Purpose: To review the types of graphs, and use MS Excel 2007 to create them from a dataset.
Outline: You will be provided with several datasets and will use MS Excel 2007 to create graphs.
Topical Objectives: Bar, line, circle graphs, scatter plot, measures of central tendency, box and whisker plot.
Instructions: Go through the following activities.

You will need to use MS Excel 2007 to complete this lab. Locate and open the file on the course website (under Project 4). Then follow the instructions below for each graph type. For the first graph you will be provided with a great deal of detail. However, since the procedure is quite repetitive, you will be given less detail as we proceed.

Part A: Bar Graph
1. Click on the tab at the bottom of the sheet for Bar.

2. See the data is presented in raw form (the column on the left) but also in intervals, as discussed.

3. Click on an empty cell.
4. Click on Insert on the menu bar, then click on Column.
5. A menu of choices will come up. The most typical bar graph used is the first. Click on that first choice.
NOTE: The display is a double bar graph, which is used when you have two (or more) different datasets.

6. A blank box will then come up, and the Design tab on the menu should automatically be selected. If not, click on the chart and then click on the Design tab.

7. Click on Select Data.
8. A box will appear, for which you can select the Legend Entries and the Horizontal Labels. Click on the value(s) automatically entered in the Chart Data Range box and delete them.

9. With your cursor still in the Chart Data Range box, move your mouse to your data set, click on the upper left corner of your data set, and drag to the bottom right corner. This will put your data in the Chart Data Range box, and it will automatically appear in the Legend Entries and Horizontal Axis Labels boxes.

10. Then click on OK.
11. Once you have your graph, you can format just about anything you can think of: colors, bar widths, gridlines, scale, etc. In the Design menu, you can choose many different Chart Layouts that are standard format.
12. Of course, it is always good practice to title your axes, and your chart. You can find these by clicking on the Layout tab, and then both Chart Title and Axis Titles.
Part B: Line Graph

1. Click on the *Line* tab.
2. Click on an empty cell.
3. Go to the *Insert* tab, then click on *Line*.

4. Choose your display type.
   
   NOTE: A line graph is typically made up of the data points and connected lines. The second row, first choice.
5. As before, click on *Select Data*.

6. Delete what is in the *Chart Data Range* box. With your cursor still in the *Chart Data Range* box, move the mouse to your data, and select your data table by clicking and dragging. Then click *OK*.
7. As before, title your axes and chart.
Part C: Circle Graph/Pie Chart

8. Click on the Pie tab.
   1. You do not have to have the data in terms of percentages to make a circle graph. Excel will calculate the percentages for you.
   2. Click on an empty cell. Click on Insert, then Pie.

9. Choose your display type.
   NOTE: The most typical pie chart is the first selection. Click on it.

10. As before, click on Select Data.

11. Delete what is in the Chart Data Range box. With your cursor still in the Chart Data Range box, move the mouse to your data, and select your data table by clicking and dragging. Then click OK.

3. As before, title your axes and chart.
4. It is very useful to have the pie pieces individually labeled. To do this, go to the Layout tab, and click on More Data Label Options.

5. A dialogue box will come up where you can choose many options: Series Name (we only have one series, so this is not useful to us), Category Name (which is the Date in our case, and is
useful to see), *Value* (which would be the numeric value of each data point), *Percentage* (which is the percentage of each value in relation to the whole) and *Leader Lines* (which would be a line connecting these labels to the pie piece). You should check the box for *Category Name* and either *Value* or *Percentage*. 
Part D: Scatterplot

1. Click on an empty cell. Go to the Insert tab, click on Scatter.

12. Choose your display type.
   NOTE: Typically with a scatter plot you do NOT want to connect the data points with a line. Click on the first selection.

2. This time, we don’t want the entire data set, only the Height and Weight. So go to Select Data as before, and delete what is in the Chart Data Range box. Then click on Add.

3. In the Series X Values box, select the data you want to be on the horizontal axis (in our case, height). Then move to the Series Y Values box, delete what is there, and select the data you want to be on the vertical axis (in our case, weight).

4. Then click OK, and OK again.
5. Now, for some reason, it seems the lines are filled in anyway, even though we didn’t select them. Right click on any data point. Then click on *Format data Series.*

6. Then select *No Line* to remove the line between points.

Adding a trendline:
7. You can fit a linear equation to any scatterplot.
8. Once you have the data in a plot, right click on any data point, and click on *Add Trendline.*
9. Make sure Linear is highlighted.

10. Also check the box titled Display Equation on Chart and the box titled Display R squared Value on Chart.

11. Click OK.

12. The linear regression line will be added to your chart, along with the equation for that line and correlation coefficient.
Part E: Measures of Central Tendency
1. You can use Excel to find various measures of central tendency.
2. Below, “DataRange” indicates the range of values where your data is. It is the topmost value then a “:” and the bottommost value (if your data is in a column). In our example, DataRange is “A4:A18”
3. To find the minimum value, click on the yellow cell next to it and type in
   \[ \text{=Min(A4:A18)} \]
   For the rest of the questions, you will type in (or click and drag with the mouse) your particular data range instead of typing “DataRange”
4. To find the maximum value, click on the yellow cell next to it and type in
   \[ \text{=Max(DataRange)} \]
5. To find the median value, click on the yellow cell next to it and type in
   \[ \text{=Median(DataRange)} \]
6. To find the average value (or mean), click on the yellow cell next to it and type in
   \[ \text{=Average(DataRange)} \]
7. To find the 25th percentile, click on the yellow cell next to it and type in
   \[ \text{=Percentile(DataRange, 0.25)} \]
8. To find the 75th percentile, click on the yellow cell next to it and type in
   \[ \text{=Percentile(DataRange, 0.75)} \]

Part F: Box and Whiskers Plot
1. MS Excel does not plot a box and whisker, so we have to “fake it” a bit.
2. Be sure all the values you need are already there in a column (max, min, median, 25th and 75th percentiles). Also notice that there is a column of “1s”, “2s” and “3s”. This is how we are planning to fake it.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min</td>
<td>55.9</td>
<td>41.8</td>
<td>35.3</td>
</tr>
<tr>
<td>Median</td>
<td>72</td>
<td>50.65</td>
<td>42.45</td>
</tr>
<tr>
<td>Max</td>
<td>96.5</td>
<td>70</td>
<td>56.4</td>
</tr>
<tr>
<td>25th Percentile</td>
<td>68.8</td>
<td>47.825</td>
<td>40.4</td>
</tr>
<tr>
<td>75th Percentile</td>
<td>79.675</td>
<td>54.675</td>
<td>44.8</td>
</tr>
</tbody>
</table>

3. Insert a Scatter Plot.
4. Delete what is in the Chart Data Range box.
5. Click on Add.
6. Name the series “Full”, and add the Min, Median, Max... values in the Series X Values box, and add the column of 1s in the Series Y Values box.
7. Then select OK.
8. Add each of the other two series by repeating steps 6 and 7 for Assistant, and Associate.
9. This will give you a chart that looks like the one below.

10. Now we want to delete the horizontal grid lines, and the vertical axis. Do this by clicking to select (one at a time) and pressing the delete key.
11. Now all we need is the box around the percentiles/median. Click on the Insert tab, and then Shapes. Add a rectangle around the percentiles (you may have to format it to not be filled). When you are finished, you should have something like the graph below.