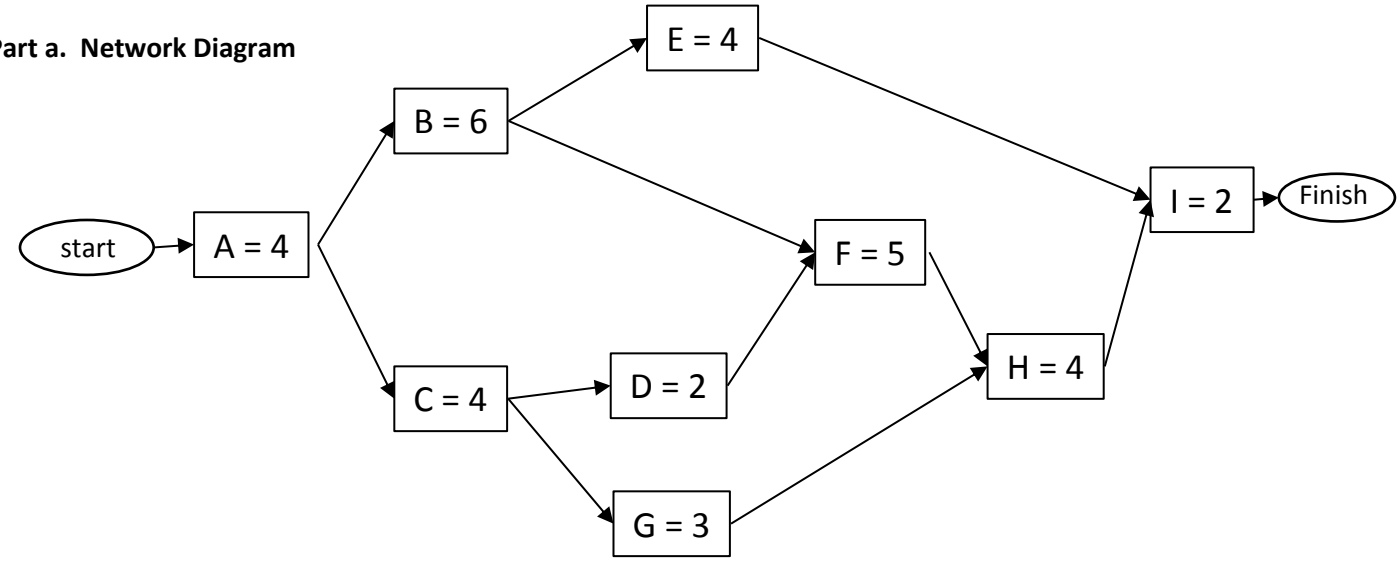
Problem 5-25

Part a. Network Diagram



Part b. EST, EFT, LST, LFT
-- see the table below

Part c. Alternative paths
… and the critical path:

Path	Duration	Critical?
a-b-e-i	16	No
a-b-f-h-i	21	Yes
a-c-d-f-h-i	21	Yes
a-c-g-h-i	17	No

There are, therefore, two critical paths!

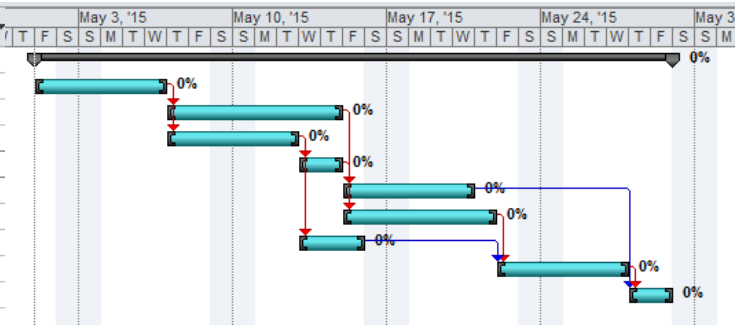
Activity	EST	EFT	LST	LFT	Slack
A	0	4	0	4	0
B	4	10	4	10	0
C	4	8	4	8	0
D	8	10	8	10	0
E	10	14	15	19	5
F	10	15	10	15	0
G	8	11	12	15	4
H	15	19	15	19	0
I	19	**21**	19	**21**	0

Part d. Slack for each Activity
– see the table

Part e. The project will require
21 days to complete.

Using MS Project: Same result

	Task Name	Duration	Start	Finish	Predecessors
1	**Project Summary**	**21 days**	**Fri 5/1/15**	**Fri 5/29/15**	
2	A	4 days	Fri 5/1/15	Wed 5/6/15	
3	B	6 days	Thu 5/7/15	Thu 5/14/15	2
4	C	4 days	Thu 5/7/15	Tue 5/12/15	2
5	D	2 days	Wed 5/13/15	Thu 5/14/15	4
6	E	4 days	Fri 5/15/15	Wed 5/20/15	3
7	F	5 days	Fri 5/15/15	Thu 5/21/15	3,5
8	G	3 days	Wed 5/13/15	Fri 5/15/15	4
9	H	4 days	Fri 5/22/15	Wed 5/27/15	7,8
10	I	2 days	Thu 5/28/15	Fri 5/29/15	6,9



St. Dismas Assisted Living Facility Project Plan – 3
Solution Considerations

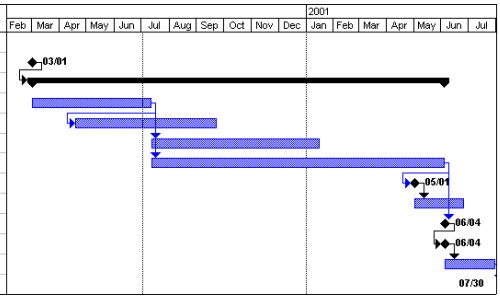
This installment of the St. Dismas case provides you with an opportunity to further develop their skills in creating and using Gantt charts.

Question 1: Draw a Gantt chart for the construction phase of the project. What is the completion date if construction starts in March? What is the completion date of the project if construction is started in November?

The following is the Gantt chart using MSP with a March 1, 2000 start date. You can use this start start date for our class if you consistency with the suggested solutions, or use any other date you prefer. This was entered using the standard calendar defaults used by MSP of a Monday through Friday 8 am to 5 pm workday with an hour off for lunch. The project completion date is 7/30/01.

Note: Start and finish milestones were added to the action plan for ease in identifying the project's start and finish dates.

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Construction & Furnishing**	**369 days**	**03/01/00**	**07/30/01**	
2	Start Project	0 days	03/01/00	03/01/00	
3	Facility construction	**329 days**	**03/01/00**	**06/04/01**	2
4	Phase 1 - Foundation & excavation (basement/1st floor slab)	95 days	03/01/00	07/11/00	
5	Phase 2 - Structure (steel/framing)	113 days	04/19/00	09/22/00	4FS-60 days
6	Phase 3 - Enclosure (masonry/windows/roof)	134 days	07/12/00	01/15/01	4
7	Phase 4 - Interiors (drywall/ceiling/flooring/casegoods)	234 days	07/12/00	06/04/01	4
8	First 45 (light assisted) units ready to prepare for occupancy	0 days	05/01/01	05/01/01	7FS-5 wks
9	First 45 units ready for residents	8 wks	05/01/01	06/25/01	8
10	Remaining 57 units (light & heavy) ready to prepare for occup	0 days	06/04/01	06/04/01	7
11	Construction complete	0 days	06/04/01	06/04/01	10
12	Building ready for residents	8 wks	06/05/01	07/30/01	11
13	Finish Project	0 days	07/30/01	07/30/01	12

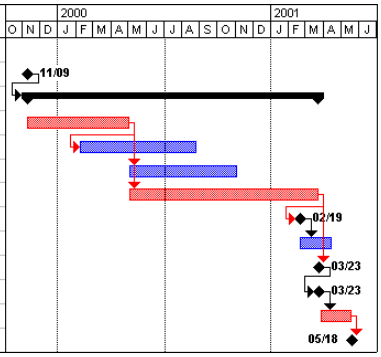


The following is the Gantt chart using MSP with a November 9, 1999 start date. This start date was chosen because one of the constraints placed on the project was that it does not begin until after the elections in November. Elections are usually held the first Tuesday in the month of November. The case stated that one to two months was estimated as needing to be added to the project schedule to allow for bad weather conditions during the outside construction phases of the project (30 - 60 working days). Days of work need to be added to the duration of each of the steps where work takes place outside if it will happen during the winter months.

Note: The authors chose to add 30 days to each of the steps affected, step # 4 and #5. Step #6 is also work done outside, but with the changes made to #4 and #5, step #6 will not start until the month of April. Students may also change the calendars to let the workers off for the holidays of 1999 in addition to those allowed for in 2000. The new ending date is May 18, 2001. The project will take a total of 30 additional days to complete. By adding 30 days of working time to each of the steps possibly affected by the weather, we only ended up adding 30 days total to the project.

This is a good discussion point of how the tasks affected by the increased durations were not both on the critical path - only Step #4 extended the length of the project. However, the student's must keep in mind resource availability and the increased cost of the project extension.

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Construction & Furnishing**	**399 days**	**11/09/99**	**05/18/01**	
2	Start Project	0 days	11/09/99	11/09/99	
3	Facility construction	**359 days**	**11/09/99**	**03/23/01**	2
4	Phase 1 - Foundation & excavation (basement/1st floor slab)	125 days	11/09/99	05/01/00	
5	Phase 2 - Structure (steel/framing)	143 days	02/08/00	08/24/00	4FS-60 days
6	Phase 3 - Enclosure (masonry/windows/roof)	134 days	05/02/00	11/03/00	4
7	Phase 4 - Interiors (drywall/ceiling/flooring/casegoods)	234 days	05/02/00	03/23/01	4
8	First 45 (light assisted) units ready to prepare for occupancy	0 days	02/19/01	02/19/01	7FS-5 wks
9	First 45 units ready for residents	8 wks	02/19/01	04/13/01	8
10	Remaining 57 units (light & heavy) ready to prepare for occupancy	0 days	03/23/01	03/23/01	7
11	Construction complete	0 days	03/23/01	03/23/01	10
12	Building ready for residents	8 wks	03/26/01	05/18/01	11
13	Finish Project	0 days	05/18/01	05/18/01	12



Question 2: Why is it not possible to meet the scheduling constraints set by the Board? What is your recommendation to handle the scheduling problem?

The case outlined two specific constraints that the Board placed on the project:

- The project should not start until after the elections in November, and
- The building must be ready for occupancy by July of the following year since the board wanted to target occupancy for the summer months.

The constraint of the building opening by July of the year following construction beginning cannot be met. No matter when the project begins it takes longer than one year to complete. If the project begins immediately after the November 1999 elections it will be completed by May 18, 2001, if the project begins in March of 2000 (as recommended by the construction manager) it will be completed by July 30, 2001.

The constraint of construction beginning after the November elections can be met without any affect on the project. Meeting the July complete occupancy constraint is possible only if the project is started in the winter months, this would add cost and time to the project. It would also make the first units available in April, which is before the targeted "summer" occupancy. Recall that the case stated that research showed that most people shopped for assisted living facilities during the summer months. A summer occupancy could be met by starting the project March 1, 2000, without additional time or cost added to the original estimated project action plan. 45 units would be available for occupancy as early as June 25, 2001 (see step #9 of Gantt chart with 3/1/00 start date).

Question 3: When will the project be completed based on your recommendation?

If students chose to start the project on:

- March 1, 2000 … the entire project will be completed by July 31, 2001.

- February 1, 2000 … without any schedule changes due to weather conditions, the project would be completed by June 29, 2001.

By using MSP to change the project's start date, students can easily choose various new start dates and see the associated project end date.

Question 4: Draw a Gantt Chart of the Marketing Plan and Implementation Phase of the Project. Determine the start date of the Marketing Plan phase of the project in order to meet your recommended facility ready for occupancy date?

Note: We assumed a March 1, 2000 start date for the project.

Below is the Gantt chart for the steps in the Marketing Plan and Implementation phase of the St. Dismas Assisted Living Project. The action steps were taken directly from the Marketing plan developed and implemented section of the broad marketing plan that was presented in the case.

To determine the project's start date, you must first determine the start date of the final step in the project action plan, "Implementation of the Marketing Plan". This must be started 5 months prior to the building being ready for occupancy so that

marketing has time to find residents to move in when the facility is available. The marketing plan must be implemented based on the date that the first 45 units are ready for residents. This date is June 25, 2001.

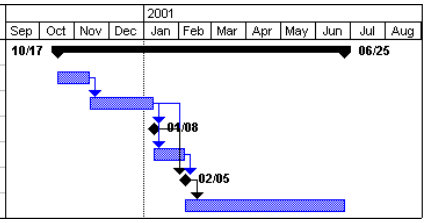
In order to determine the start date of the Implementation task, Step #7, one can schedule this project backwards, we know the completion date, we do not know when to start. Once we enter the projects completion date, MSP will determine when each step of the project should take place. First enter all of the tasks names, precedences, and their durations, as shown below:

ID	Task Name	Duration	Predecessors
1	**Marketing plan developed and implemented**	**180 days**	
2	PR firm contracted	4 wks	
3	Marketing plan developed	8 wks	2
4	Determine name and signage for facility	0 days	3
5	Hire Marketing Director	4 wks	3
6	Marketing plan ready to implement	0 days	3,4,5
7	Implementation of marketing plan - 5 months before facility ready then o	20 wks	6

Next, we must enter this project's overall finish date, using the project information dialog box, found in the "Project" menu on the tool bar.

Enter an end date of 6/25/01, and select "Schedule from the project finish date". MSP will automatically determine each step's start and end date to meet the constraint you set. See below:

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Marketing plan developed and implemented**	**180 days**	**10/17/00**	**06/25/01**	
2	PR firm contracted	4 wks	10/17/00	11/13/00	
3	Marketing plan developed	8 wks	11/14/00	01/08/01	2
4	Determine name and signage for facility	0 days	01/08/01	01/08/01	3
5	Hire Marketing Director	4 wks	01/09/01	02/05/01	3
6	Marketing plan ready to implement	0 days	02/05/01	02/05/01	3,4,5
7	Implementation of marketing plan	20 wks	02/06/01	06/25/01	6



Question 5: What is the next step the team members must take in order to complete their action plans?

Each member of the project steering team needs to prepare final action plans, including dates and resources. The team must also determine the predecessors from outside their specific plan that link to their plans; for example if a step cannot be completed on the marketing phase of the project until Legal has completed a step in their project plan, this must be noted on the action plan. This will enable a complete overall integrated project action plan to be tied to the project budget, monitored and controlled.