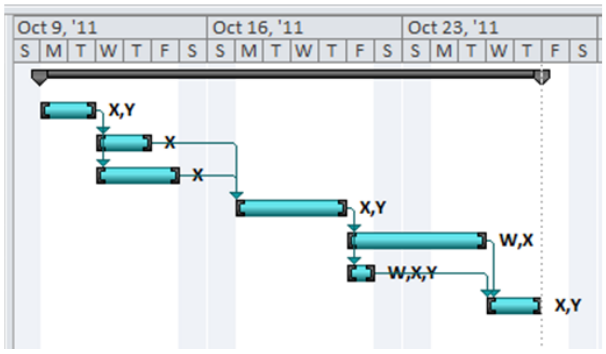
The following project activities are to landscape a new building site (use start date of Monday, October 10, 2011):

Activity	Predecessor	Duration (days)	Resource Used
A	-	2	X, Y
B	A	2	X
C	A	3	X
D	B, C	4	X, Y
E	D	3	W, X
F	D	1	W, X, Y
G	E, F	2	X, Y

a) Draw the Gantt chart using MSP
b) Assuming a five-day week, find the critical path and project duration in days
c) Given that each resource is assigned 100% to each task, identify the resource constraints
d) Using the MSP default, level the resources and determine the new project duration and critical path
e) Identify what alternative solutions can be used to shorten the project duration without over-allocating the resources

MSP Gantt Chart with Resources

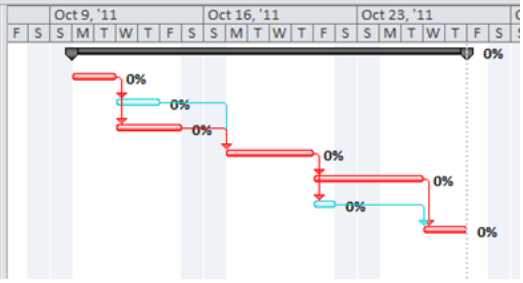
	Task Mode	Task Name	Duration	Predecessors	Resource Names
1		Landscape Project	14 days		
2		A	2 days		X,Y
3		B	2 days	2	X
4		C	3 days	2	X
5		D	4 days	3,4	X,Y
6		E	3 days	5	W,X
7		F	1 day	5	W,X,Y
8		G	2 days	6,7	X,Y



MSP Critical Path

View > Network Diagram > More Views > Tracking Gantt

Task Mode	Task Name	Duration	Predecessors	Resource Names
	Landscape Project	**14 days**		
	A	2 days		X,Y
	B	2 days	2	X
	C	3 days	2	X
	D	4 days	3,4	X,Y
	E	3 days	5	W,X
	F	1 day	5	W,X,Y
	G	2 days	6,7	X,Y



✓ Critical Path: A – C – D – E – G (project completion in 14 days)

Resource Usage

View > Resource Usage > Resource Usage

Note: double-click here to change headers, size, etc.

Resource Name	Work	Details	Oct 9, '11 Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Oct 16, '11 Sun	Mon	Tue	Wed	Thu	Fri	Sat	Oct 23, '11 Sun	Mon	Tue	Wed	Thu	Fri	Sat
X	136 hrs	Work			8h	8h	16h	16h	8h			8h	8h	8h	8h	16h			8h	8h	8h	8h		
A	*16 hrs*	Work			8h	8h																		
B	*16 hrs*	Work					8h	8h																
C	*24 hrs*	Work					8h	8h	8h															
D	*32 hrs*	Work										8h	8h	8h	8h									
E	*24 hrs*	Work														8h			8h	8h				
F	*8 hrs*	Work														8h								
G	*16 hrs*	Work																			8h	8h		
Y	72 hrs	Work			8h	8h						8h	8h	8h	8h	8h					8h	8h		
A	*16 hrs*	Work			8h	8h																		
D	*32 hrs*	Work										8h	8h	8h	8h									
F	*8 hrs*	Work														8h								
G	*16 hrs*	Work																			8h	8h		
W	32 hrs	Work														16h			8h	8h				
E	*24 hrs*	Work														8h			8h	8h				
F	*8 hrs*	Work														8h								

✓ Resource X is over utilized on Wednesday and Thursday of week 1, and Friday of week 2

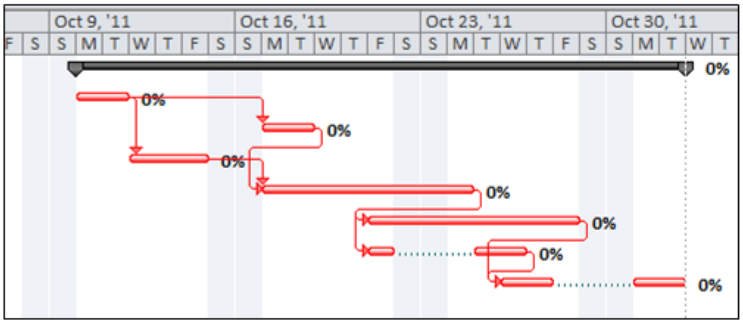
✓ Resource W is over utilized on Friday of week 2

Leveled Resources (X & W)

	Resource Name	Work	Details	'11 Mon	Tue	Wed	Thu	Fri	Sat	Sun	Oct 16, '11 Mon	Tue	Wed	Thu	Fri	Sat	Sun	Oct 23, '11 Mon	Tue	Wed	Thu	Fri	Sat	Sun	Oct 30, '11 Mon	Tue	We
1	X	136 hrs	Work	8h	8h	8h	8h	8h			8h	8h	8h	8h	8h			8h	8h	8h	8h	8h			8h	8h	
	A	*16 hrs*	Work	8h	8h																						
	B	*16 hrs*	Work								8h	8h															
	C	*24 hrs*	Work			8h	8h	8h																			
	D	*32 hrs*	Work								0h	0h	8h	8h	8h			8h									
	E	*24 hrs*	Work												0h			0h	0h	8h	8h	8h					
	F	*8 hrs*	Work												0h			0h	8h								
	G	*16 hrs*	Work																	0h	0h	0h			8h	8h	
2	Y	72 hrs	Work	8h	8h						8h	8h	8h	8h	8h					8h	8h						
	A	*16 hrs*	Work	8h	8h																						
	D	*32 hrs*	Work								8h	8h	8h	8h													
	F	*8 hrs*	Work												8h												
	G	*16 hrs*	Work																	8h	8h						
3	W	32 hrs	Work												8h			8h	8h	8h							
	E	*24 hrs*	Work												8h			8h	8h								
	F	*8 hrs*	Work												0h			0h	0h	8h							
			Work																								

Resource Leveling

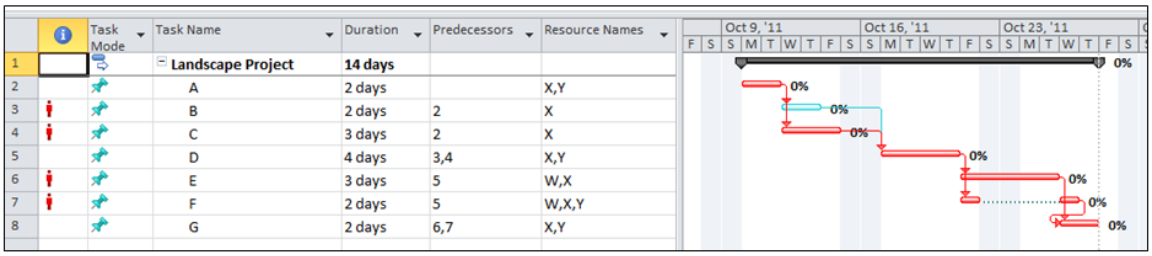
	Task Mode	Task Name	Duration	Predecessors	Resource Names
1		**Landscape Project**	**17 days**		
2		A	2 days		X,Y
3		B	2 days	2	X
4		C	3 days	2	X
5		D	6 days	3,4	X,Y
6		E	6 days	5	W,X
7		F	3 days	5	W,X,Y
8		G	4 days	6,7	X,Y



- ✓ After leveling the project duration is 17 days
- ✓ The critical path is has changed to A-B-C-D-E-F-G

Alternative Solutions to Shorten Project Duration

In the Resource Usage view, select only Resource W for leveling…



	Task Mode	Task Name	Duration	Predecessors	Resource Names
1		Landscape Project	14 days		
2		A	2 days		X,Y
3		B	2 days	2	X
4		C	3 days	2	X
5		D	4 days	3,4	X,Y
6		E	3 days	5	W,X
7		F	2 days	5	W,X,Y
8		G	2 days	6,7	X,Y

- ✓ After leveling only Resource W, the project duration is back to 14 days (*Note, leveling only X result in a project duration of 17 days…try it!*)
- ✓ The critical path is A – C – D – E - F - G

Problem 6-23

Given the project shown in Figure 5-10 of Chapter 5 and the fact that the facility used by activities **c** and **d** is scarce, which activity would benefit from each of the rules?

The following Table shows the activity, slack, critical followers, duration, and latest start time for activities **c** and **d**:

Activity	Slack	Followers	Critical Followers	Duration	Latest Start Time
c	3	**f**,i	None	3	8
d	2	**g**,**h**,**j**	**h**,**j**	4	7

a. Using the minimum slack rule: Activity **d**D has the least amount of slack and therefore would get the facility first using this rule.

b. Most followers … **d** has the most followers and would get the facility first.

c. Most critical followers … **d** has the most critical followers and would get the facility first.

d. Shortest task first … **c** has a smaller duration and would get the facility first.

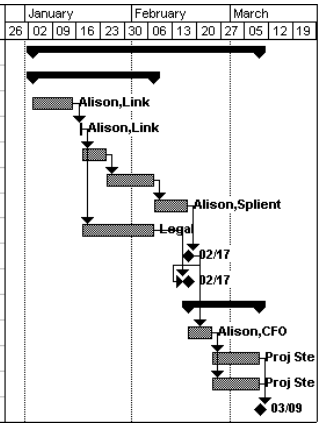
e. With the "as late as possible" priority rule, the latest start times are used. In this case activity **c** has a LS of 8 and **d** has a LS of 7. In using this rule it only makes sense to assign the facility to the resource with the earliest LS or activity **d**.

St. Dismas Assisted Living Facility Resource Usage – Part 4
Solution Considerations

Question 1: Prepare a Gantt chart with resources for the action plan Dr. Alison submitted. Begin this project on January 2. Prepare a resource calendar for Dr. Alison.

The following is the Gantt chart of the action plan presented in the case.
Note: the case stated to start the project on January 2, if students use the year 2000, the project will actually begin work on January 3rd, as January 2nd is a non-working day. If students use January 2, 2001 (or later), the project will start on January 2nd. The start date used in these examples is January 2, 2000, to coincide with the year that the case started.

ID	Task Name	Duration	Start	Finish	Predec.	Resource Names
1	**Medical/Health services determined**	**48.25 days**	**01/03/00**	**03/09/00**		
2	Physical health assessment tool for residents developed	**25.75 days**	**01/03/00**	**02/07/00**		**Alison,Link**
3	Develop tool	2 wks	01/03/00	01/14/00		Alison,Link
4	Test of assessment tool conducted by physicians (12 patients)	6 hrs	01/17/00	01/17/00	3	Alison,Link
5	Revise tool as necessary	1 wk	01/17/00	01/24/00	4	
6	Test of tool conducted by others (i.e., phys. asst., RN, therapist)	2 wks	01/24/00	02/07/00	5	
7	Admission & Discharge criteria finalized	1.5 wks	02/07/00	02/17/00	6	Alison,Splient
8	Investigate copyrighting assessment tool	3 wks	01/17/00	02/07/00	4	Legal
9	Assessment tool finalized	0 days	02/17/00	02/17/00	7	
10	Copyright tool	0 days	02/17/00	02/17/00	8,9	
11	Financial impact of health services determined	**15 days**	**02/17/00**	**03/09/00**		
12	Costs determined	1 wk	02/17/00	02/24/00	9	Alison,CFO
13	Scope of health services determined to include in base rate	2 wks	02/24/00	03/09/00	12	Proj Steering Team
14	Scope of services to provide on a fee for service basis	2 wks	02/24/00	03/09/00	12	Proj Steering Team
15	Finalize services and programs to be offered	0 days	03/09/00	03/09/00	13,14	



Question 2: How would you handle Dr. Alison's resource problem?

The resource issue that Dr. Alison has should be handled by adjusting the project schedule to allow for the scheduling constraints.

The case states that Dr. Alison can perform all of the project steps within his 8 a.m. to 5 p.m. normal work week, however he will only be able to perform the "Test of the assessment tool" during his administrative time on Wednesday's from 8 a.m. to 12 p.m. Since that step is important to the success of the project, it is necessary to adjust the project plan to reflect Dr. Alison's scheduling conflict. It is not appropriate to add another resource, or over-allocate Dr. Allison to get this task done within the time frame specified.

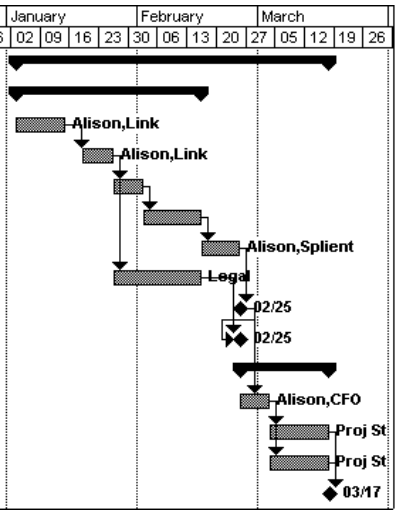
Question 3: Given Dr. Alison's availability, how long will it take to complete testing of the assessment tool?

Based on Dr. Alison's availability to complete the step "Test of the assessment tool", Step #4 will now take from January 19, 2000 – January 26, 2000. Please note that the task's duration remains at 6 hours, however with Dr. Alison only available to work on the step from 8 a.m. – 12 p.m. one day a week, the step will now take an extra calendar week to complete. Without the constraint the task could begin as soon as Step #3 was completed, January 14. However, with the constraint applied, Step #4 cannot begin until the following Wednesday when Dr. Alison is available, and he can only work 4 hours on that day, so another 2 hours the following Wednesday is necessary to complete the task.

Question 4: Prepare a Gantt chart for Dr. Alison's plan incorporating any changes you recommend.

The Gantt chart below shows the scheduling changes adjusted for the availability of Dr. Alison to complete step #4 in the action plan.

ID	Task Name	Duration	Start	Finish
1	**Medical/Health services determined**	**54.75 days**	**01/03/00**	**03/17/00**
2	Physical health assessment tool for residents developed	**32.25 days**	**01/03/00**	**02/16/00**
3	Develop tool	2 wks	01/03/00	01/14/00
4	Test of assessment tool conducted by physicians (12 patients)	6 hrs	01/19/00	01/26/00
5	Revise tool as necessary	1 wk	01/26/00	02/02/00
6	Test of tool conducted by others (i.e., phys. asst., RN, therapist)	2 wks	02/02/00	02/16/00
7	Admission & Discharge criteria finalized	1.5 wks	02/16/00	02/25/00
8	Investigate copyrighting assessment tool	3 wks	01/26/00	02/16/00
9	Assessment tool finalized	0 days	02/25/00	02/25/00
10	Copyright tool	0 days	02/25/00	02/25/00
11	Financial impact of health services determined	**15 days**	**02/25/00**	**03/17/00**
12	Costs determined	1 wk	02/25/00	03/03/00
13	Scope of health services determined to include in base rate	2 wks	03/03/00	03/17/00
14	Scope of services to provide on a fee for service basis	2 wks	03/03/00	03/17/00
15	Finalize services and programs to be offered	0 days	03/17/00	03/17/00



Or with a more detailed view of the calendar: