

THE POM+ PROJECT*

Big Kola Company has been concerned that specialized fruit drinks have been eroding their cola market. The CEO mandates that "If you can't beat them, join them." Grape juice was the first product that was successful after an advertising blitz claiming the antioxidant benefits. Lately, competition is compressing grape juice margins and profits. Months of additional market surveys and focus groups have resulted in three potential high-margin drinks: cranberry, blueberry, and pomegranate. All these choices represent antioxidants. The decision is to produce the pomegranate drink that has many health claims. For example, the relative ability of these juices to eliminate harmful free radicals (antioxidants) is 71 percent for pomegranate, 33 percent for blueberry, and 20 percent for cranberry (Technion Institute of Technology). The market potential appears very attractive and should have a higher profit margin than the other potential juice products. Another appeal for pomegranate juice is its familiarity in the Middle East and Asia.

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The Priority Matrix for the POM+ Project is:

	Time	Scope	Cost
Constrain			X
Enhance		X	
Accept	X		

Connor Gage, the project manager, has formed his project team and the members have come up with the following work breakdown structure.

- 1.0 POM+Project
 - 1.1 R&D product development
 - 1.1.1 Need survey
 - 1.1.2 Set product specs
 - 1.1.3 Shelf life report
 - 1.1.4 Nutrition report
 - 1.2 Secure fruit suppliers
 - 1.3 Initial Production
 - 1.3.1 Equipment rehab
 - 1.3.2 Production trials
 - 1.3.3 Quality trials
 - 1.3.4 Quality metrics
 - 1.3.5 Quality training
 - 1.4 Distribution
 - 1.4.1 Market testing
 - 1.4.2 Package design
 - 1.4.3 Select distributors
 - 1.5 Legal
 - 1.5.1 Complete FDA certification
 - 1.5.2 Register trademark
 - 1.6 Prepare product launch

Part 1

1. Develop the WBS outline using the software available (save your file).
2. Use this file and the information provided below to create a project schedule.
3. The following holidays are observed: January 1, Martin Luther King Day (third Monday in January), Memorial Day (last Monday in May), July 4th, Labor Day (first Monday in September), Thanksgiving Day (4th Thursday in November), December 25 and 26.
4. If a holiday falls on a Saturday then Friday will be given as an extra day off, and if it falls on a Sunday then Monday will be given off.
5. The project team works eight-hour days, Monday through Friday.
6. The project will begin on January 3, 2012.

7. Based on this schedule, submit a memo that answers the following questions:
- When is the project estimated to be completed? How many working days will it take?
 - What is the critical path?
 - Which activity has the most total slack?
 - How sensitive is this network?
 - Identify two sensible milestones and explain your choice.

Include the following (one page) printouts:

- A Gantt chart.
- A network diagram highlighting the critical path.
- A schedule table reporting ES, LS, EF, LF, and slack for each activity.

Hints: Change the timescale to months and weeks. The estimated duration of the project is 135 days.

Remember: Save your files for future exercises!

The following information has been derived from the WBS. *Note* that the activity number is what appears in the software with the complete WBS entered.

#*	Activity	Duration	Predecessor(s)
3	Need survey	20	None
4	Set product specs	15	3
5	Shelf life report	10	4
6	Nutrition report	5	4
7	Select fruit suppliers	20	5, 6
9	Equipment rehab	30	4
10	Production trials	15	7, 9
11	Quality trials	20	10
12	Quality metrics	5	11
13	Quality training	15	12
15	Market testing	30	5, 6
16	Package design	15	15
17	Select distributors	25	5, 6
19	Complete FDA certification	15	7, 15
20	Register trademark	5	7, 15
21	Prepare product launch	15	13, 16, 17, 19FS + 25 days, 20FS + 15 days

FS = Finish to Start lag

Part 2

Remember the old saying, "A project plan is not a schedule until resources are committed." This exercise illustrates this sometime subtle, but important point.

Using your files from Part 1, input resources and their costs if you have not already done so. All information is found in Tables A2.1 and A2.2.

TABLE A2.1
Resource Assignments

Activity	Resources
Need survey	MRKT (500%)
Set product specs	R&D (400%), MRKT (200%)
Shelf life report	R&D (300%)
Nutrition report	R&D (300%)
Select fruit suppliers	PURCH (100%)
Equipment rehab	ENG (1,000%), PROD (2,000%)
Production trials	PROD (1,500%), PURCH (100%), ENG (1,000%)
Quality trials	QUAL (300%), PROD (500%)
Quality metrics	QUAL (300%), PROD (100%)
Quality training	QUAL (300%), PROD (1,500%)
Market testing	MRKT (500%)
Package design	DESIGN (300%), MRKT (100%)
Select distributors	MRKT (500%)
Complete FDA certification	LEGAL (300%)
Register trademark	LEGAL (300%)
Prepare product launch	QUAL (300%), PURCH (200%), PROD (1,500%), MRKT (500%), ENG (500%), R&D (100%)

TABLE A2.2
Resources Availability and Pay Rates

Resource	Abbrev	Available	Hourly rate
Marketing staff	MRKT	5	\$ 80/hr
R&D	R&D	5	\$ 80/hr
Engineering	ENG	10	\$100/hr
Purchasing	PURCH	2	\$ 60/hr
Quality engineers	QUAL	3	\$ 80/hr
Designers	DESIGN	3	\$ 60/hr
Legal staff	LEGAL	3	\$120/hr
Production	PROD	20	\$ 60/hr

Prepare a memo that addresses the following questions:

1. Which if any of the resources are overallocated?
2. Assume that the project is time constrained and try to resolve any overallocation problems by leveling within slack. What happens?
3. What is the impact of leveling within slack on the sensitivity of the network?

Include a Gantt chart with the schedule table after leveling within slack.

4. Assume the project is resource constrained and resolve any overallocation problems by leveling outside of slack. What happens?

Include a Gantt chart with the schedule table after leveling outside of slack.

Note: No splitting of activities is allowed.

Note: No partial assignments (e.g., 50 percent). All resources must be assigned 100 percent.

Part 3

Top management has accepted the July 19th completion schedule created at the end of Part 2. Prepare a brief memo that addresses the following questions:

1. How much will the project cost? What is the most expensive activity?
2. What does the cash flow statement tell you about how costs are distributed over the life span of the project?

Include a monthly cash flow for the project.

Once you are confident that you have the final schedule, save the file as a baseline. **Hint:** Save a backup file just in case without baseline!

Part 4 A

Assume that today is March 31, 2012, and Table A2.3 contains the tracking information for the project up till now. Enter this information into your saved baseline file and prepare a status report for the first three months of the POM+ project.

TABLE A2.3
Status Report March 31, 2012

Activity	Actual Start	Actual Finish	Actual Duration	Remaining Duration
Need survey	1/3/12	2/2/12	22	0
Set product specs	2/3/12	2/28/12	18	0
Shelf life report	2/29/12	3/13/12	10	0
Nutrition report	3/14/12	3/19/12	4	0
Equipment rehab	2/29/12		23	12

Your status report should also address the following questions:

1. How is the project progressing in terms of cost and schedule?
2. What activities have gone well? What activities have not gone well?
3. What do the PCIB and PCIC indicate in terms of how much of the project has been accomplished to date?
4. What is the forecasted cost at completion (EAC_f)? What is the predicted VAC_f ?
5. Report and interpret the TCPI for the project at this point in time.
6. What is the estimated date of completion?
7. How well is the project doing in terms of its priorities?

Try to present the above information in a form worthy of consideration by top management.

Include an Earned Value table and a Tracking Gantt Chart.

Note: Insert March 31, 2012, as the status date in the Project Information box.

Part 4 B

Assume that today is May 31, 2012, and Table A2.4 contains the tracking information for the project up till now. Enter this information into your saved baseline file and prepare a status report for the POM+ project.

TABLE A2.4

Status Report May 31, 2012

Activity	Actual Start	Actual Finish	Actual Duration	Remaining Duration
Need survey	1/3/12	2/2/12	22	0
Set product specs	2/3/12	2/28/12	18	0
Shelf life report	2/29/12	3/13/12	10	0
Nutrition report	3/14/12	3/19/12	4	0
Select fruit suppliers	4/3/12	4/30/12	20	0
Equipment rehab	2/29/12	4/11/12	31	0
Production trials	4/17/12	5/4/12	14	0
Quality trials	5/7/12	5/31/12	18	0
Market testing	4/4/12	5/9/12	26	0
Package design	5/10/12	5/25/12	12	0
Select distributors	5/28/12		4	18
Complete FDA certification	5/11/12	5/31/12	14	0

Your status report should address the following questions:

1. How is the project progressing in terms of cost and schedule?
2. What activities have gone well? What activities have not gone well?
3. What do the PCIB and PCIC indicate in terms of how much of the project has been accomplished to date?
4. What is the forecasted cost at completion (EAC_p)? What is the predicted VAC_t ?
5. Report and interpret the TCPI for the project at this point in time.
6. What is the estimated date of completion?
7. How well is the project doing in terms of its priorities?

Try to present the above information in a form worthy of consideration by top management.

Include an Earned Value table and a Tracking Gantt Chart.

Note: Insert May 31, 2012, as the status date in the Project Information box.

RED ZUMA PROJECT

The ARC Company specializes in developing and selling a wide range of high-quality scooters. Sales representatives report that there is a growing demand for racing scooters. ARC's president, Robin Lane, is excited about the possibilities and predicts that one day these kinds of razor scooters will be featured in X-Game events. ARC is a small company and uses a strong matrix to optimally utilize limited manpower.

The Project Priority Matrix for the Red Zuma Project is:

	Time	Scope	Cost
Constrain		X	
Enhance	X		
Accept			X

Part 1

You are a member of a project team assigned to develop the new razor scooter code named “Red Zuma.” Table A2.5 contains the information necessary to create a project schedule. For the purpose of this case assume the following:

1. The project begins January 2, 2015.
2. The following holidays are observed: January 1, Martin Luther King Day (third Monday in January), Memorial Day (last Monday in May), July 4th, Labor Day (first Monday in September), Thanksgiving Day (4th Thursday in November), December 25.
3. If a holiday falls on a Saturday, then Friday will be given as an extra day off, and if it falls on a Sunday, then Monday will be given as a day off. If December 25th falls on a Friday then Monday will not be given a day off.
4. The project team works eight-hour days, Monday through Friday.

TABLE A2.5
Red Zuma: Project Schedule

ID	Task Name	Duration	Predecessors
1	1 Red Zuma Project	260 days	
2	1.1 Market Analysis	25 days	
3	1.2 Product Design	30 days	2
4	1.3 Manufacturing Study	20 days	2
5	1.4 Product Design Selection	10 days	3, 4
6	1.5 Detailed Marketing Plan	15 days	5
7	1.6 Manufacturing Process	30 days	5
8	1.7 Detailed Product Design	45 days	5
9	1.8 Build Prototypes	25 days	8
10	1.9 Lab Test Prototypes	10 days	9
11	1.10 Field Test Prototypes	15 days	9
12	1.11 Finalized Product Design	20 days	7,10,11
13	1.12 Final Manufacturing Process	10 days	12
14	1.13 Order Components	7 days	12
15	1.14 Order Production Equipment	14 days	13
16	1.15 Install Production Equipment	35 days	14FS+20 days,15FS+30 days
17	1.16 Celebrate	1 days	6, 16

Note: FS refers to a Finish-to-Start lag.

Construct a network schedule for this project and prepare a memo that answers the following questions:

1. When is the project estimated to be completed? How long will the project take?
2. What is the critical path for the project?
3. Which activity has the greatest amount of slack?
4. How sensitive is this network?
5. Identify two sensible milestones and explain your choices.

Include the following printouts:

- A Gantt chart.
- A network diagram highlighting the critical path.
- A schedule table reporting ES, LS, EF, LF, and slack for each activity.

Part 2

The following personnel have been assigned full-time to the Red Zuma project team:

- 4 marketing specialists
- 4 design engineers
- 4 development engineers
- 4 industrial engineers
- 4 test riders
- 2 purchasing agent

Use the file from Part 1 and the information contained in Tables A2.6 and A2.7 to assign resources to the project schedule.

Part A

Prepare a memo that addresses the following questions:

1. Which if any of the resources are overallocated?

TABLE A2.6
Red Zuma Project Resources

	\$	Number available
Marketing specialist	\$80,000/yr	4
Design engineer	\$125,000/yr	4
Development engineer	\$110,000/yr	4
Industrial engineer	\$100,000/yr	4
Purchasing agent	\$75,000/yr	2
Test rider	\$70/hr	4

Note: MS Project considers resources in terms of percentages with one full-time worker being 100%.

TABLE A2.7
Red Zuma Resource Assignments

Task Name	Resource Names
Red Zuma Project	
Market Analysis	Marketing Specialist [400%]
Product Design	Marketing Specialist, Design Engineer [400%], Development Engineer [200%], Industrial Engineer, Purchasing Agent
Manufacturing Study	Industrial Engineer [400%], Development Engineer [200%]
Product Design Selection	Marketing Specialist [200%], Design Engineer [300%], Development Engineer [200%], Industrial Engineer [200%], Purchasing Agent [25%]
Detailed Marketing Plan	Marketing Specialist [400%]
Manufacturing Process	Design Engineer, Development Engineer [200%], Industrial Engineer [300%]
Detailed Product Design	Marketing Specialist [200%], Design Engineer [400%], Development Engineer [200%], Industrial Engineer [200%], Purchasing Agent [25%]
Build Prototypes	Design Engineer [200%], Development Engineer [200%], Industrial Engineer [400%]
Lab Test Prototypes	Design Engineer [200%], Development Engineer [200%], Test Rider
Field Tests	Marketing Specialist, Design Engineer [200%], Development Engineer, Industrial Engineer, Test Rider [300%]
Finalized Product Design	Marketing Specialist [200%], Design Engineer [300%], Development Engineer [300%], Industrial Engineer [200%], Purchasing Agent [25%]
Final Manufacturing Process	Industrial Engineer [300%], Design Engineer, Purchasing Agent [25%]
Order Components	Purchasing Agent
Order Production Equipment	Purchasing Agent
Install Production Equipment	Design Engineer, Development Engineer [300%], Industrial Engineer [400%]
Celebration	Design Engineer [400%], Development Engineer [400%], Industrial Engineer [400%], Marketing Specialist [400%], Purchasing Agent [200%]

Note: Resource assignments without brackets is 100%.

2. Assume that the project is time constrained and try to resolve any overallocation problems by leveling within slack. What happens?
3. What is the impact of leveling within slack on the sensitivity of the network?

Include a Gantt chart with the schedule table after leveling within slack.

4. Assume that the project is resource constrained and no additional personnel are available. How long will the project take given the resources assigned? (Hint: Undo leveling performed in Part A before answering this question.)

Note: No splitting of activities is allowed.

5. How does the new duration compare with the estimated completion date generated from Part 1? What does this tell you about the impact resources can have on a schedule?

Include a Gantt chart with a schedule table displaying free and total slack depicting the resource-constrained schedule.

Part B

Top management is not happy with the resource-constrained schedule. Robin Lane, the president, has promised retailers that ARC will begin production in time for the major trade show in Las Vegas on January 22, 2016, which means the project needs to be completed by January 17, 2016. She has authorized working the first available Saturday of each month to help the project get completed sooner. She realizes that this will only reduce the project duration by 12–13 days.

After talking to the engineers, everyone agrees that they do not have to wait for the Detailed Product Design to be 100% completed before starting to build the prototype. The consensus is that Building the Prototype can start 30 days after the start of the Detailed Product Design. Likewise the Final Manufacturing Process can start 15 days after the start of Finalized Product Design.

Dewey Martin, director of product development, is also willing to add personnel to the project. He is willing to make available at least one more Development, Design, and/or Industrial Engineer to the project as well as Marketing Specialist. Since there is an acute shortage of personnel at ARC he requests that you only use additional manpower that will help meet the deadline. Your objective is to develop a schedule which will satisfy the deadline with minimum additional resource usage.

Prepare a memo that addresses the following questions:

1. What was the impact of introducing Start-to-Start lags to the schedule and budget?
2. Which, if any additional personnel assignments, would you choose to complete the project before the January 17th deadline? Explain your choices as well as the reasons for not choosing other options.
3. How have these changes affected the sensitivity of the network and the critical path?

Include a Gantt chart with a schedule table displaying free and total slack for the new schedule.

Note: Do not assign new personnel to specific tasks, simply add them to the Resource Sheet. All new personnel are available full time (100%).

At first glance—this appears to be a very complicated, difficult assignment, but if you enter the information correctly, the computer is able to generate the answers with a few simple clicks.

Part 3

Top management has accepted the schedule created at the end of Part 2. Prepare a brief memo that addresses the following questions:

1. How much will the project cost? What is the most expensive activity?
2. What does the cash flow statement tell you about how costs are distributed over the life span of the project?

Include a monthly cash flow for the project.

Once you are confident that you have the final schedule, save the file as a baseline. **Hint:** Save a backup file just in case without baseline!

Part 4

Part A

Today's date is July 8, 2015, the milestone date for the completion of the Prototype. You are charged with preparing a status report for top management. Table A2.8 summarizes progress on the Red Zuma project:

Submit a professional status report to Robin Lane that addresses the following questions:

1. How is the project progressing in terms of cost and schedule?
2. What activities have gone well? What activities have not gone well?
3. How much of the project has been accomplished (PCIB)?
4. What is the forecasted cost at completion (EAC_p)?
5. What is the estimated completion date?
6. How is the project doing in terms of priorities (see Part 1)?

Report and interpret relevant Earned Value metrics in your report.

Include a Tracking Gantt chart as well as an Earned Value Table with your memo.

TABLE A2.8
Red Zuma Project Update

Task Name	Act. Start	Act. Finish	% Comp.	Phys. % Comp.	Act. Dur.	Rem. Dur.
1 1 Red Zuma	Fri 1/9/15	NA	46%	0%	125.85 days	146.4 days
2 1.1 Market Analysis	Fri 1/9/15	Thu 2/12/15	100%	0%	25 days	0 days
3 1.2 Product Design	Fri 2/13/15	Wed 4/1/15	100%	0%	35 days	0 days
4 1.3 Manufacturing Study	Fri 2/13/15	Fri 3/6/15	100%	0%	16 days	0 days
5 1.4 Product Design Selection	Thu 4/2/15	Fri 4/17/15	100%	0%	13 days	0 days
6 1.5 Detailed Marketing Plan	NA	NA	0%	0%	0 days	15 days
7 1.6 Manufacturing Process	NA	NA	0%	0%	0 days	30 days
8 1.7 Detailed Product Design	Mon 4/20/15	Wed 6/24/15	100%	0%	49 days	0 days
9 1.8 Build Prototypes	Wed 6/10/15	NA	39%	0%	9 days	14 days
10 1.9 Lab Test Prototypes	NA	NA	0%	0%	0 days	10 days
11 1.10 Field Test Prototypes	NA	NA	0%	0%	0 days	15 days
12 1.11 Finalized Product Design	NA	NA	0%	0%	0 days	20 days
13 1.12 Final Manufacturing Process	NA	NA	0%	0%	0 days	10 days
14 1.13 Order Components	NA	NA	0%	0%	0 days	7 days
15 1.14 Order Production Equipment	NA	NA	0%	0%	0 days	14 days
16 1.15 Install Production Equipment	NA	NA	0%	0%	0 days	35 days
17 1.16 Celebrate	NA	NA	0%	0%	0 days	1 days

Part B

You have told Robin Lane that based on what you know now you need to revise the estimates for some of the remaining activities. Detailed Product Design is expected to take 3 days longer than planned. Build Prototypes is expected to take 2 days less than planned and Finalized Product Design is expected to take 3 days longer than planned. Final Manufacturing Process is expected to take 2 days less than planned, while Install Production Equipment is now expected to take only

30 days. You also report that Detailed Marketing plan will be completed before the end of the New Year. She is insisting that the project be completed by January 17th in order to be ready for the Las Vegas show. She is willing to spend \$50,000 from Management Reserves to expedite shipping if necessary. \$25,000 would reduce the shipping of components by 5 days and/or \$25,000 would reduce the shipping of manufacturing parts by 5 days (Hint: Adjust lag). Prepare a memo to Robin that addresses the following questions:

1. What is the impact of the revised estimates for Finalized Product Design and Install Production Equipment on the project schedule and cost?
2. Would you recommend authorizing the expenditure of \$50,000? Explain.
3. What, if any other recommendations, would you make so that the project can achieve Robin's deadline? Justify your recommendations.

Include a Tracking Gantt chart with variance schedule that depicts your final recommendations and revised schedule.

Hint: After adjusting the Installation of Production Equipment and Finalized Product Design, level outside of slack to eliminate any resource over allocation problems.