

LAB MANUAL

Sample Pages



**Microsoft
Project 2016**

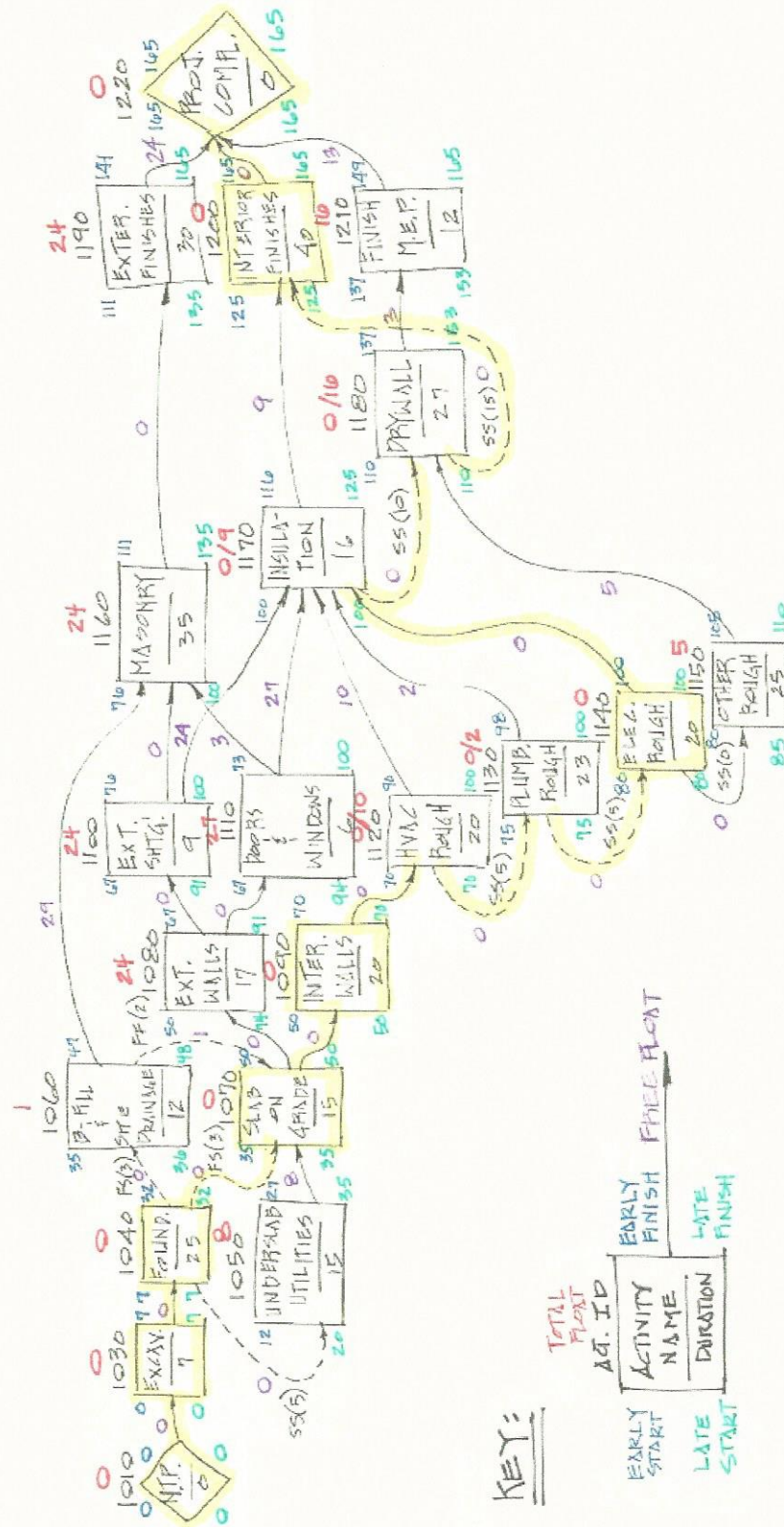
Real World
Scheduling

AN ENTIRE COMPUTER SCHEDULING LAB COURSE IN ONE BOOK

JohnWyatt Publishing

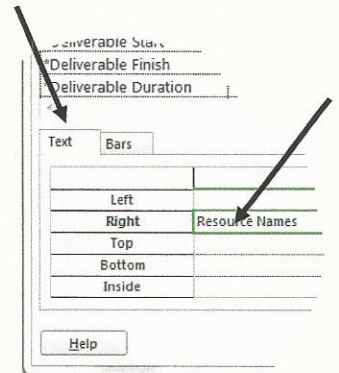
John Buttelwerth

ISBN: 978-0-9975255-4-0

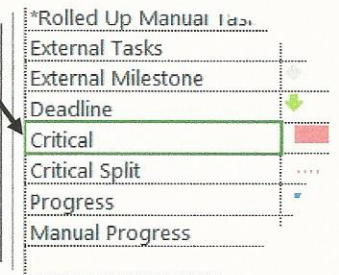


Same Schedule – Hand Drawn with Hand Calculations

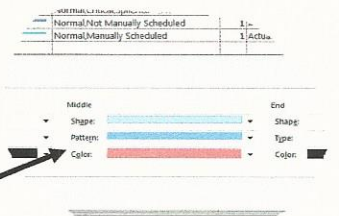
2. On the lower left side of this window, select the **Text** tab as shown here to the right. Next, click in the field that currently contains **Resource Names** as shown to the right. Use the pull-down in this field to select **Name**. After it is selected, click . Notice that now, all of the *non-critical* tasks (blue bar tasks) show the **Task Name** to the right of each bar.



3. Repeat this same step for the *critical* tasks. To do this, open the same window; however, this time – first scroll down to the **Critical** name (fourth from the bottom) using the scroll bar on the far right side of the window, and select it as shown here below to the right.

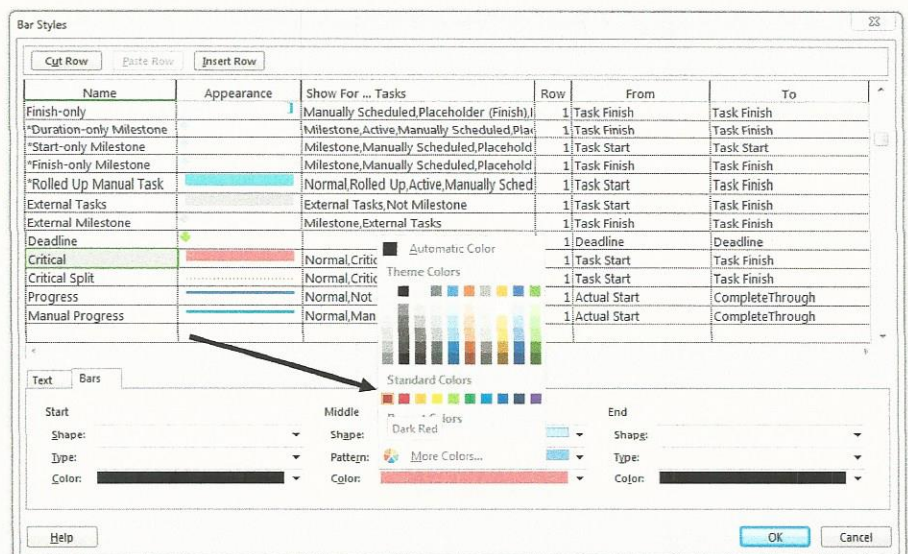


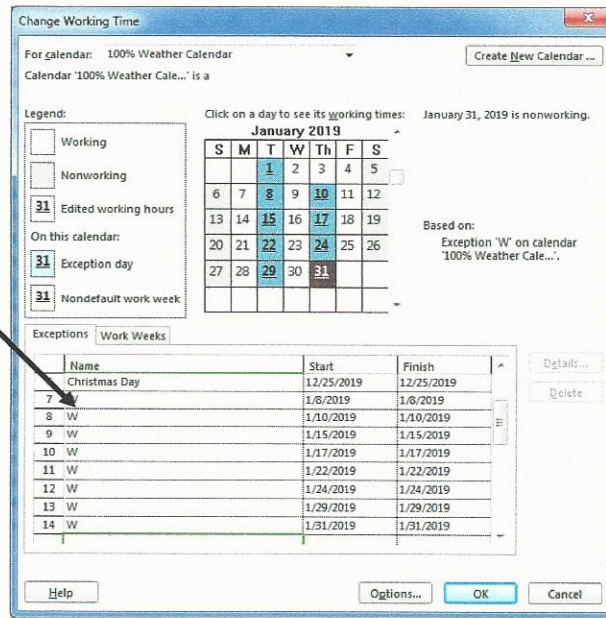
4. Again, on the lower left side of this window, select the **Text** tab. Next, click in the field that currently contains **Resource Names** and use the pull-down in this field to select **Name**. Then, click . All of the *critical* tasks (**red** bar tasks) should now show the **Task Name** to the right of each bar.

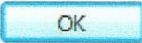


5. Next, re-open the **Bar Styles** window and scroll back down to select the **Critical** bar, then select the **Bars** tab in the bottom of the window. Go to the **Middle** section, and from there down to the **Color:** field as shown to the right.

6. Use the pull-down in the **Color:** field and select the color **Dark Red** as shown below. Then, click





46. Scroll to **February 2019**. Continue placing the weather days for the remainder of the months for the year 2019 using the *exact dates* shown below. *Carefully double-check to ensure accuracy*, then click .

January 2019

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February 2019

S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March 2019

S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April 2019

S	M	T	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May 2019

S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June 2019

S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

22. A partial view of the schedule to the left shows the **Contractor | Responsibility** custom task group. Notice that the label of each group has either **Text1:** or **Text2:** in the description. These serve no purpose, look bad, and are easily removed.

We will now remove these labels from the task group headings.

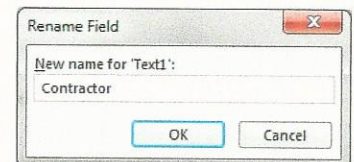
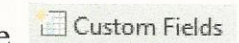
Working with Custom Fields

Follow the directions below to learn how to work with Custom Fields and to remove the **Text1:** or **Text2:** labels from the task group headings.

Task Name	Dur.
Text1: (your name) Construction Co.	16
Text2: Smith	16
Office Building - (your name)	166
Lab #4e - Custom Task Group	
Notice to Proceed	0 d
Excavation	7 d
Backfill / Site Drainage	12 d
Slab on Grade	15 d
HVAC Rough-In	20 d
Project Complete	0 da
Text2: Jones	159
Foundation	25 d
Exterior Walls	17 d
Interior Walls	20 d
Exterior Sheathing	9 d
Doors & Windows	6 d
Drywall	27 d
Interior Finishes	40 c
Exterior Finishes	30 c
Text1: Subcontractor	15
Text2: Smith	15
Underslab Utilities	15
Plumbing Rough-In	23
Electrical Rough-In	20
Other Rough-In	25
Masonry	
Insulation	
Finish MEP	

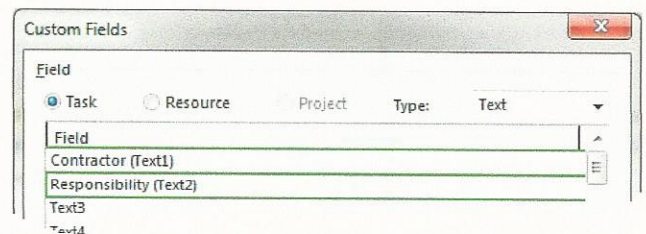
23. Go to **Format**, then to the **Columns** area and select the **Custom Fields** button to open the Custom Fields window.

24. If it is not already highlighted, select **Text1**. Click the **Rename...** button to open the **Rename Field** window. Type in **Contractor** into the **New name for 'Text1':** field as shown to the right. Then click **OK**.



25. Next, select **Text2** and **Rename...** it to **Responsibility** and click **OK**.

26. Verify that the **Custom Fields** window matches the partial window shown here, then click **OK** to see the results.




27. If nothing changes, go back to the **Group by:** pull-down field and re-select **Contractor | Responsibility** task group.

	Task Name	Duration	Start	Finish	Tot. #loc
0	Office Building - (your name) Lab #4f - Summary Tasks	166 days	Mon 4/15/19	Fri 12/6/19	0 d
1	(your name) Construction Co.	35 days	Mon 4/15/19	Mon 6/3/19	0 d
2	Notice to Proceed	0 days	Mon 4/15/19	Mon 4/15/19	0 d
3	Excavation	7 days	Mon 4/15/19	Tue 4/23/19	0 d
4	Foundation	25 days	Wed 4/24/19	Mon 6/3/19	
5	Underslab Utilities	15 days	Fri 5/3/19	Fri 5/3/19	
	Backfill / Site Drainage	12 days	Mon 6/10/19		

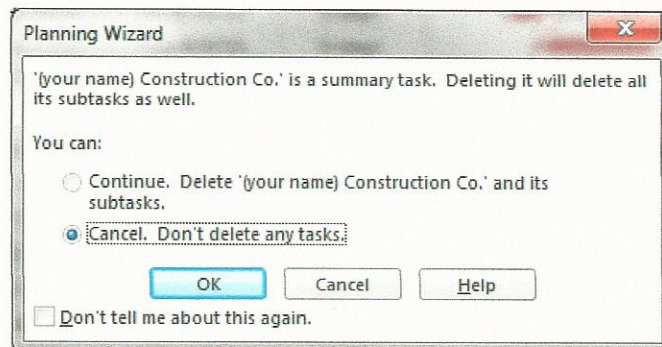
Annotations: "Indented" points to the task level column; "Same Dates" points to the Start and Finish date columns.

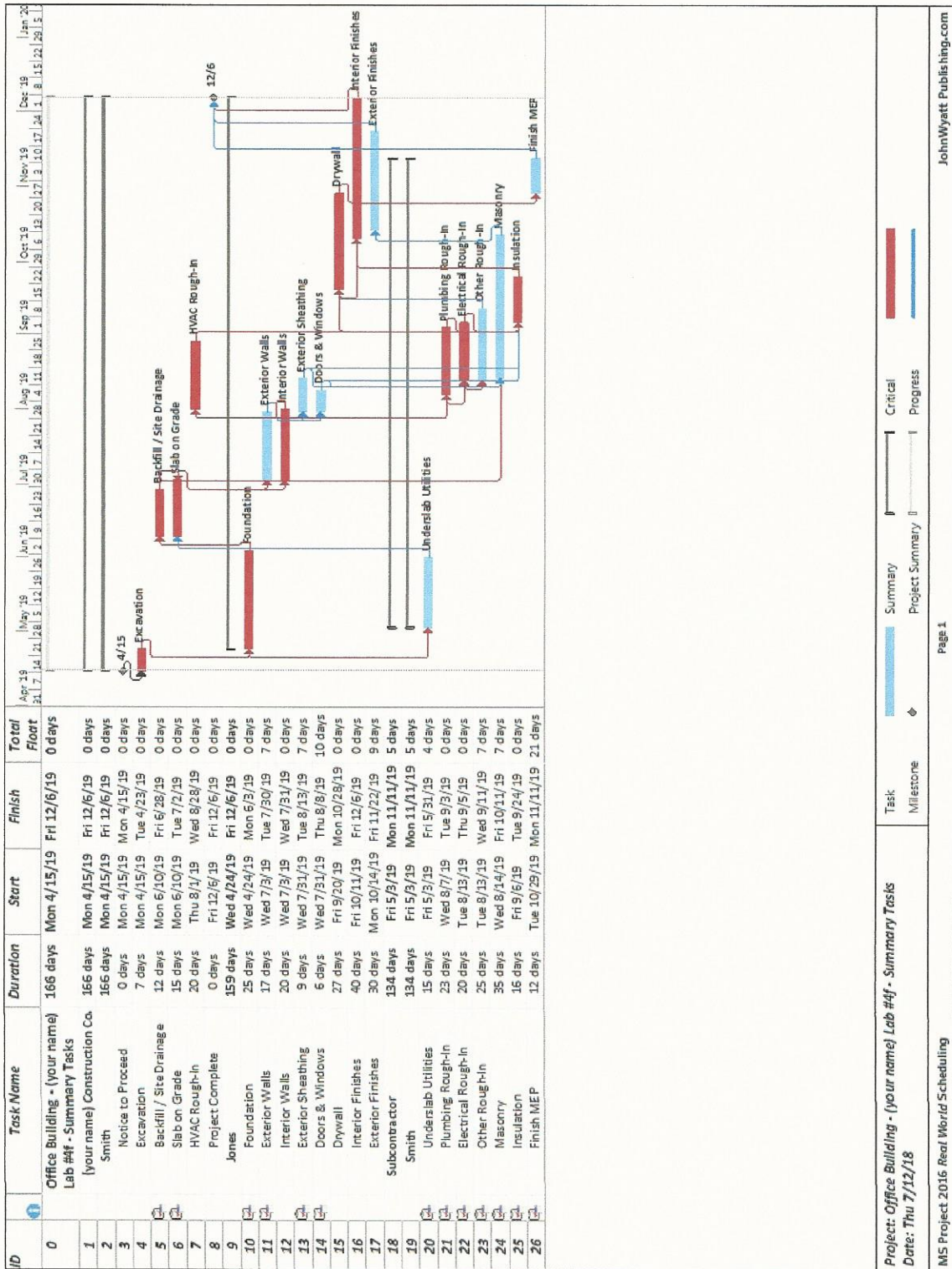
(FYI) “Outdenting” a Subtask

If you want to remove a subtask from a summary task, you can “*outdent*” it. You do this by selecting the task or tasks that you want to remove as subtasks, then click the **Outdent Task** button  which is located in the **Schedule** section of the **Task** ribbon. Those tasks will then outdent one outline level to the left.

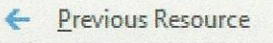
(FYI) Deleting a Summary Task (Be Careful)

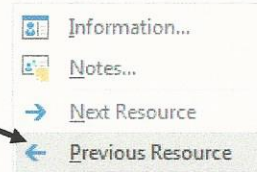
Deleting a summary task can be *very dangerous* – particularly if you do not want to delete any of the subtasks beneath it. You must be careful. Because, when you delete a summary task, every subtask directly beneath it gets deleted as well. The following warning comes up. If you wanted to keep (save) any of the subtasks, you would click **Cancel. Don't delete any tasks.** and then click as shown below.






Office Building Schedule – With Nested Summary Tasks

10. Select the  as seen to the right to view the Carpenter resource graph as shown below.



11. Analyze the carpenter resource graph. We now know that the most carpenters we will need for the entire project is **5**, based on the **500%** histogram indicator (tallest vertical bar on the graph). We also know that we will only need this many carpenters sometime in the month of **July**. Based on the resource legend, we know that the red section of the histogram bar indicates an **over-allocation** of carpenters.

Since we have an over-allocation of a resource, your company will definitely want to know what day, or what days that occurs. So the next step is to zoom the schedule in far enough to see the histogram on a daily level.

12. The schedule's Zoom feature, shown here , is located in the bottom right-hand corner of your schedule.. Notice that the (**—**) and the (**+**) signs may be dark as shown above, which means that you cannot zoom. To “light up” the signs and allow you to zoom the schedule in and

Microsoft Project 2016: *Real World Scheduling*

Schedule Analysis – Lab #5

Name _____

After completing Lab #5, answer the following questions from Resource Loading, Cost Resources, and Accelerated schedules in the software and from the printouts for this lab and turn the Schedule Analysis – Lab #5 in to your instructor stapled on top of the printouts.

Resource Loading:

1. What is the crew cost, not including additional costs, of the Exterior Walls crew ?

Cost per day _____ Cost per hour _____

2. What is the average cost per hour, *per crew member* of the Foundation task crew ? _____

3. There is an over-allocation of 1 carpenter for 1 day on Friday, July 31st, between the Interior Walls, Exterior Sheathing, and Doors & Windows tasks. How would you recommend solving this shortage of 1 carpenter ? _____

4. There is an over-allocation of resources with the Interior and Exterior Finishes tasks. Describe what resource or resources are over-allocated, list how many of each additional resource(s) are needed, and list when are they needed (from when to when) ? _____

5. How would you recommend solving the over-allocation of the Interior and Exterior Finishes tasks? _____

Cost Resources:

6. What is the cost per day rate of the Insulation subcontractor ? _____
7. The Foundation task's total cost is \$131,600. Factoring in duration, crew mix, cost rates, and other additional costs, write the calculation that equals \$131,600 ? _____

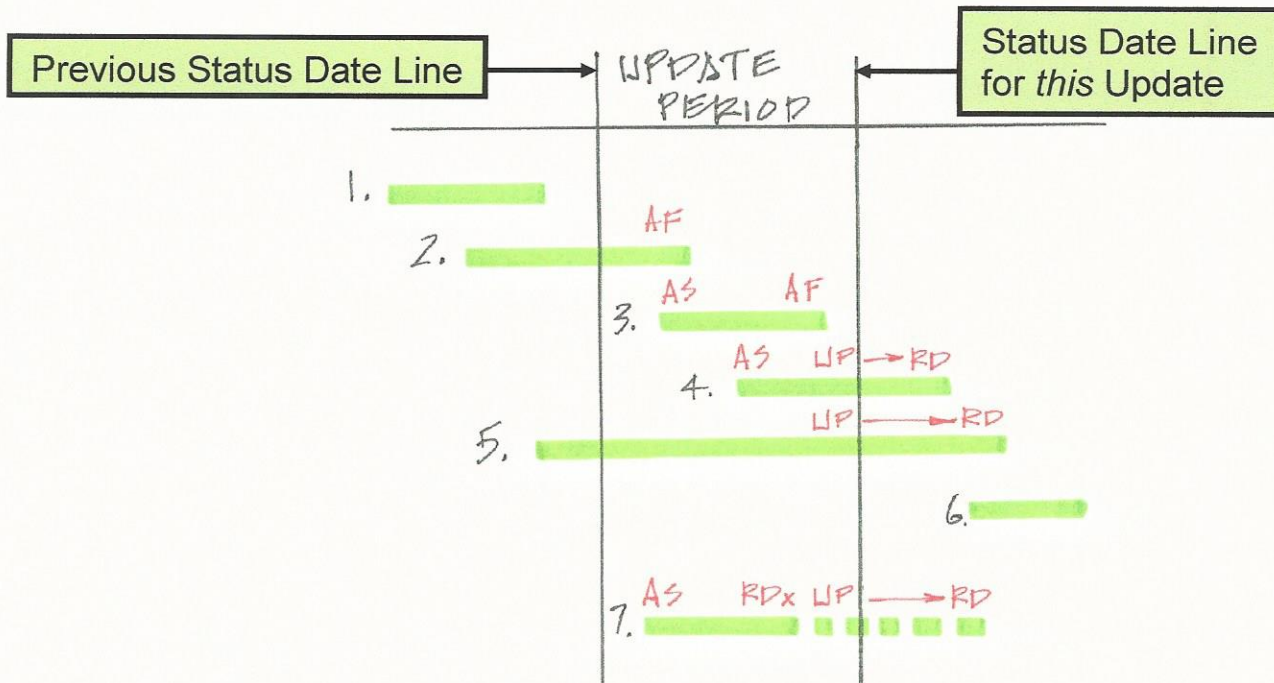
Schedule Analysis – Lab #5 (con'td)

8. You are thinking about having your drywall crew work (7) days per week from the Drywall start date on Friday, September 20th, through their completion, at a cost that is 50% above their standard rate for the weekend days during this period. Based on the crew cost per day (**not** including additional costs for materials, etc...), what would be the total additional cost incurred for working weekends ? \$ _____
9. In the question above, how many weekend days would have been worked ? _____

Accelerated Schedule (compared to the non-accelerated Cost Resource schedule):

Inserting the Weather Calendars into the project schedule caused the project end date to slip from 11/27/19 to 12/6/19. Your company is trying to avoid paying a liquidated damage penalty clause to the owner of \$100 **per weekday** delay for this slippage. For that reason the schedule was accelerated to remove the slippage. Answer the questions below about this acceleration.

10. Did the schedule acceleration change the critical path ? **Yes No**
11. Based on the overtime rates, what is the **additional** cost **per day** to work on Saturdays for each of these tasks ? Interior Finishes \$ _____ Drywall \$ _____
12. How many Saturdays did Interior Finishes work on the Six Day Workweek ? _____
13. Calculate the additional cost for the Interior Finishes task to work on the Six Day Workweek schedule \$ _____ and calculate resulting potential savings in the penalty clause liquidated damages if they avoid the slippage \$ _____
14. Considering everything, do you think your company should accelerate the project ?

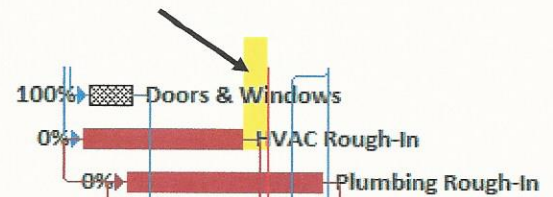


1. **Task is already complete** ↔ Nothing should be entered for the task.
2. **Task had already started before the update period and finished during the update period** ↔ Enter the **Actual Finish** date of the task.
3. **Task started and finished during the update period** ↔ Enter the **Actual Start** and **Actual Finish** date of the task, *unless it is a milestone task* (see instructions for updating milestone tasks – **never** enter an actual finish for milestone task).
4. **Task started during the update period – the bar extends beyond the status line – and the task is still in progress** ↔ Enter in this exact order, the **Actual Start** date of the task, click **Update Project** for the Selected tasks, then enter your estimate of the task's **Remaining Duration**.
5. **Task had already started before the update period – the bar extends beyond the status line – and the task is still in progress** ↔ Click **Update Project** for Selected tasks, then enter your estimate of the task's **Remaining Duration**.
6. **Task has not started yet** ↔ Nothing should be entered for the task yet.
7. The **“special case”** occurs when the **task bar does not extend beyond the status date line** – and the task is still in progress ↔ Enter in this exact order, the **Actual Start** date of the task, then **Increase Remaining Duration** by (**x**) amount until the task bar passes the status date line, click **Update Project** for the Selected tasks, then enter your estimate of the task's **real Remaining Duration**.

General Note: If a task is running “on time”, you do not have to manually input the task’s remaining duration – the software will calculate it for you. However, if a task is running “ahead” or “behind”, you *will also have to manually adjust the remaining duration accordingly*.

Updating the “Special Case”

The “*special case*” occurs when the task bar *does not* extend into and beyond the status date line and the task is still in progress. This **gap** can be seen to the right with the HVAC Rough-In task.





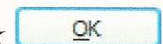
This scenario requires a *special updating procedure* specific only to Microsoft Project. You will first enter the actual start. Then check to see if the task bar extends past the status date line. If it does extend past the status date line, it is no longer the “special case” and proceed to update the task normally. If it does not extend past the status date line, you will need to increase the remaining duration by a sufficient *temporary* amount that ensures that the task bar passes the status date line. Then proceed to the **Update Project** window to update the project for that selected task. Finally, you will enter your estimate of the *real* remaining duration.

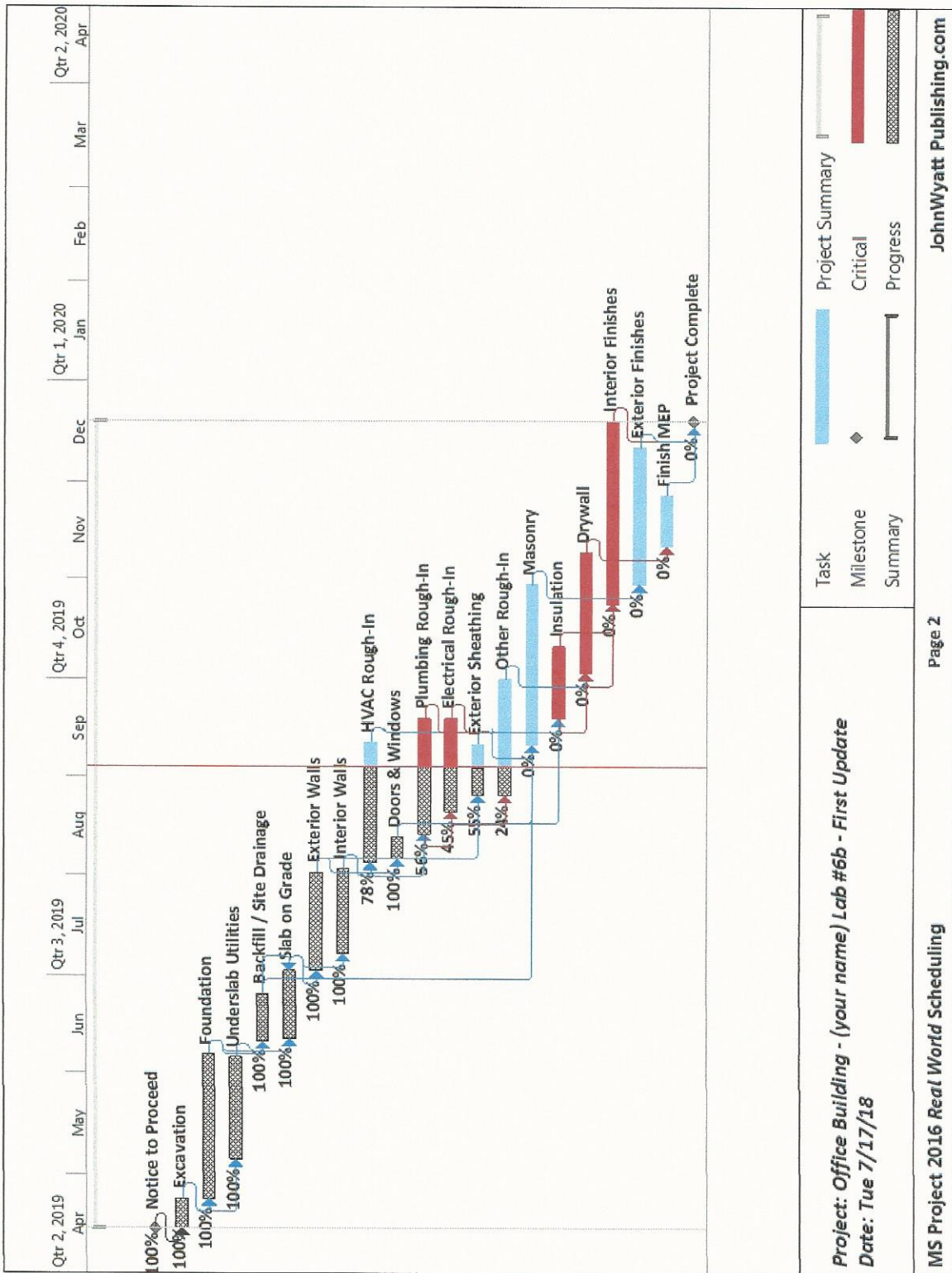
Follow these directions to update the HVAC Rough-In task.

32. Select the **HVAC Rough-In** task. This task started on **8/5/19**, so enter that as the **Actual Start**. After entering this actual start date, notice that the task bar did not extend past the status date line as shown directly here to the right



33. Next, increase the **Remaining Duration** by a sufficient amount until the task bar passes the status date line, so increase the remaining duration from 20 to **25**. As you can see here , the bar now extends past the status date line. **Gap is no longer there**

34. Next, select **Update Project**. Be sure to choose the **Selected tasks** button , then click .



Project: Office Building - (your name) Lab #6b - First Update
 Date: Tue 7/17/18

Office Building Schedule – After the First Update (page two)

Microsoft Project 2016: *Real World Scheduling*

Schedule Analysis – Lab #6

Name _____

After completing Lab #6, answer the following questions from the Baseline and First Update schedules in the software and from the printouts for this lab and turn the Schedule Analysis – Lab #6 in to your instructor stapled on top of the printouts.

Baseline Schedule:




- Once you start the update, which set(s) of dates can potentially change? (circle all that apply)
All Baseline Dates **All Start/Finish Dates** **Only Start Dates** **Only Finish Dates**
- Once you start the update, which duration(s) can potentially change? (circle all that apply)
Baseline Duration (Bas Dur) **Duration (Dur)** **Remaining Duration (Rem Dur)**
- Prior to the first update, could Baseline and Baseline 1 be different? **Yes** or **No**
- Which schedule stays “locked in” forever? **Baseline** or **Baseline 1** (circle one)

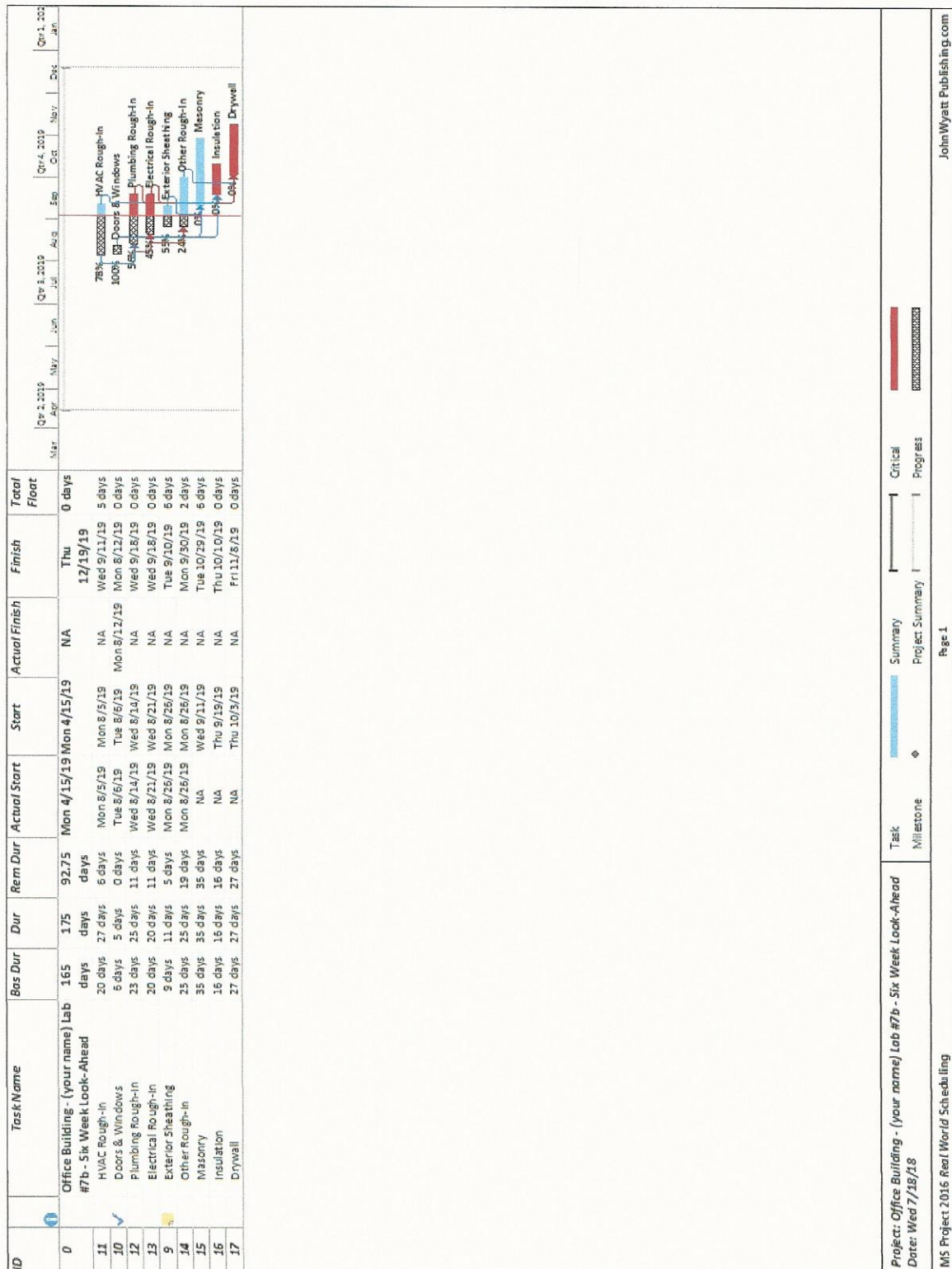
First Update Schedule:

- Did the project end date change from the Baseline to the 1st Update? **Yes** or **No**. If yes, from what date _____ to what date _____, and by how many workdays _____?
Baseline End Date 1stUpdate End Date
- The Foundation task started on time on 4/24/19 and was supposed to take 25 workdays to complete and end on 5/29/19. However, it ended on June 6th. Explain why it ended (8) calendar days later, but only took (6) extra workdays to complete? _____

- The Underground Utilities task’s Baseline finish was on 5/21/19, but it actually finished on 6/5/19, (15) **calendar** days late. How many of those days were delayed due to the following causes?
Foundation task delay _____ **Started late** _____ **Weekends** _____
Holidays _____ **Low productivity** _____

Schedule Analysis – Lab #6 (con'td)

8. Based on the actual finish date of the Foundation and schedule logic, did Slab on Grade start as early as it could have? **Yes** or **No** If no, how many workdays late did it start? _____
9. What is the earliest date that Insulation can start? _____ Which task(s) is planned to end on the previous workday? _____
10. The Doors & Windows task's Baseline finish was on 7/26/19, but it actually did not even start until 8/6/19, (11) calendar days later. How many workdays was its start delayed? _____
11. Considering the calendar that the Electrical Rough-In task is assigned to, verify and explain that the remaining duration of 11 days which was calculated by the software, is accurate?
- _____
- _____
- _____
12. The finish date of the Exterior Sheathing task has slipped (28) workdays, from 7/31/19 to the planned finish date of 9/10/19. Before the update, this task had (24) days of total float. After the update, even though it had slipped (28) days, it **still has (6) days** of total float left !! You would have expected it to have pushed the critical path out (4) days (28 *workday delay* – 24 *workdays of total float* = 4 days). Explain why it still has (6) days of total float left? _____
- _____
- _____
- _____
13. What do the three icons that may appear in the Indicator column represent?
-  _____
-  _____
-  _____

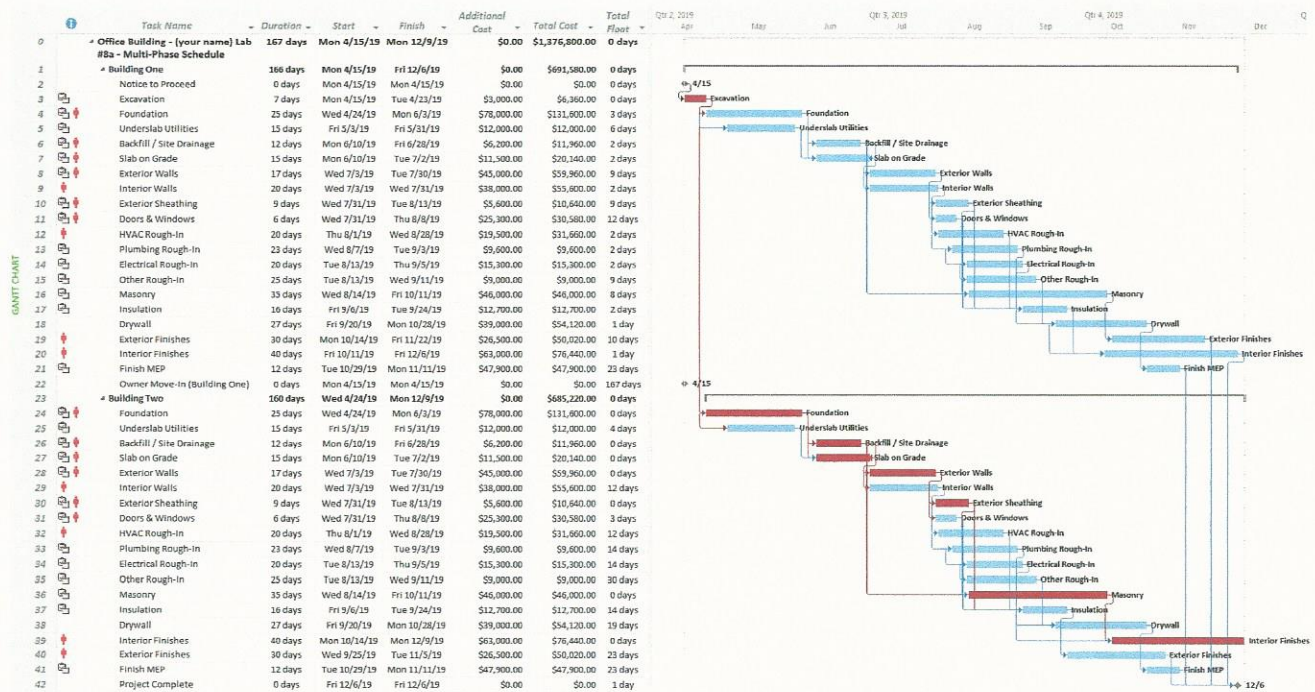


Office Building Schedule – First Update Six Week Look-Ahead Schedule

17. Place the **Building Two** summary task above the second foundation task, then indent the remainder of the tasks of the schedule beneath it.

18. While it could be argued that the Notice to Proceed, Excavation, and Project Complete tasks are all related to the *total* project – and not a specific building – and therefore, should be organized beneath their own separate specific summary task; many schedulers would, for the sake of simplicity and saving time, leave them beneath their current summary tasks.

When complete, your schedule should look like this below.



19. Save the project by going to **File**, then **Save**, or simply click the  button.

Adding Logic to New Schedule Tasks

All the schedule activities have been added, but are not yet tied together with the proper logic. As discussed previously, when a crew is complete with the first building, they will move on to the second to minimize the total project duration. We will first add this logic into the schedule.

20. Go to the **View** tab, in the **Split View** area, click the **Details** box to open the **Details Split Screen** as shown to the right. Select the **Task Form** if it is not selected.