

## **IS475/675 HW#6**

### **Using SQL with More Complex Queries**

---

Each of the questions in this assignment requires you to create one or more SELECT statements to satisfy the request. There are 10 questions for this assignment. Creating an accurate result table is your primary goal for the questions. An accurate result table includes conversion of fields to the appropriate data type (for example, converting a calculated or aggregated field to a MONEY data type when necessary) and sorting the result table.

#### ***Deliverables***

Most of the questions are best answered with the use of a SQL View. Some questions require the use of multiple Views. You must include your View code in the deliverables you submit for grading. Since some of the Views may be used for more than one question, I recommend putting all the View code in an appendix and then clearly labeling the name of the View. It would be very helpful if you highlighted the name with color - either via a color printer or a highlighter. It would also be helpful if you put the views in some sort of order – by name if you use the same view on multiple questions, or by number if you use different views for each question.

Turn in two deliverables for this assignment:

(1) Paper-based output (one per team): Please refer to HW#4 for a description of the paper-based output.

(2) One computer file per individual or team with SQL code: Upload the file to the "Assignment Uploads" disk on the COBA computer server in the IS475\HW6 directory. The one computer file should contain all SQL code required to complete the assignment. Please clearly mark in that file the number of the question answered. The file can be in MS Word or text format. The purpose of this file is so that I can test your SQL code directly if I have any questions/issues with it so please don't include a "picture" of your SQL code – I need a text-based version of the SQL code. Do NOT snip your code with the Windows snipping tool for this deliverable. I want an actual copy of your SQL code. Name your file with your lastname and HW6. For example, my file would be called EdbergHW6.txt (if using a txt format file). If you are working in a team, then use the team number. For example, Team11HW6.docx (if using a Word file).

## Here are the questions:

1. Summarize the actual hours worked and labor cost (hours worked \* hourly pay rate) by JobID and TaskID for all rows in the JobTask table. Remember that an employee's pay rate changes by date, so it is necessary to locate the correct pay rate by date as you did for question #15 for HW#5. If you were not able to get question #15 on HW#5 to work, I recommend doing that before starting on this question. Compare the actual labor hours to the estimated labor hours, and the actual labor costs to the estimated labor costs. The full result table is provided in two pieces below and on the top of the next page.

|    | JobID | TaskID | TaskDescription       | DateStarted | DateCompleted | EstHours | ActualHoursWorked | LaborHoursVariance | EstLaborCost | ActualLaborCost | LaborCostVariance |
|----|-------|--------|-----------------------|-------------|---------------|----------|-------------------|--------------------|--------------|-----------------|-------------------|
| 1  | 16885 | 110    | Remove Existing Floor | 12/10/2014  | 12/11/2014    | 6        | 7.00              | -1.00              | 75.00        | 77.000000       | -2.000000         |
| 2  | 16885 | 130    | Install sub-floor     | 12/12/2014  | 12/16/2014    | 22       | 23.50             | -1.50              | 280.00       | 276.125000      | 3.875000          |
| 3  | 16885 | 140    | Design mosaic/glass   | 11/24/2014  | 11/28/2014    | 10       | 9.00              | 1.00               | 240.00       | 247.500000      | -7.500000         |
| 4  | 16885 | 150    | Prepare sub floor     | 12/16/2014  | 12/16/2014    | 5        | 4.50              | 0.50               | 61.00        | 54.000000       | 7.000000          |
| 5  | 16885 | 160    | Install tile floor    | 12/17/2014  | Not Done      | 18       | 19.25             | -1.25              | 230.00       | 223.487500      | 6.512500          |
| 6  | 16885 | 170    | Grout                 | 12/28/2014  | Not Done      | 33       | 0.00              | 33.00              | 450.00       | 0.000000        | 450.000000        |
| 7  | 16885 | 180    | Seal and finish work  | 01/19/2015  | Not Done      | 17       | 0.00              | 17.00              | 180.00       | 0.000000        | 180.000000        |
| 8  | 16885 | 240    | Install tile wall     | 12/22/2014  | Not Done      | 16       | 0.00              | 16.00              | 252.00       | 0.000000        | 252.000000        |
| 9  | 16885 | 260    | Build mosaic/glass    | 01/05/2015  | Not Done      | 16       | 0.00              | 16.00              | 384.00       | 0.000000        | 384.000000        |
| 10 | 16885 | 270    | General demolition    | 12/08/2014  | 12/10/2014    | 8        | 7.50              | 0.50               | 100.00       | 81.562500       | 18.437500         |
| 11 | 32687 | 110    | Remove Existing Floor | 07/31/2014  | 07/31/2014    | 8        | 7.50              | 0.50               | 88.00        | 82.500000       | 5.500000          |
| 12 | 32687 | 130    | Install sub-floor     | 08/04/2014  | 08/04/2014    | 7        | 8.00              | -1.00              | 113.00       | 92.000000       | 21.000000         |
| 13 | 32687 | 150    | Prepare sub floor     | 08/04/2014  | 08/07/2014    | 3        | 4.50              | -1.50              | 50.00        | 54.000000       | -4.000000         |
| 14 | 32687 | 160    | Install tile floor    | 08/11/2014  | 08/14/2014    | 10       | 10.00             | 0.00               | 180.00       | 160.000000      | 20.000000         |
| 15 | 32687 | 170    | Grout                 | 08/18/2014  | 08/18/2014    | 6        | 6.50              | -0.50              | 90.00        | 78.000000       | 12.000000         |
| 16 | 32687 | 180    | Seal and finish work  | 08/22/2014  | 08/22/2014    | 4        | 4.50              | -0.50              | 60.00        | 63.000000       | -3.000000         |
| 17 | 55841 | 130    | Install sub-floor     | 07/15/2013  | 07/15/2013    | 8        | 7.50              | 0.50               | 83.00        | 90.000000       | -7.000000         |
| 18 | 55841 | 150    | Prepare sub floor     | 07/16/2013  | 07/16/2013    | 4        | 4.00              | 0.00               | 45.00        | 48.000000       | -3.000000         |
| 19 | 55841 | 160    | Install tile floor    | 07/18/2013  | 07/19/2013    | 11       | 10.50             | 0.50               | 170.00       | 168.000000      | 2.000000          |
| 20 | 55841 | 170    | Grout                 | 07/22/2013  | 07/22/2013    | 10       | 10.50             | -0.50              | 140.00       | 139.000000      | 1.000000          |
| 21 | 55841 | 180    | Seal and finish work  | 07/29/2013  | 07/29/2013    | 5        | 4.00              | 1.00               | 58.00        | 46.000000       | 12.000000         |
| 22 | 55873 | 130    | Install sub-floor     | 08/14/2013  | 08/15/2013    | 8        | 5.75              | 2.25               | 110.00       | 132.250000      | -22.250000        |
| 23 | 55873 | 150    | Prepare sub floor     | 08/16/2013  | 08/16/2013    | 4        | 4.25              | -0.25              | 45.00        | 59.500000       | -14.500000        |
| 24 | 55873 | 160    | Install tile floor    | 08/19/2013  | 08/20/2013    | 11       | 11.30             | -0.30              | 170.00       | 180.800000      | -10.800000        |
| 25 | 55873 | 170    | Grout                 | 08/26/2013  | 08/26/2013    | 10       | 10.50             | -0.50              | 140.00       | 133.875000      | 6.125000          |
| 26 | 55873 | 180    | Seal and finish work  | 09/02/2013  | 09/02/2013    | 5        | 5.00              | 0.00               | 58.00        | 70.000000       | -12.000000        |
| 27 | 55878 | 130    | Install sub-floor     | 09/12/2013  | 09/12/2013    | 8        | 8.00              | 0.00               | 110.00       | 104.000000      | 6.000000          |
| 28 | 55878 | 150    | Prepare sub floor     | 09/16/2013  | 09/16/2013    | 4        | 4.50              | -0.50              | 45.00        | 54.000000       | -9.000000         |

|    |       |     |                      |            |            |    |       |       |         |             |            |
|----|-------|-----|----------------------|------------|------------|----|-------|-------|---------|-------------|------------|
| 29 | 55878 | 160 | Install tile floor   | 09/19/2013 | 09/20/2013 | 11 | 10.75 | 0.25  | 170.00  | 172.000000  | -2.000000  |
| 30 | 55878 | 170 | Grout                | 09/24/2013 | 09/24/2013 | 10 | 9.75  | 0.25  | 140.00  | 128.500000  | 11.500000  |
| 31 | 55878 | 180 | Seal and finish work | 09/30/2013 | 09/30/2013 | 5  | 5.00  | 0.00  | 53.00   | 60.000000   | -7.000000  |
| 32 | 62254 | 150 | Prepare sub floor    | 10/14/2014 | 10/24/2014 | 20 | 19.50 | 0.50  | 270.00  | 273.000000  | -3.000000  |
| 33 | 62254 | 160 | Install tile floor   | 10/16/2014 | 10/30/2014 | 65 | 61.25 | 3.75  | 1040.00 | 980.000000  | 60.000000  |
| 34 | 62254 | 170 | Grout                | 10/21/2014 | 10/31/2014 | 40 | 40.50 | -0.50 | 540.00  | 492.500000  | 47.500000  |
| 35 | 62254 | 180 | Seal and finish work | 10/30/2014 | 11/03/2014 | 33 | 32.00 | 1.00  | 446.00  | 452.937500  | -6.937500  |
| 36 | 62257 | 150 | Prepare sub floor    | 10/30/2014 | 11/03/2014 | 20 | 20.25 | -0.25 | 270.00  | 232.875000  | 37.125000  |
| 37 | 62257 | 160 | Install tile floor   | 11/03/2014 | 11/07/2014 | 65 | 64.50 | 0.50  | 1040.00 | 1043.520000 | -3.520000  |
| 38 | 62257 | 170 | Grout                | 11/07/2014 | 11/12/2014 | 40 | 39.00 | 1.00  | 540.00  | 528.500000  | 11.500000  |
| 39 | 62257 | 180 | Seal and finish work | 11/13/2014 | 11/18/2014 | 33 | 30.75 | 2.25  | 446.00  | 424.437500  | 21.562500  |
| 40 | 78431 | 140 | Design mosaic/glass  | 11/17/2014 | 12/15/2014 | 24 | 23.65 | 0.35  | 575.00  | 650.375000  | -75.375000 |
| 41 | 78431 | 190 | Install mosaic       | 01/19/2015 | Not Done   | 4  | 0.00  | 4.00  | 64.00   | 0.000000    | 64.000000  |
| 42 | 78431 | 200 | Build structure      | 01/12/2015 | Not Done   | 8  | 0.00  | 8.00  | 128.00  | 0.000000    | 128.000000 |
| 43 | 78431 | 260 | Build mosaic/glass   | 12/22/2014 | Not Done   | 40 | 35.50 | 4.50  | 960.00  | 976.250000  | -16.250000 |
| 44 | 91584 | 150 | Prepare sub floor    | 03/31/2014 | 04/02/2014 | 33 | 34.00 | -1.00 | 450.00  | 425.625000  | 24.375000  |
| 45 | 91584 | 160 | Install tile floor   | 04/07/2014 | 04/11/2014 | 72 | 74.25 | -2.25 | 1200.00 | 1188.000000 | 12.000000  |
| 46 | 91584 | 170 | Grout                | 04/14/2014 | 04/14/2014 | 16 | 18.75 | -2.75 | 216.00  | 221.250000  | -5.250000  |
| 47 | 91584 | 180 | Seal and finish work | 04/18/2014 | 04/21/2014 | 8  | 7.50  | 0.50  | 108.00  | 88.125000   | 19.875000  |
| 48 | 91584 | 230 | Install tile counter | 04/03/2014 | 04/04/2014 | 16 | 16.50 | -0.50 | 265.00  | 264.000000  | 1.000000   |

2. Summarize the actual material costs by jobID and task ID and compare them to the estimated material cost for each row in the JobTask table. This is very similar to what you did for question #11 in HW#5, so this should be fairly easy if you got question #11 to work. The result table is divided and shown below and on the next page:

|    | JobID | TaskID | TaskDescription       | DateStarted | DateCompleted | EstMaterialCost | ActualMaterialCost | MaterialCostVariance |
|----|-------|--------|-----------------------|-------------|---------------|-----------------|--------------------|----------------------|
| 1  | 16885 | 110    | Remove Existing Floor | 12/10/2014  | 12/11/2014    | 25.00           | 22.83              | 2.17                 |
| 2  | 16885 | 130    | Install sub-floor     | 12/12/2014  | 12/16/2014    | 360.00          | 261.40             | 98.60                |
| 3  | 16885 | 140    | Design mosaic/glass   | 11/24/2014  | 11/28/2014    | 10.00           | 18.00              | -8.00                |
| 4  | 16885 | 150    | Prepare sub floor     | 12/16/2014  | 12/16/2014    | 250.00          | 242.975            | 7.025                |
| 5  | 16885 | 160    | Install tile floor    | 12/17/2014  | Not Done      | 1530.00         | 1794.74            | -264.74              |
| 6  | 16885 | 170    | Grout                 | 12/28/2014  | Not Done      | 40.00           | 46.00              | -6.00                |
| 7  | 16885 | 180    | Seal and finish work  | 01/19/2015  | Not Done      | 25.00           | 19.95              | 5.05                 |
| 8  | 16885 | 240    | Install tile wall     | 12/22/2014  | Not Done      | 1625.00         | 1970.99            | -345.99              |
| 9  | 16885 | 260    | Build mosaic/glass    | 01/05/2015  | Not Done      | 110.00          | 0.00               | 110.00               |
| 10 | 16885 | 270    | General demolition    | 12/08/2014  | 12/10/2014    | 0.00            | 0.00               | 0.00                 |
| 11 | 32687 | 110    | Remove Existing Floor | 07/31/2014  | 07/31/2014    | 0.00            | 0.00               | 0.00                 |
| 12 | 32687 | 130    | Install sub-floor     | 08/04/2014  | 08/04/2014    | 95.00           | 98.95              | -3.95                |

|    |       |     |                      |            |            |          |          |         |
|----|-------|-----|----------------------|------------|------------|----------|----------|---------|
| 13 | 32687 | 150 | Prepare sub floor    | 08/04/2014 | 08/07/2014 | 110.00   | 105.00   | 5.00    |
| 14 | 32687 | 160 | Install tile floor   | 08/11/2014 | 08/14/2014 | 13550.00 | 13810.60 | -260.60 |
| 15 | 32687 | 170 | Grout                | 08/18/2014 | 08/18/2014 | 12.00    | 12.87    | -0.87   |
| 16 | 32687 | 180 | Seal and finish work | 08/22/2014 | 08/22/2014 | 10.00    | 9.975    | 0.025   |
| 17 | 55841 | 130 | Install sub-floor    | 07/15/2013 | 07/15/2013 | 83.00    | 94.90    | -11.90  |
| 18 | 55841 | 150 | Prepare sub floor    | 07/16/2013 | 07/16/2013 | 110.00   | 99.975   | 10.025  |
| 19 | 55841 | 160 | Install tile floor   | 07/18/2013 | 07/19/2013 | 240.00   | 235.15   | 4.85    |
| 20 | 55841 | 170 | Grout                | 07/22/2013 | 07/22/2013 | 9.00     | 11.88    | -2.88   |
| 21 | 55841 | 180 | Seal and finish work | 07/29/2013 | 07/29/2013 | 13.00    | 11.75    | 1.25    |
| 22 | 55873 | 130 | Install sub-floor    | 08/14/2013 | 08/15/2013 | 83.00    | 94.90    | -11.90  |
| 23 | 55873 | 150 | Prepare sub floor    | 08/16/2013 | 08/16/2013 | 110.00   | 99.975   | 10.025  |
| 24 | 55873 | 160 | Install tile floor   | 08/19/2013 | 08/20/2013 | 240.00   | 9.43     | 230.57  |
| 25 | 55873 | 170 | Grout                | 08/26/2013 | 08/26/2013 | 9.00     | 11.88    | -2.88   |
| 26 | 55873 | 180 | Seal and finish work | 09/02/2013 | 09/02/2013 | 13.00    | 11.75    | 1.25    |
| 27 | 55878 | 130 | Install sub-floor    | 09/12/2013 | 09/12/2013 | 83.00    | 81.40    | 1.60    |
| 28 | 55878 | 150 | Prepare sub floor    | 09/16/2013 | 09/16/2013 | 110.00   | 99.975   | 10.025  |
| 29 | 55878 | 160 | Install tile floor   | 09/19/2013 | 09/20/2013 | 240.00   | 11.52    | 228.48  |
| 30 | 55878 | 170 | Grout                | 09/24/2013 | 09/24/2013 | 9.00     | 11.88    | -2.88   |
| 31 | 55878 | 180 | Seal and finish work | 09/30/2013 | 09/30/2013 | 13.00    | 11.75    | 1.25    |
| 32 | 62254 | 150 | Prepare sub floor    | 10/14/2014 | 10/24/2014 | 790.00   | 771.25   | 18.75   |
| 33 | 62254 | 160 | Install tile floor   | 10/16/2014 | 10/30/2014 | 1897.00  | 142.95   | 1754.05 |
| 34 | 62254 | 170 | Grout                | 10/21/2014 | 10/31/2014 | 120.00   | 116.25   | 3.75    |
| 35 | 62254 | 180 | Seal and finish work | 10/30/2014 | 11/03/2014 | 125.00   | 99.75    | 25.25   |
| 36 | 62257 | 150 | Prepare sub floor    | 10/30/2014 | 11/03/2014 | 790.00   | 771.25   | 18.75   |
| 37 | 62257 | 160 | Install tile floor   | 11/03/2014 | 11/07/2014 | 1897.00  | 142.95   | 1754.05 |
| 38 | 62257 | 170 | Grout                | 11/07/2014 | 11/12/2014 | 120.00   | 116.25   | 3.75    |
| 39 | 62257 | 180 | Seal and finish work | 11/13/2014 | 11/18/2014 | 125.00   | 99.75    | 25.25   |
| 40 | 78431 | 140 | Design mosaic/glass  | 11/17/2014 | 12/15/2014 | 50.00    | 46.25    | 3.75    |
| 41 | 78431 | 190 | Install mosaic       | 01/19/2015 | Not Done   | 0.00     | 0.00     | 0.00    |
| 42 | 78431 | 200 | Build structure      | 01/12/2015 | Not Done   | 175.00   | 0.00     | 175.00  |
| 43 | 78431 | 260 | Build mosaic/glass   | 12/22/2014 | Not Done   | 1460.00  | 1589.00  | -129.00 |
| 44 | 91584 | 150 | Prepare sub floor    | 03/31/2014 | 04/02/2014 | 300.00   | 313.87   | -13.87  |
| 45 | 91584 | 160 | Install tile floor   | 04/07/2014 | 04/11/2014 | 11590.00 | 11762.80 | -172.80 |
| 46 | 91584 | 170 | Grout                | 04/14/2014 | 04/14/2014 | 150.00   | 154.85   | -4.85   |
| 47 | 91584 | 180 | Seal and finish work | 04/18/2014 | 04/21/2014 | 175.00   | 168.00   | 7.00    |
| 48 | 91584 | 230 | Install tile counter | 04/03/2014 | 04/04/2014 | 400.00   | 433.71   | -33.71  |

3. Now it's time to put them together. Compare actual to estimated costs for each row in the JobTask table. The PercentVariance is the percentage variance between the TotalEstCost and the TotalActualCost. The general calculation is:  $((\text{TotalEstCost} - \text{TotalActualCost}) / \text{TotalEstCost}) * 100$ . Virtually unreadable result table provided below.

|    | JobID | TaskID | TaskDescription       | DateStarted | DateCompleted | EstHours | ActualHoursWorked | LaborHoursVariance | EstLaborCost | ActualLaborCost | LaborCostVariance | EstMaterialCost | ActualMaterialCost | MaterialCostVariance | TotalEstCost | TotalActualCost | TotalCostVariance | PercentVariance |
|----|-------|--------|-----------------------|-------------|---------------|----------|-------------------|--------------------|--------------|-----------------|-------------------|-----------------|--------------------|----------------------|--------------|-----------------|-------------------|-----------------|
| 1  | 16885 | 110    | Remove Existing Floor | 12/10/2014  | 12/11/2014    | 6        | 7.00              | -1.00              | 75.00        | 77.000000       | -2.000000         | 25.00           | 22.83              | 2.17                 | 100.00       | 99.830000       | 0.170000          | 0.170000        |
| 2  | 16885 | 130    | Install sub-floor     | 12/12/2014  | 12/16/2014    | 22       | 23.50             | -1.50              | 280.00       | 276.125000      | 3.875000          | 360.00          | 261.40             | 98.60                | 640.00       | 537.525000      | 102.475000        | 16.010000       |
| 3  | 16885 | 140    | Design mosaic/glass   | 11/24/2014  | 11/28/2014    | 10       | 9.00              | 1.00               | 240.00       | 247.500000      | -7.500000         | 10.00           | 18.00              | -8.00                | 250.00       | 265.500000      | -15.500000        | -6.200000       |
| 4  | 16885 | 150    | Prepare sub floor     | 12/16/2014  | 12/16/2014    | 5        | 4.50              | 0.50               | 61.00        | 54.000000       | 7.000000          | 250.00          | 242.975            | 7.025                | 311.00       | 296.975000      | 14.025000         | 4.510000        |
| 5  | 16885 | 160    | Install tile floor    | 12/17/2014  | Not Done      | 18       | 19.25             | -1.25              | 230.00       | 223.487500      | 6.512500          | 1530.00         | 1794.74            | -264.74              | 1760.00      | 2018.227500     | -258.227500       | -14.670000      |
| 6  | 16885 | 170    | Grout                 | 12/28/2014  | Not Done      | 33       | 0.00              | 33.00              | 450.00       | 0.000000        | 450.000000        | 40.00           | 46.00              | -6.00                | 490.00       | 46.000000       | 444.000000        | 90.610000       |
| 7  | 16885 | 180    | Seal and finish work  | 01/19/2015  | Not Done      | 17       | 0.00              | 17.00              | 180.00       | 0.000000        | 180.000000        | 25.00           | 19.95              | 5.05                 | 205.00       | 19.950000       | 185.050000        | 90.270000       |
| 8  | 16885 | 240    | Install tile wall     | 12/22/2014  | Not Done      | 16       | 0.00              | 16.00              | 252.00       | 0.000000        | 252.000000        | 1625.00         | 1970.99            | -345.99              | 1877.00      | 1970.990000     | -93.990000        | -5.010000       |
| 9  | 16885 | 260    | Build mosaic/glass    | 01/05/2015  | Not Done      | 16       | 0.00              | 16.00              | 384.00       | 0.000000        | 384.000000        | 110.00          | 0.00               | 110.00               | 494.00       | 0.000000        | 494.000000        | 100.000000      |
| 10 | 16885 | 270    | General demolition    | 12/08/2014  | 12/10/2014    | 8        | 7.50              | 0.50               | 100.00       | 81.562500       | 18.437500         | 0.00            | 0.00               | 0.00                 | 100.00       | 81.562500       | 18.437500         | 18.440000       |
| 11 | 32687 | 110    | Remove Existing Floor | 07/31/2014  | 07/31/2014    | 8        | 7.50              | 0.50               | 88.00        | 82.500000       | 5.500000          | 0.00            | 0.00               | 0.00                 | 88.00        | 82.500000       | 5.500000          | 6.250000        |
| 12 | 32687 | 130    | Install sub-floor     | 08/04/2014  | 08/04/2014    | 7        | 8.00              | -1.00              | 113.00       | 92.000000       | 21.000000         | 95.00           | 98.95              | -3.95                | 208.00       | 190.950000      | 17.050000         | 8.200000        |
| 13 | 32687 | 150    | Prepare sub floor     | 08/04/2014  | 08/07/2014    | 3        | 4.50              | -1.50              | 50.00        | 54.000000       | -4.000000         | 110.00          | 105.00             | 5.00                 | 160.00       | 159.000000      | 1.000000          | 0.630000        |
| 14 | 32687 | 160    | Install tile floor    | 08/11/2014  | 08/14/2014    | 10       | 10.00             | 0.00               | 180.00       | 160.000000      | 20.000000         | 13550.00        | 13810.60           | -260.60              | 13730.00     | 13970.600000    | -240.600000       | -1.750000       |
| 15 | 32687 | 170    | Grout                 | 08/18/2014  | 08/18/2014    | 6        | 6.50              | -0.50              | 90.00        | 78.000000       | 12.000000         | 12.00           | 12.87              | -0.87                | 102.00       | 90.870000       | 11.130000         | 10.910000       |
| 16 | 32687 | 180    | Seal and finish work  | 08/22/2014  | 08/22/2014    | 4        | 4.50              | -0.50              | 60.00        | 63.000000       | -3.000000         | 10.00           | 9.975              | 0.025                | 70.00        | 72.975000       | -2.975000         | -4.250000       |
| 17 | 55841 | 130    | Install sub-floor     | 07/15/2013  | 07/15/2013    | 8        | 7.50              | 0.50               | 83.00        | 90.000000       | -7.000000         | 83.00           | 94.90              | -11.90               | 166.00       | 184.900000      | -18.900000        | -11.390000      |
| 18 | 55841 | 150    | Prepare sub floor     | 07/16/2013  | 07/16/2013    | 4        | 4.00              | 0.00               | 45.00        | 48.000000       | -3.000000         | 110.00          | 99.975             | 10.025               | 155.00       | 147.975000      | 7.025000          | 4.530000        |
| 19 | 55841 | 160    | Install tile floor    | 07/18/2013  | 07/19/2013    | 11       | 10.50             | 0.50               | 170.00       | 168.000000      | 2.000000          | 240.00          | 235.15             | 4.85                 | 410.00       | 403.150000      | 6.850000          | 1.670000        |
| 20 | 55841 | 170    | Grout                 | 07/22/2013  | 07/22/2013    | 10       | 10.50             | -0.50              | 140.00       | 139.000000      | 1.000000          | 9.00            | 11.88              | -2.88                | 149.00       | 150.880000      | -1.880000         | -1.260000       |
| 21 | 55841 | 180    | Seal and finish work  | 07/29/2013  | 07/29/2013    | 5        | 4.00              | 1.00               | 58.00        | 46.000000       | 12.000000         | 13.00           | 11.75              | 1.25                 | 71.00        | 57.750000       | 13.250000         | 18.660000       |
| 22 | 55873 | 130    | Install sub-floor     | 08/14/2013  | 08/15/2013    | 8        | 5.75              | 2.25               | 110.00       | 132.250000      | -22.250000        | 83.00           | 94.90              | -11.90               | 193.00       | 227.150000      | -34.150000        | -17.690000      |
| 23 | 55873 | 150    | Prepare sub floor     | 08/16/2013  | 08/16/2013    | 4        | 4.25              | -0.25              | 45.00        | 59.500000       | -14.500000        | 110.00          | 99.975             | 10.025               | 155.00       | 159.475000      | -4.475000         | -2.890000       |
| 24 | 55873 | 160    | Install tile floor    | 08/19/2013  | 08/20/2013    | 11       | 11.30             | -0.30              | 170.00       | 180.800000      | -10.800000        | 240.00          | 9.43               | 230.57               | 410.00       | 190.230000      | 219.770000        | 53.600000       |
| 25 | 55873 | 170    | Grout                 | 08/26/2013  | 08/26/2013    | 10       | 10.50             | -0.50              | 140.00       | 133.875000      | 6.125000          | 9.00            | 11.88              | -2.88                | 149.00       | 145.755000      | 3.245000          | 2.180000        |
| 26 | 55873 | 180    | Seal and finish work  | 09/02/2013  | 09/02/2013    | 5        | 5.00              | 0.00               | 58.00        | 70.000000       | -12.000000        | 13.00           | 11.75              | 1.25                 | 71.00        | 81.750000       | -10.750000        | -15.140000      |
| 27 | 55878 | 130    | Install sub-floor     | 09/12/2013  | 09/12/2013    | 8        | 8.00              | 0.00               | 110.00       | 104.000000      | 6.000000          | 83.00           | 81.40              | 1.60                 | 193.00       | 185.400000      | 7.600000          | 3.940000        |
| 28 | 55878 | 150    | Prepare sub floor     | 09/16/2013  | 09/16/2013    | 4        | 4.50              | -0.50              | 45.00        | 54.000000       | -9.000000         | 110.00          | 99.975             | 10.025               | 155.00       | 153.975000      | 1.025000          | 0.660000        |
| 29 | 55878 | 160    | Install tile floor    | 09/19/2013  | 09/20/2013    | 11       | 10.75             | 0.25               | 170.00       | 172.000000      | -2.000000         | 240.00          | 11.52              | 228.48               | 410.00       | 183.520000      | 226.480000        | 55.240000       |
| 30 | 55878 | 170    | Grout                 | 09/24/2013  | 09/24/2013    | 10       | 9.75              | 0.25               | 140.00       | 128.500000      | 11.500000         | 9.00            | 11.88              | -2.88                | 149.00       | 140.380000      | 8.620000          | 5.790000        |
| 31 | 55878 | 180    | Seal and finish work  | 09/30/2013  | 09/30/2013    | 5        | 5.00              | 0.00               | 53.00        | 60.000000       | -7.000000         | 13.00           | 11.75              | 1.25                 | 66.00        | 71.750000       | -5.750000         | -8.710000       |
| 32 | 62254 | 150    | Prepare sub floor     | 10/14/2014  | 10/24/2014    | 20       | 19.50             | 0.50               | 270.00       | 273.000000      | -3.000000         | 790.00          | 771.25             | 18.75                | 1060.00      | 1044.250000     | 15.750000         | 1.490000        |
| 33 | 62254 | 160    | Install tile floor    | 10/16/2014  | 10/30/2014    | 65       | 61.25             | 3.75               | 1040.00      | 980.000000      | 60.000000         | 1897.00         | 142.95             | 1754.05              | 2937.00      | 1122.950000     | 1814.050000       | 61.770000       |
| 34 | 62254 | 170    | Grout                 | 10/21/2014  | 10/31/2014    | 40       | 40.50             | -0.50              | 540.00       | 492.500000      | 47.500000         | 120.00          | 116.25             | 3.75                 | 660.00       | 608.750000      | 51.250000         | 7.770000        |
| 35 | 62254 | 180    | Seal and finish work  | 10/30/2014  | 11/03/2014    | 33       | 32.00             | 1.00               | 446.00       | 452.937500      | -6.937500         | 125.00          | 99.75              | 25.25                | 571.00       | 552.687500      | 18.312500         | 3.210000        |
| 36 | 62257 | 150    | Prepare sub floor     | 10/30/2014  | 11/03/2014    | 20       | 20.25             | -0.25              | 270.00       | 232.875000      | 37.125000         | 790.00          | 771.25             | 18.75                | 1060.00      | 1004.125000     | 55.875000         | 5.270000        |
| 37 | 62257 | 160    | Install tile floor    | 11/03/2014  | 11/07/2014    | 65       | 64.50             | 0.50               | 1040.00      | 1043.520000     | -3.520000         | 1897.00         | 142.95             | 1754.05              | 2937.00      | 1186.470000     | 1750.530000       | 59.600000       |
| 38 | 62257 | 170    | Grout                 | 11/07/2014  | 11/12/2014    | 40       | 39.00             | 1.00               | 540.00       | 528.500000      | 11.500000         | 120.00          | 116.25             | 3.75                 | 660.00       | 644.750000      | 15.250000         | 2.310000        |
| 39 | 62257 | 180    | Seal and finish work  | 11/13/2014  | 11/18/2014    | 33       | 30.75             | 2.25               | 446.00       | 424.437500      | 21.562500         | 125.00          | 99.75              | 25.25                | 571.00       | 524.187500      | 46.812500         | 8.200000        |
| 40 | 78431 | 140    | Design mosaic/glass   | 11/17/2014  | 12/15/2014    | 24       | 23.65             | 0.35               | 575.00       | 650.375000      | -75.375000        | 50.00           | 46.25              | 3.75                 | 625.00       | 696.625000      | -71.625000        | -11.460000      |
| 41 | 78431 | 190    | Install mosaic        | 01/19/2015  | Not Done      | 4        | 0.00              | 4.00               | 64.00        | 0.000000        | 64.000000         | 0.00            | 0.00               | 0.00                 | 64.00        | 0.000000        | 64.000000         | 100.000000      |
| 42 | 78431 | 200    | Build structure       | 01/12/2015  | Not Done      | 8        | 0.00              | 8.00               | 128.00       | 0.000000        | 128.000000        | 175.00          | 0.00               | 175.00               | 303.00       | 0.000000        | 303.000000        | 100.000000      |
| 43 | 78431 | 260    | Build mosaic/glass    | 12/22/2014  | Not Done      | 40       | 35.50             | 4.50               | 960.00       | 976.250000      | -16.250000        | 1460.00         | 1589.00            | -129.00              | 2420.00      | 2565.250000     | -145.250000       | -6.000000       |
| 44 | 91584 | 150    | Prepare sub floor     | 03/31/2014  | 04/02/2014    | 33       | 34.00             | -1.00              | 450.00       | 425.625000      | 24.375000         | 300.00          | 313.87             | -13.87               | 750.00       | 739.495000      | 10.505000         | 1.400000        |
| 45 | 91584 | 160    | Install tile floor    | 04/07/2014  | 04/11/2014    | 72       | 74.25             | -2.25              | 1200.00      | 1188.000000     | 12.000000         | 11590.00        | 11762.80           | -172.80              | 12790.00     | 12950.800000    | -160.800000       | -1.260000       |
| 46 | 91584 | 170    | Grout                 | 04/14/2014  | 04/14/2014    | 16       | 18.75             | -2.75              | 216.00       | 221.250000      | -5.250000         | 150.00          | 154.85             | -4.85                | 366.00       | 376.100000      | -10.100000        | -2.760000       |
| 47 | 91584 | 180    | Seal and finish work  | 04/18/2014  | 04/21/2014    | 8        | 7.50              | 0.50               | 108.00       | 88.125000       | 19.875000         | 175.00          | 168.00             | 7.00                 | 283.00       | 256.125000      | 26.875000         | 9.500000        |
| 48 | 91584 | 230    | Install tile counter  | 04/03/2014  | 04/04/2014    | 16       | 16.50             | -0.50              | 265.00       | 264.000000      | 1.000000          | 400.00          | 433.71             | -33.71               | 665.00       | 697.710000      | -32.710000        | -4.920000       |



4. Summarize the information created in question #3 by job. The result table should have one row per job in the Job table. Add additional data from the Job and Client tables to provide more information about each job in the result table. Hint: **Calculate** the PercentVariance – you cannot sum that field.

|    | JobID | JobName                        | ClientName                    | JobStatus    | EstHours | ActualHoursWorked | LaborHoursVariance | EstLaborCost | ActualLaborCost | LaborCostVariance | EstMaterialCost | ActualMaterialCost | MaterialCostVariance | TotalEstCost | TotalActualCost | TotalCostVariance | PercentVariance |
|----|-------|--------------------------------|-------------------------------|--------------|----------|-------------------|--------------------|--------------|-----------------|-------------------|-----------------|--------------------|----------------------|--------------|-----------------|-------------------|-----------------|
| 1  | 15771 | Main Showroom, Entry Area      | Less Furniture Company        | Not Finished | NULL     | NULL              | NULL               | NULL         | NULL            | NULL              | NULL            | NULL               | NULL                 | NULL         | NULL            | NULL              | NULL            |
| 2  | 16885 | Hampstead, Bathroom #2         | Ms. Catherine Hampstead       | Not Finished | 151      | 70.75             | 80.25              | 2252.00      | 959.675000      | 1292.325000       | 3975.00         | 4376.885           | -401.885             | 6227.00      | 5336.560000     | 890.440000        | 14.299600       |
| 3  | 32687 | Hampstead, Bathroom 1          | Ms. Catherine Hampstead       | Finished     | 38       | 41.00             | -3.00              | 581.00       | 529.500000      | 51.500000         | 13777.00        | 14037.395          | -260.395             | 14358.00     | 14566.895000    | -208.895000       | -1.454900       |
| 4  | 55841 | AO Reid - Wonder Valley PH 2-2 | AO Reid Construction          | Finished     | 38       | 36.50             | 1.50               | 496.00       | 491.000000      | 5.000000          | 455.00          | 453.655            | 1.345                | 951.00       | 944.655000      | 6.345000          | 0.667100        |
| 5  | 55873 | AO Reid - Wonder Valley PH 2-3 | AO Reid Construction          | Finished     | 38       | 36.80             | 1.20               | 523.00       | 576.425000      | -53.425000        | 455.00          | 227.935            | 227.065              | 978.00       | 804.360000      | 173.640000        | 17.754600       |
| 6  | 55878 | AO Reid - Wonder Valley PH 2-4 | AO Reid Construction          | Finished     | 38       | 38.00             | 0.00               | 518.00       | 518.500000      | -0.500000         | 455.00          | 216.525            | 238.475              | 973.00       | 735.025000      | 237.975000        | 24.457800       |
| 7  | 62254 | Dew Drop, Meadow Wood-1        | Dew Drop Inn Luxury Suites    | Finished     | 158      | 153.25            | 4.75               | 2296.00      | 2198.437500     | 97.562500         | 2932.00         | 1130.20            | 1801.80              | 5228.00      | 3328.637500     | 1899.362500       | 36.330500       |
| 8  | 62257 | Dew Drop, Meadow Wood-2        | Dew Drop Inn Luxury Suites    | Finished     | 158      | 154.50            | 3.50               | 2296.00      | 2229.332500     | 66.667500         | 2932.00         | 1130.20            | 1801.80              | 5228.00      | 3359.532500     | 1868.467500       | 35.739600       |
| 9  | 78431 | Custom Stained Glass Part.     | Casem, Brokaw and Stuart, LLC | Not Finished | 76       | 59.15             | 16.85              | 1727.00      | 1626.625000     | 100.375000        | 1685.00         | 1635.25            | 49.75                | 3412.00      | 3261.875000     | 150.125000        | 4.399900        |
| 10 | 91584 | Restaurant Remodel             | Adam's Rib Restaurant         | Finished     | 145      | 151.00            | -6.00              | 2239.00      | 2187.000000     | 52.000000         | 12615.00        | 12833.23           | -218.23              | 14854.00     | 15020.230000    | -166.230000       | -1.119000       |

5. Which job that is finished had actual total costs that were closest to the estimated total costs? (PercentVariance closest to zero) Make sure that the query could select the correct job from any data set – the query should not just work with our test data set. Result table:

|   | JobID | JobName                        | ClientName           | JobStatus | EstHours | ActualHoursWorked | LaborHoursVariance | EstLaborCost | ActualLaborCost | LaborCostVariance | EstMaterialCost | ActualMaterialCost | MaterialCostVariance | TotalEstCost | TotalActualCost | TotalCostVariance | PercentVariance |
|---|-------|--------------------------------|----------------------|-----------|----------|-------------------|--------------------|--------------|-----------------|-------------------|-----------------|--------------------|----------------------|--------------|-----------------|-------------------|-----------------|
| 1 | 55841 | AO Reid - Wonder Valley PH 2-2 | AO Reid Construction | Finished  | 38       | 36.50             | 1.50               | 496.00       | 491.000000      | 5.000000          | 455.00          | 453.655            | 1.345                | 951.00       | 944.655000      | 6.345000          | 0.667100        |

6. Which job that is finished had the largest percentage positive labor hours variance? In other words, which finished job was able to be completed with the least number of labor hours, when compared to the estimated labor hours? The percentage labor hours variance is calculated as the LaborHoursVariance/EstHours \* 100. Add in the name of the employee who served as the manager for the job. Result table:

|   | JobID | JobName                        | ClientName           | EmployeeManager  | EstHours | ActualHoursWorked | LaborHoursVariance | PercentHoursVariance |
|---|-------|--------------------------------|----------------------|------------------|----------|-------------------|--------------------|----------------------|
| 1 | 55841 | AO Reid - Wonder Valley PH 2-2 | AO Reid Construction | Galloway, Odessa | 38       | 36.50             | 1.50               | 3.947300             |

7. What is the average amount of time (labor hours) spent on a completed job task per square foot, as compared to the estimated amount of time that should be spent on a task per square foot?

Use the data in the JobTask table to calculate the average amount of EstHours/Squarefeet, but use the data in the TimeSheet table to calculate the average amount of time that was actually worked on a completed task. I recommend creating separate views for the estimated hours per square feet and the actual hours per square feet. The estimate view is a little easier to create because it doesn't require a join. Include all rows in the JobTask table to get the average EstHours/Squarefeet for a task. To get the average actual hours per square feet requires that you join the TimeSheet table and the JobTask table to be able to use the square feet in the JobTask table. Do not include data for incompleted tasks when calculating the ActualHours/SquareFeet. Remember that you have to SUM the HoursWorked in the TimeSheet table by JobID and TaskID to get the Actual HoursWorked from the TimeSheet table. I rounded the final results to 6 digits after the decimal point. The result table is at the top of the next page. There is one row in the result table for each row in the Task table. Sort the result table by TaskID.

|    | TaskID | TaskDescription       | EstimatedHoursPerSqFt | ActualHoursPerSqFt   | ComparisonMessage |
|----|--------|-----------------------|-----------------------|----------------------|-------------------|
| 1  | 110    | Remove Existing Floor | 0.071579000000000000  | 0.076842000000000000 | Actual Larger     |
| 2  | 120    | Clean mold            | NULL                  | NULL                 | Null Estimate     |
| 3  | 130    | Install sub-floor     | 0.092564000000000000  | 0.092809000000000000 | Actual Larger     |
| 4  | 140    | Design mosaic/glass   | 0.231250000000000000  | 0.234375000000000000 | Actual Larger     |
| 5  | 150    | Prepare sub floor     | 0.031991000000000000  | 0.036022000000000000 | Actual Larger     |
| 6  | 160    | Install tile floor    | 0.093924000000000000  | 0.092838000000000000 | Estimate Larger   |
| 7  | 170    | Grout                 | 0.072814000000000000  | 0.072563000000000000 | Estimate Larger   |
| 8  | 180    | Seal and finish work  | 0.047346000000000000  | 0.038552000000000000 | Estimate Larger   |
| 9  | 190    | Install mosaic        | 0.025000000000000000  | NULL                 | Null Actual       |
| 10 | 200    | Build structure       | 0.050000000000000000  | NULL                 | Null Actual       |
| 11 | 210    | Remove existing tile  | NULL                  | NULL                 | Null Estimate     |
| 12 | 220    | Clean site            | NULL                  | NULL                 | Null Estimate     |
| 13 | 230    | Install tile counter  | 0.470588000000000000  | 0.500000000000000000 | Actual Larger     |
| 14 | 240    | Install tile wall     | 0.114286000000000000  | NULL                 | Null Actual       |
| 15 | 260    | Build mosaic/glass    | 0.375000000000000000  | NULL                 | Null Actual       |
| 16 | 270    | General demolition    | 0.071429000000000000  | 0.071429000000000000 | No difference     |

The ComparisonMessage should be generated as shown on the result table above; if both the EstimatedHours and ActualHours are null, then put the message “Null Estimate” in the ComparisonMessage column. Remember that a CASE statement in the SELECT list executes sequentially, so whatever WHEN statement is placed first will be executed first. The CASE statement stops executing as soon as a WHEN condition is true.

Potential problem: EstHours and Squarefeet are integers and must be converted to decimal data types before they can be used in a calculation that could generate a decimal result.

8. Use the result table generated for question #7 to help you answer this question. The goal of this query is to identify which task has the largest negative difference between the EstimatedHoursPerSqFt and ActualHoursPerSqFt (which estimate is the worst because the actual is larger). Result table:

|   | TaskID | TaskDescription      | EstimatedHoursPerSqFt | ActualHoursPerSqFt   | ComparisonMessage |
|---|--------|----------------------|-----------------------|----------------------|-------------------|
| 1 | 230    | Install tile counter | 0.470588000000000000  | 0.500000000000000000 | Actual Larger     |

9. The objective of this query is similar to that for question #7, except this time we are going to look at labor costs rather than labor hours. What is the average estimated labor cost per square foot as compared to the actual labor cost per square foot for each task? I recommend looking back at question #1, where you probably created a view to help you calculate actual labor costs for a task on a job. That view will help you with this question. Do **not** include data for incompleted tasks when calculating the actual labor cost/SquareFeet; do include data for incompleted tasks when calculating the estimated labor cost/squarefeet. Result table:

|    | TaskID | TaskDescription       | EstimatedLaborCostPerSqFt  | ActualLaborCostPerSqFt   |
|----|--------|-----------------------|----------------------------|--------------------------|
| 1  | 110    | Remove Existing Floor | 0.834737000000000000000000 | 0.8202630000000000000000 |
| 2  | 120    | Clean mold            | NULL                       | NULL                     |
| 3  | 130    | Install sub-floor     | 1.220681000000000000000000 | 1.2226170000000000000000 |
| 4  | 140    | Design mosaic/glass   | 5.546875000000000000000000 | 5.9062500000000000000000 |
| 5  | 150    | Prepare sub floor     | 0.403222000000000000000000 | 0.4319450000000000000000 |
| 6  | 160    | Install tile floor    | 1.463245000000000000000000 | 1.4456420000000000000000 |
| 7  | 170    | Grout                 | 1.016067000000000000000000 | 0.8946270000000000000000 |
| 8  | 180    | Seal and finish work  | 0.563582000000000000000000 | 0.4938960000000000000000 |
| 9  | 190    | Install mosaic        | 0.400000000000000000000000 | NULL                     |
| 10 | 200    | Build structure       | 0.800000000000000000000000 | NULL                     |
| 11 | 210    | Remove existing tile  | NULL                       | NULL                     |
| 12 | 220    | Clean site            | NULL                       | NULL                     |
| 13 | 230    | Install tile counter  | 7.794118000000000000000000 | 7.7647060000000000000000 |
| 14 | 240    | Install tile wall     | 1.800000000000000000000000 | NULL                     |
| 15 | 260    | Build mosaic/glass    | 9.000000000000000000000000 | NULL                     |
| 16 | 270    | General demolition    | 0.892857000000000000000000 | 0.7321430000000000000000 |



10. Which clients did not have any jobs with a DateAccepted last year? Which materials were not assigned (DateAssigned) to any job tasks last year? Combine the clients and materials into a single result table (hint: Use the UNION statement). Make sure that you use the GETDATE() function to determine the correct year. Result table:

|    | ClientOrMaterialID | ClientOrMaterialName                   |
|----|--------------------|--|
| 1  | Client: 2417       | Client: Kelly Property Development     |
| 2  | Client: 4147       | Client: Lloyds Casino Properties, LLC  |
| 3  | Client: 4339       | Client: 3 Gals From Verona             |
| 4  | Client: 4469       | Client: Fran and Harold Meyers         |
| 5  | Client: 5012       | Client: Less Furniture Company         |
| 6  | Client: 5423       | Client: Aero Professional Corp.        |
| 7  | Client: 6295       | Client: AO Reid Construction           |
| 8  | Material: 1030     | Material: Henry 440 Bulk               |
| 9  | Material: 1040     | Material: Henry 440 Cove Base          |
| 10 | Material: 1050     | Material: Henry 356C Multi             |
| 11 | Material: 1100     | Material: Granite                      |
| 12 | Material: 1120     | Material: Underlayment Screws          |
| 13 | Material: 1130     | Material: Standard Install Supply Pack |
| 14 | Material: 1140     | Material: ProTex Concrete Backer       |
| 15 | Material: 1160     | Material: Grout, Epoxy                 |