



Excel 2021 In Practice - Ch 9 Guided
Project 9-3

Guided Project 9-3

Courtyard Medical Plaza has new worksheets for weight loss workshops. You use *Solver* with sample data and add scenarios, data tables, and array formulas to complete a sample set.

[Student Learning Outcomes 9.1, 9.3, 9.4, 9.5, 9.7]

File Needed: **CourtyardMedical-09.xlsx** (Available from the Start File link.)

Completed Project File Name: **[your name]-CourtyardMedical-09.xlsx**

Skills Covered in This Project

- Create and manage scenarios.
- Use *Solver* in a worksheet to find a solution.
- Build a one-variable data table.
- Create a two-variable data table.
- Build an array formula.
- Generate *Descriptive Statistics* for a set of data.

Steps to complete This Project

Mark the steps as checked when you complete them.

1. ☐ Open the **CourtyardMedical-09** start file and click the **Enable Editing** button. The file will be renamed automatically to include your name.

2. Install *Solver* and the *Analysis ToolPak*.

a. ☐ Click **Tools** [*Excel* menu].

b. ☐ Select **Excel Add-ins...**

c. ☐ Select the **Solver Add-in** box.

d. ☐ Select the **Analysis ToolPak** box and click **OK**.

3. ☐ Select the **Workout Plan** worksheet tab and select cell **E10**. Five activities are summed to count calories. This cell includes a *SUM* formula.

4. Name a range and add scenarios in a worksheet.

a. ☐ Click the **Name Manager** button [*Formulas* tab, *Defined Names* group]. The values in column D are named. You should also name the value in cell E10.

b. ☐ Close the dialog box, select cell **E10**, and name it as **CalorieTotal**.

c. ☐ Select cells **D5:D9**, click the **What-if Analysis** button [*Data* tab, *Forecast* group], and select **Scenario Manager**.

d. ☐ Click **+** and type **Basic Plan** as the name.

e. ☐ Verify or set the *Changing cells* box to display **D5:D9** and click **OK**.

f. ☐ Do not edit the *Scenario Values* and click **OK**.

g. ☐ Click **+** to add another scenario.
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- h. ☐ Type **Double** as the name, keep the *Changing cells* as **D5:D9**, and click **OK**.
- i. ☐ Change the values to **2, 2, 4, 2, and 2**, doubling each current value, in the *Scenario Values* dialog box and click **OK** ([Figure 9-90](#)).
- j. ☐ Click **Close** and select cell **B3**.

5. Use **Solver** to find a maximum calorie burn.

- a. ☐ Click the **Solver** button [*Data tab, Analysis group*].
- b. ☐ Select cell **E10**, the cell with a *SUM* formula, for the *Set Objective* box.
- c. ☐ Verify or select the **Max** radio button.
- d. ☐ Click the **By Changing Variable Cells** box and select cells **D5:D7** to adjust the occurrences of three activities in the workout plan.

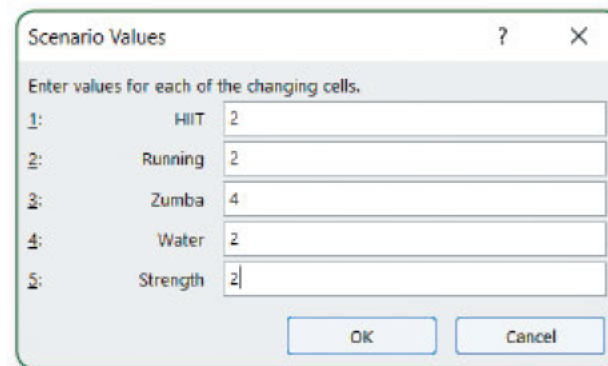


Figure 9-90 Edited scenario values

6. Add constraints to a *Solver* problem.

- a. ☐ Click **Add** to the right of the *Subject to the Constraints* box.
- b. ☐ Select cell **D5** for the *Cell Reference* box and choose **int** as the operator. The *Constraint* box displays **integer** to require that the result be a whole number.
- c. ☐ Click **Add** to add each of constraints shown here:

D5 ≤ 4

D5 ≥ 2

D6 **int**

D6 ≤ 3

D6 ≥ 1

D7 **int**

D7 ≤ 4

D7 ≥ 1

- d. ☐ When all constraints are identified, click **OK** in the *Add Constraint* dialog box.
- e. ☐ Verify or select **Simplex LP** for the *Select a Solving Method* option.
- f. ☐ Confirm that the *Make Unconstrained Variables Non-Negative* box is selected ([Figure 9-91](#)).
- g. ☐ Click **Solve**. A solution displays in the worksheet, and the *Solver Results* dialog box is open.

7. Save *Solver* results as a scenario.

- a. ☐ Click **Save Scenario** in the *Solver Results* dialog box.
- b. ☐ Type **Solver** as the scenario name.
- c. ☐ Click **OK** to return to the *Solver Results* dialog box.
- d. ☐ Select the **Restore Original Values** button and click **OK**.

8. Create a scenario summary report.

- a. ☐ Click the **What-if Analysis** button [*Data tab, Forecast group*] and select **Scenario Manager**.
- b. ☐ Click the **Summary** button and verify that the *Scenario summary* button is selected.
- c. ☐ Select cells **D5:D9** for the *Result cells* box, type a comma (,) and then select cell **E10**.
- d. ☐ Click **OK** to create the report ([Figure 9-92](#)).

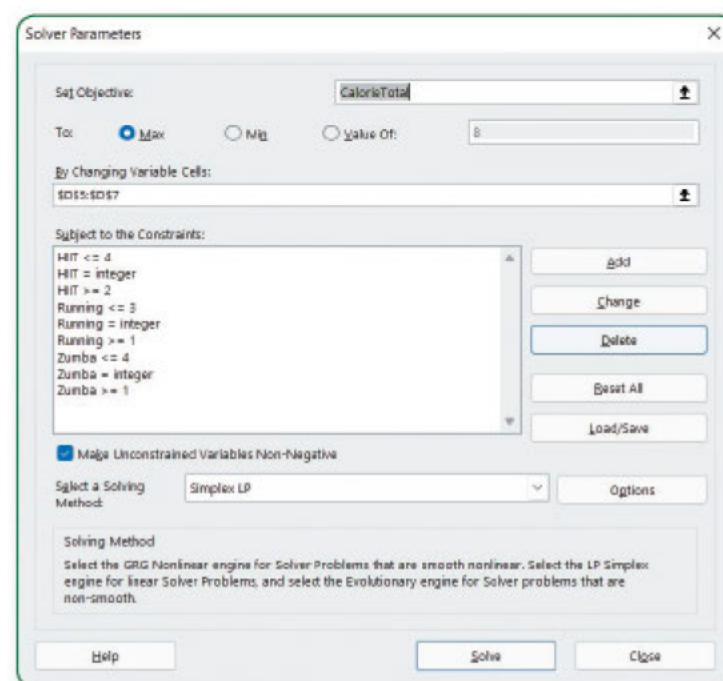


Figure 9-91 *Solver* parameters and constraints

9. Create a one-variable data table to calculate daily calories if only dinner calories are adjusted.

- a. ☐ Click the **Calorie Journal** worksheet tab and select cell **I5**. The *SUM* formula calculates total calories consumed per day. You can use this formula to build the data table.
- b. ☐ Select cell **E15**. The formula must be one column to the right and one row above the first input value.
- c. ☐ Type **=**, click cell **I5**, and press **Enter**.
- d. ☐ Select cells **D15:E23** as the data table range.
- e. ☐ Click the **What-If Analysis** button [*Data tab, Forecast group*] and choose **Data Table**.

- f. ☐ Click the **Column input cell** box and select cell **G5**. The input values will be substituted for this cell in the data table formula.
- g. ☐ Click **OK** (Figure 9-93).
10. Build a two-variable data table to display calorie count if both lunch and dinner calories are adjusted.
- a. ☐ Select cell **L15**. A two-variable table has one formula, one row above column inputs and one column left of row values.
- b. ☐ Type **=**, click cell **I5**, and press **Enter**.
- c. ☐ Select cells **L15:T23**.
- d. ☐ Click the **What-If Analysis** button [Data tab, Forecast group] and choose **Data Table**.

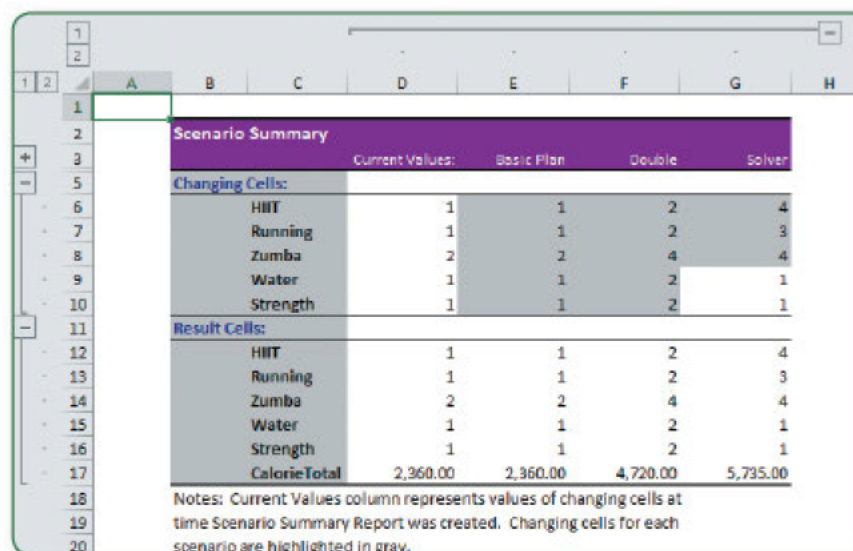


Figure 9-92 Generated scenario summary

- e. ☐ Select cell **E5** for the *Row input cell* box. Lunch calories are in the row of this data table.
- f. ☐ Click the **Column input cell** box and select cell **G5**. Dinner calories are in the column.
- g. ☐ Click **OK** to build the data table.
- h. ☐ Format the values as **Comma Style** with no decimals.
- i. ☐ Set the width of columns **L:T** to **10** (Figure 9-94).



	Daily Total Is
	2,450
500	2,150
600	2,250
700	2,350
800	2,450
900	2,550
1,000	2,650
1,100	2,750
1,200	2,850

Figure 9-93 One-variable data table results

11. Create an array formula to calculate variances.
- a. ☐ Click the **Dental Insurance** sheet tab and select cell **F5**. The maximum benefit minus the amount billed is the variance.
- b. ☐ Type **=** and select cells **D5:D35** as the first array.
- c. ☐ Type **-** to subtract and select cells **E5:E35**. The arrays have the same dimension.
- d. ☐ Press **Enter**. The dynamic array results are not formatted.
- e. ☐ Select cells **F6:F35** and format them as **Currency** with two decimal places.
- f. ☐ Select the odd-numbered cells in column **F** and apply the matching fill color.

Daily Total Is										
If Dinner Calories Are	If Lunch Calories Are									
	2,450	500	600	700	800	900	1,000	1,100	1,200	
	500	2,050	2,150	2,250	2,350	2,450	2,550	2,650	2,750	
	600	2,150	2,250	2,350	2,450	2,550	2,650	2,750	2,850	
	700	2,250	2,350	2,450	2,550	2,650	2,750	2,850	2,950	
	800	2,350	2,450	2,550	2,650	2,750	2,850	2,950	3,050	
	900	2,450	2,550	2,650	2,750	2,850	2,950	3,050	3,150	
	1,000	2,550	2,650	2,750	2,850	2,950	3,050	3,150	3,250	
	1,100	2,650	2,750	2,850	2,950	3,050	3,150	3,250	3,350	
	1,200	2,750	2,850	2,950	3,050	3,150	3,250	3,350	3,450	

Figure 9-94 Two-variable data table results

12. Generate *Descriptive Statistics* for a rating category.
- a. ☐ Click the **Data Analysis** button [Data tab, Analysis group].
- b. ☐ Select **Descriptive Statistics** and click **OK**.
- c. ☐ Select cells **F4:F35** for the *Input Range* box.
- d. ☐ Select the **Labels in First Row** box.
- e. ☐ Select the **Output Range** button, click the **Output Range** box, and select cell **H4**.
- f. ☐ Select the **Summary statistics** box and click **OK**.
- g. ☐ *AutoFit* column **H** (Figure 9-95).

	A	B	C	D	E	F	G	H	I
1	Courtyard Medical Plaza Dental Services								
2									
3									
4	Patient ID	Insurance	Service Code	Maximum Benefit	Billed	Variance		Variance	
5	OP0001	CompDent	D0120	\$125.00	\$135.00	-\$10.00			
6	OP0002	SIP	D1110	\$185.00	\$135.00	\$50.00	Mean	14.35483871	
7	OP0003	CompDent	D2751	\$235.00	\$250.00	-\$15.00	Standard Error	11.01499939	
8	OP0004	Westville	D2751	\$135.00	\$100.00	\$35.00	Median	10	
9	OP0005	CompDent	D1110	\$245.00	\$185.00	\$60.00	Mode	-10	
10	OP0006	SIP	D1110	\$275.00	\$100.00	\$175.00	Standard Deviation	61.32892107	
11	OP0007	SIP	D1110	\$325.00	\$425.00	-\$100.00	Sample Variance	3761.236559	
12	OP0008	Westville	D0120	\$175.00	\$125.00	\$50.00	Kurtosis	1.596794461	
13	OP0009	BlueDent	D0120	\$195.00	\$145.00	\$50.00	Skewness	0.33001189	
14	OP0010	BlueDent	D1110	\$200.00	\$225.00	-\$25.00	Range	300	
15	OP0011	BlueDent	D1110	\$225.00	\$235.00	-\$10.00	Minimum	-125	
16	OP0012	SIP	D1110	\$200.00	\$185.00	\$15.00	Maximum	175	
17	OP0013	CompDent	D2751	\$475.00	\$325.00	\$150.00	Sum	445	
18	OP0014	SIP	D1110	\$235.00	\$235.00	\$0.00	Count	31	
19	OP0015	SIP	D1110	\$235.00	\$245.00	-\$10.00			
20	OP0016	BlueDent	D1110	\$225.00	\$200.00	\$25.00			
21	OP0017	BlueDent	D0120	\$185.00	\$175.00	\$10.00			
22	OP0018	Westville	D0120	\$195.00	\$150.00	\$45.00			
23	OP0019	Westville	D1110	\$225.00	\$125.00	\$100.00			
24	OP0020	CompDent	D2751	\$375.00	\$500.00	-\$125.00			
25	OP0021	CompDent	D2330	\$325.00	\$400.00	-\$75.00			
26	OP0022	Westville	D2751	\$450.00	\$400.00	\$50.00			
27	OP0023	Westville	D0120	\$325.00	\$300.00	\$25.00			
28	OP0024	SIP	D0210	\$500.00	\$550.00	-\$50.00			
29	OP0025	SIP	D0120	\$250.00	\$250.00	\$0.00			
30	OP0026	BlueDent	D2751	\$125.00	\$115.00	\$10.00			
31	OP0027	CompDent	D0120	\$325.00	\$300.00	\$25.00			
32	OP0028	Westville	D2330	\$275.00	\$250.00	\$25.00			
33	OP0029	SIP	D2751	\$200.00	\$235.00	-\$35.00			
34	OP0030	BlueDent	D1110	\$185.00	\$175.00	\$10.00			
35	OP0031	CompDent	D2330	\$225.00	\$235.00	-\$10.00			

Figure 9-95 Excel 9-3 completed

13. Uninstall *Solver* and the *Analysis ToolPak*.

- ☐ Click **Tools** [*Excel* menu].
- ☐ Select **Excel Add-ins...**
- ☐ Deselect the **Solver Add-in** and **Analysis ToolPak** boxes and click **OK**.

14. ☐ Save and close the workbook.

15. ☐ Upload and save your project file.

16. ☐ Submit file for grading.

