Project: FenDog

**Sample Only**

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Document Title: User Guide

Revision Number: 2.0

**1. Location and Meaning of input parameters and input streams**

All input parameters and input streams are located on the worksheet called “Inputs” in the FenDog-scenario1.xls or FenDog-scenario2.xls workbook. The input streams are local named ranges. The “Inputs” worksheet is the only worksheet in the model where input parameters and input streams can be entered or modified. We will describe each input from left to right and top to bottom.

The two inputs that control the scenario of the workbook are listed at the top of the worksheet in the small table called, “Scenario Inputs.” The first input is High Product Mix. This input tells the scenario whether to consider an extended product line or not. When the cell is filled with “Yes,” then the model considers all products in the product mix. An input other than “Yes” in this cell (such as “No”) will result in considering only sausage, water and soda as the full product line.

The second input in the “Scenario Inputs” section is “More Employees?” The input in this cell determines if the cart has employees in addition to the owner of the cart. An input of “Yes” will run some calculations using the inputs lower in the sheet in the table called “Worker Information.” Any other response (such as “No”) will run calculations with no additional employees other than the owner of the cart.

The first input stream is called “NumberOfWins.” This input streams represents how many games the Red Sox are expected to win in that two-week period. Each of the numbers can be manually altered to represent winning streaks or losing streaks. This information is important, as our model assumes that the amount of customers is significantly more for the sausage cart when the team is losing. The preliminary data in this stream are derived from wins the previous year.

The second input stream, located below “NumberOfWins” is called “Temperature.” This stream represents the average temperature for that bi-week period. Each cell may be altered manually. The preliminary data in the worksheet is derived from average monthly temperatures for Boston during these weeks. This information allows us to predict which menu items will be popular during specific weeks. For example, lemonade would sell during bi-weeks of high temperatures and cocoa when temperatures are low.

The third input stream, located below “Temperature” is called “Game Attendance.” This stream represents the predicted number of people who come to Red Sox games during each two-week period. The numbers entered now are the numbers attending last year’s games during the same periods. This information is important as our prediction of how many people purchase from the cart is calculated as a fraction of number attending games.

In the table called “Various Parameters,” There are some important parameters that we will not alter for these scenarios, but could be altered if business conditions change. “Number Games for Winning Bi-week,” determines the amount of wins in a two-week period that will result in a “Winning Week.” The input “Percentage of Attendees who Purchase in a Winning Bi-week,” is the percentage of attendance that we can anticipate for customers during a winning bi-week. The next input “Percentage of Attendees who Purchase in a Losing Bi-week,” is the percentage of attendance that we can anticipate for customers during a losing bi-week. “Number of Periods” is the number of periods considered in the model and “Degrees Break between Seasons” is the temperature at which we will consider the weather to be cold or warm, which is important in deciding which products will sell during that period.

To the right of the “Various Parameters” section is a section called, “Worker Information.” It contains the following parameters:

“Salary Per Hour” represents the hourly wage of a cashier or food preparer

“Fringe Benefits” represents the percentage of salary that is calculated for benefits and insurance

“Hours Per Bi-Week” represents the number of hours each worker is expected to work per week

“Percentage Increase of Throughput with Extra Staff” represents the percentage of increased revenue that can be expected with extra workers.

“Extra Cashier” represents the number of extra cashiers to be hired

“Extra Preparer” represents the number of extra preparers to be hired

All of the above parameters can be altered independently. We will not alter them for these two scenarios, but future considerations, such as higher salary can be considered here.

To the right of the “Worker Information” section is a table called “Product Line,” that shows the full product line, from Sausage through Lemonade. The column “% Sold Over Break Point” represents the percentages of total cart customers who come to the cart and order that product when the temperature is warm. “% Sold Under Break Point” represents the percentage of total customers for the cart who order that product when the temperature is cool. The next column, “Sale Price,” represents the current price that our sausage vendor charges his customers. All of these numbers can be altered if circumstances change, but remain constant for the two current scenarios.

The next section, below the “Various Parameters” section is called Ingredients and it lists each ingredient. The next column, “Price” represents the price vendors charge our cart owner for a package of that item. The next column, “Amount Per Serving” represents how many of each item are used in one product ordered. The next column, “Amount Per Package” represents how many of each item come in the packages ordered from vendors by our owner.

Below the Ingredients section is the final parameter section, “Ingredients Per Product.” In this section we itemize each ingredient vertically and each salable product horizontally. This table represents how many of each ingredient is used in each salable product.

**2. Location and meaning of outputs**

Major outputs are located on the Excel worksheet called “Outputs” in the FenDog-scenario1.xls or FenDog-scenario2.xls worksheets. We will describe each output from left to right and top to bottom. The first output “Total Profits for the Season,” is the sum of all of the bi-weekly profits. These costs are determined by the total profit per item, which already removes the cost of purchasing each ingredient.

We display the total salary costs for the entire season, in “Total Salary Costs.”

We display the “Gross Profit” below “Total Salary Costs,” which is the amount of profits after subtracting any salary costs. This number would be the one to compare in the two scenarios to determine which scenario reaps the most benefit for our sausage cart owner.

In addition, we display the total cost of supplies for the season in “Total Cost of Supplies,” for planning purposes. This number is calculated independently of the profits calculations, which are determined on a per item basis.

Below the “Total Cost of Supplies” table, there are two named output streams of data. “Total Bi-Weekly Profits” is the final summation of how much profit can be expected, regardless of which scenario is used, before salary costs are deducted

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The second output stream is called, “Ingredient Packages to Order.” This output stream demonstrates how many packages of each ingredient need to be purchased each week to meet the demands determined by the model.

There are several intermediate calculations throughout the model. Here is a list of the calculations and their definition by worksheet in the order that they appear; right to left, and top to bottom.

ProfitPerOrder Worksheet

Costs Per Ingredient multiplies each ingredient times its cost (divide cost of one package by the product of the number of ingredients in a package and how much is in a serving).

Total Cost Per Product sums the costs of all ingredients in the product.

Profit Per Product subtracts the total cost per product from the price charged customers per product.

Games Worksheet

Percentage Who Purchase calculates if it is a winning week by comparing games won to the input “Number Games for Winning Week.” If it is a winning week, it multiplies the game attendance times the input “Percentage of Attendees who Purchase in a Winning Bi-week.” If it is a losing week, it multiplies the game attendance times the input “Percentage of Attendees who Purchase in a Losing Bi-week.” It then rounds up to a whole number.

Temperature Effect on Demand calculates what percentage of sausage cart customers will purchase that product, depending on the temperature.

Number Ordered with Temperature & Winning/Losing Considered calculates amount of each product are ordered, by multiplying the percentage in “Temperature Effect on Demand” by the number of customers in “Percentage Who Purchase.”

“Number Ordered with High or Low Mix” copies over the number ordered for the three basic products. For the rest of the items, it zeros out the total if the scenario isn’t the “High Product Mix” version, i.e. it does not have “Yes” as the input “High Product Mix.”

“Total Sales” multiplies this last array, “Number Ordered with High or Low Mix” by the Sales Price.

“Food Profits” multiplies the array, “Number Ordered with High or Low Mix” by the profit margin of each product.

Total Profits then multiplies the “Food Profits” by the percentage determined to be the positive effect on throughput by hiring extra staff. If there are no extra employees, then this number will equal Food Profits.

Staffing

“Worker Bi-weekly Salary” multiplies the hourly wage times the number of hours in a bi-week times the number of extra employees.

“Cashier” and “Food Preparer” check to see if the scenario includes extra workers or not. If it does, it returns the inputs “Extra Cashier” and “Extra Preparer.”

“Total Workers” sums the amounts above.

“Salary costs” multiplies the bi-weekly salary times the number of employees times the number of periods to determine the cost for the whole season.

Ordering

“Ingredients Per Bi-Week” calculates how many of each product are used each bi-week.

“Packs to Order Per Bi-Week” divides the number of each product necessary each bi-week by the amount in a package delivered from the vendor.

“Cost Per Ingredient Per Bi-Week” multiplies the total to order by the cost per package.

“Bi-Weekly Supply Cost” sums the cost per bi-week.

**3. Guide to visual cues**

In each worksheet of the workbooks FenDog-scenario1.xls and FenDog-scenario2.xls, there is a key that displays the color-coding used in the model. If a cell is yellow, it is an input and may be changed by the user. If a cell is purple, then it references an input. If a cell is light blue, it is a calculation. If it is light red, then it is a reference to a calculation done elsewhere in the workbook. If a cell is green, then it is an output.

**4. Step-by-step use of the model**

Step 1 – locate the inputs. All yellow cells are inputs and are located on the “Inputs” worksheet. Any of these can be edited.

Step 2 – change the inputs. For the sake of the scenarios suggested in this model, you can either enter “Yes” in the High Product Mix input box and “No” in the More Employees input box, or you can enter “No” in the High Product Mix input box and “Yes” in the More Employees input box. Choose the first option to experiment with having more products in rotation. Choose the second option if you would like to see what the scenario might be like with more employees.

Step 3 – review the analysis. If you are interested, you can tab through the worksheets, “ProfitsPerOrder,” “Games,” “Staffing,” and “Ordering” to see how the changes have affected the different calculations.

Step 4 – review the outputs. Go to the “Outputs” worksheet of the FenDog-scenario1.xls workbook. You will see the final results of how much profit you can expect over the season, as well as how many packages of each ingredient you will need to order.

Step 5 – manipulate the model. Go back to the “Inputs” worksheet and try different variations. You can see how much profit is possible by having a high product mix and more employees. In addition, you may want to change other parameters, such as how much more profit you can expect from the extra employees, or change game attendance, or number of wins equal a winning week. If you find that the cost per package your vendors charge, you can change that as well.

If you are curious how a certain cell is calculated, click on a calculation cell and then the formula bar. You will see the calculation as well as the named ranges in the calculation. You can use the Formula Auditing toolbar in Excel to trace dependents and/or precedents button to locate all the cells that are associated with the calculation.