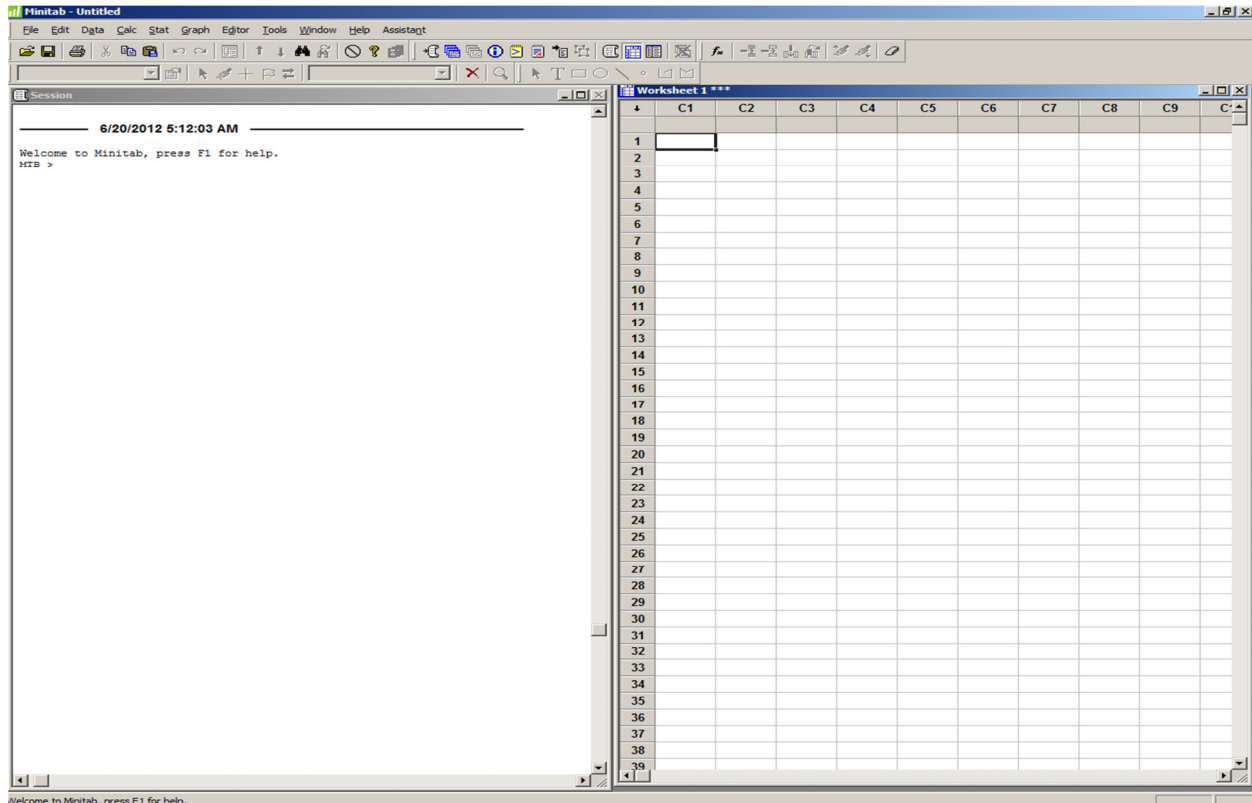


Data Presentation Methods with Minitab

Following example comes from the data called ch3example.mtw, which can be downloaded from D2L site.



1. Working with Minitab Data

1-1 Entering data

The Data window offers a number of features that can make the somewhat tedious process of data entry easy. Here's a sample of those features.

Data entry arrow

When you use the Enter key, the active cell advances in the same direction that this arrow points. Click this arrow to change its direction so that you can enter data in the way that's convenient for you—down columns or across rows.

1-2 Create simple patterns with Autofill like Excel

Minitab's Data window can take the tedium out of creating repetitive or patterned values. Just highlight the pattern, and then click and drag to extend it to where you want it.

You can access these and many other features without leaving the Data window. Just right-click the Data window to reformat columns, change value order, insert and move columns, and more.

1-3 Importing data

In many cases, the person who collects data is not the one who analyzes it in Minitab. Because of this fact, data are often collected with the tool at hand, be it a spreadsheet or text file. Fortunately, importing data from a non-Minitab file is often as simple as opening a standard Minitab worksheet. Here's an example.

1-4 Importing an Excel spreadsheet

Suppose that you have an Excel workbook with three sheets and you want to import all of sheets into the Minitab Data window for analysis.

Choose File > Open Worksheet.

From Files of type, choose Excel.

Navigate to and select the Excel file.

Click Preview to ensure that the spreadsheet is imported into Minitab correctly.

Click Options to make adjustments in the way the spreadsheet is imported.

Click OK in each dialog box.

As you can see in the above example, importing even the most complex of files into the Data window isn't difficult. In fact, you can use the exact same steps to import files in a wide array of formats.

1-5 Manipulating data

Once your data are in Minitab, you can change the way that they're organized. Minitab is very accommodating in the way that your data can be formatted, so reorganization is often a matter of personal preference. Often, the layout that is easiest to use for data collection isn't the easiest to work with later on. Here's an example.

1-6 Stacking data

Suppose that you collected data on three items from your product line in an unstacked format (shown on the right). However, as you explore the data, you find that a stacked format would be simpler to analyze.

Choose Data > Stack > Columns.

In Stack the following columns, enter the columns to stack.

Click OK.

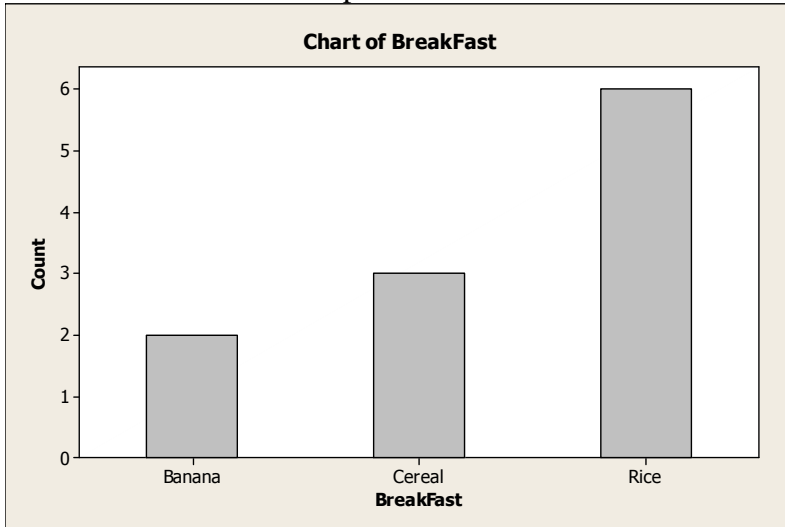
Whether you want to stack, unstack, merge, or subset your data, Minitab offers several straightforward tools to restructure your Data window quickly and easily.

2. Working with Graphs

2.1 The Bar Chart

The categorical data is most often presented in bar charts that are either vertical or horizontal bar charts. The following shows a vertical bar chart.

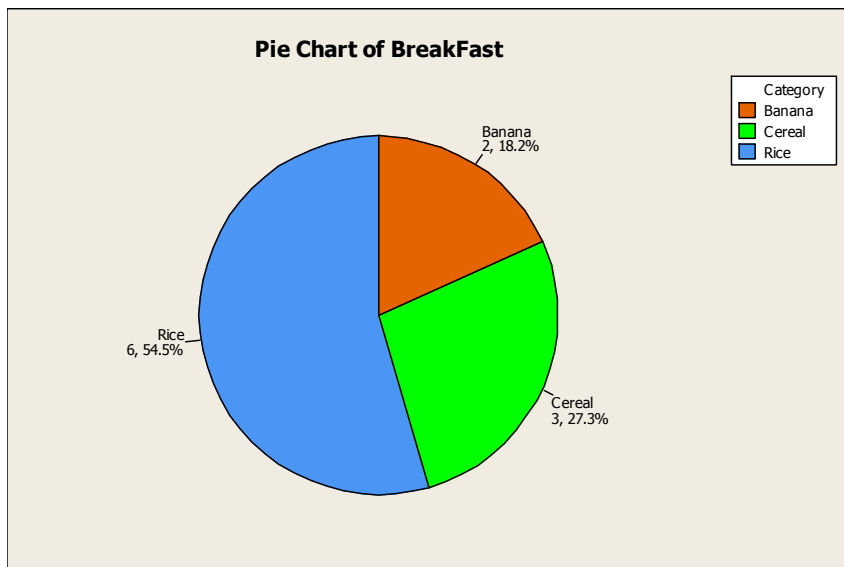
Graph > Bar Charts -> Select Simple -> Select Breakfast



2.2 The Pie Chart

Categorical data is equally frequently presented in a pie chart as in a bar chart.

Graph > Pie Charts -> Select Chart Counts of unique values-> Select Breakfast



2.3 Presentation of Numerical Data

Numerical data, if they can be properly grouped, can be presented by using the presentation methods for categorical data as shown above. However, they allow many unique methods of their own that can better summarize their characteristics.

Example>

Assume that the following is the survey data on DePaul MBA students' ages:

25, 36, 27, 29, 21, 31, 34, 28, 26, 45

This data can be presented in the following ways:

2.3.1 The Ordered Array

→ Rank order the data by magnitude → smallest to largest

21, 25, 26, 27, 28, 29, 31, 32, 34, 45

2.3.2 The Stem-and-Leaf Display

```
MTB > Stem-and-Leaf 'Age of MBA';
SUBC> Increment 10.
```

Stem-and-Leaf Display: Age of MBA

```
Stem-and-leaf of Age of MBA N = 10
Leaf Unit = 1.0
```

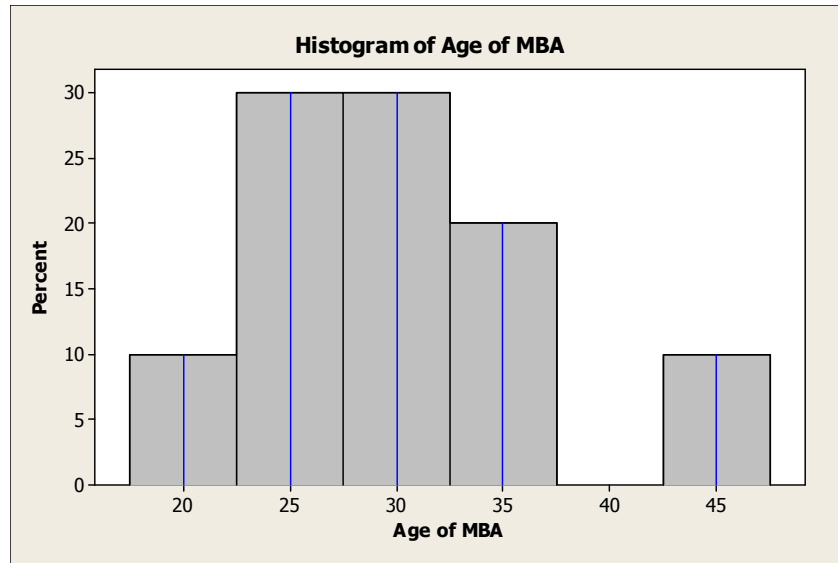
```
(6) 2 156789
     4 3 146
     1 4 5
```

2.4 The Histogram ≠ A Bar Chart

A histogram is almost the same as a bar chart, except that there is no space between bars. Unfortunately, the Excel Spreadsheet can not draw a histogram and thus, relative and cumulative frequencies are shown in the following double side-by-side bar chart.

Histogram of Age of MBA

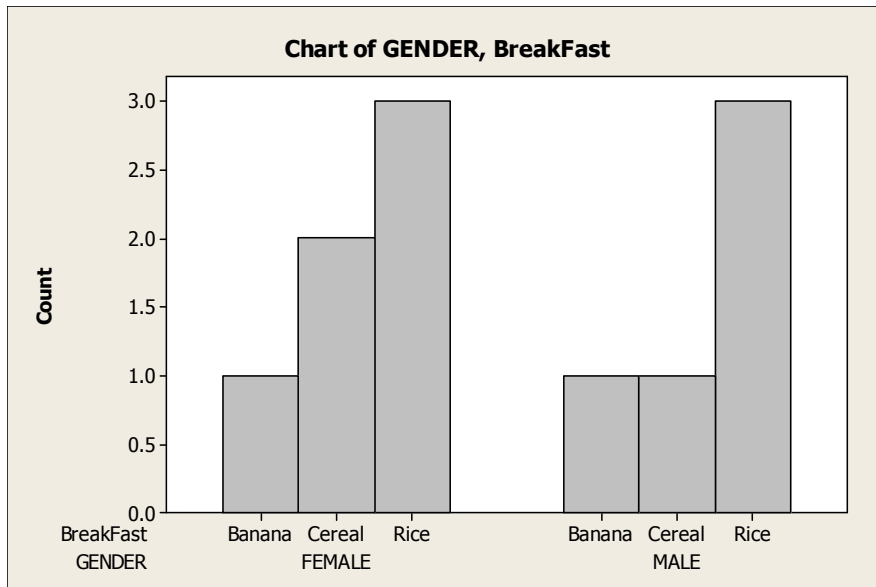
```
MTB > Tally 'Age of MBA';
SUBC> Counts;
SUBC> Percents.
```



2.5 The Side-by-Side Bar Chart

Horizontal vs. Vertical Side-by-Side Bar charts are often used to compare two or more data sets. The following shows a vertical side-by-side bar chart.

```
MTB > Chart 'GENDER';
SUBC> Group 'BreakFast';
SUBC> Bar.
```

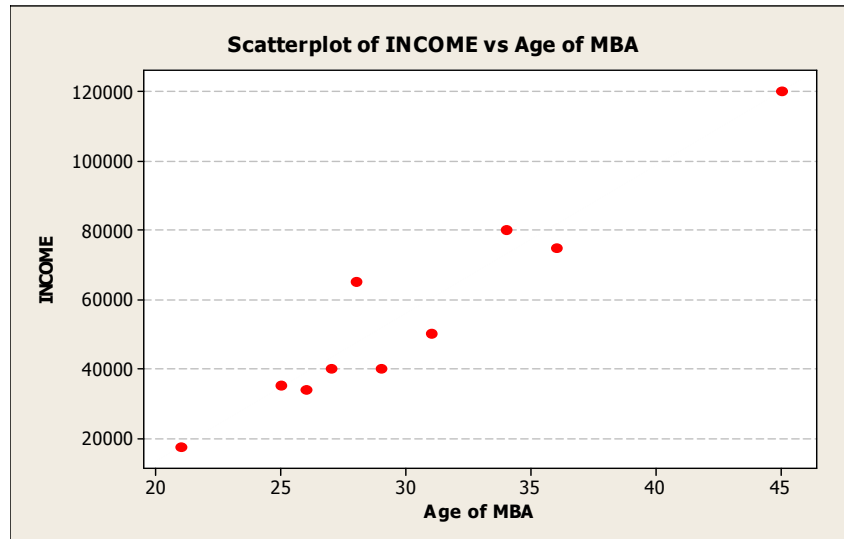


2.6 The Scatter Diagram

A scatter diagram shows two or more characteristics or variables being plotted against each other on a graph → no lines or bars are used → consequently, only scattered dots are shown on the graph.

Scatterplot of INCOME vs Age of MBA

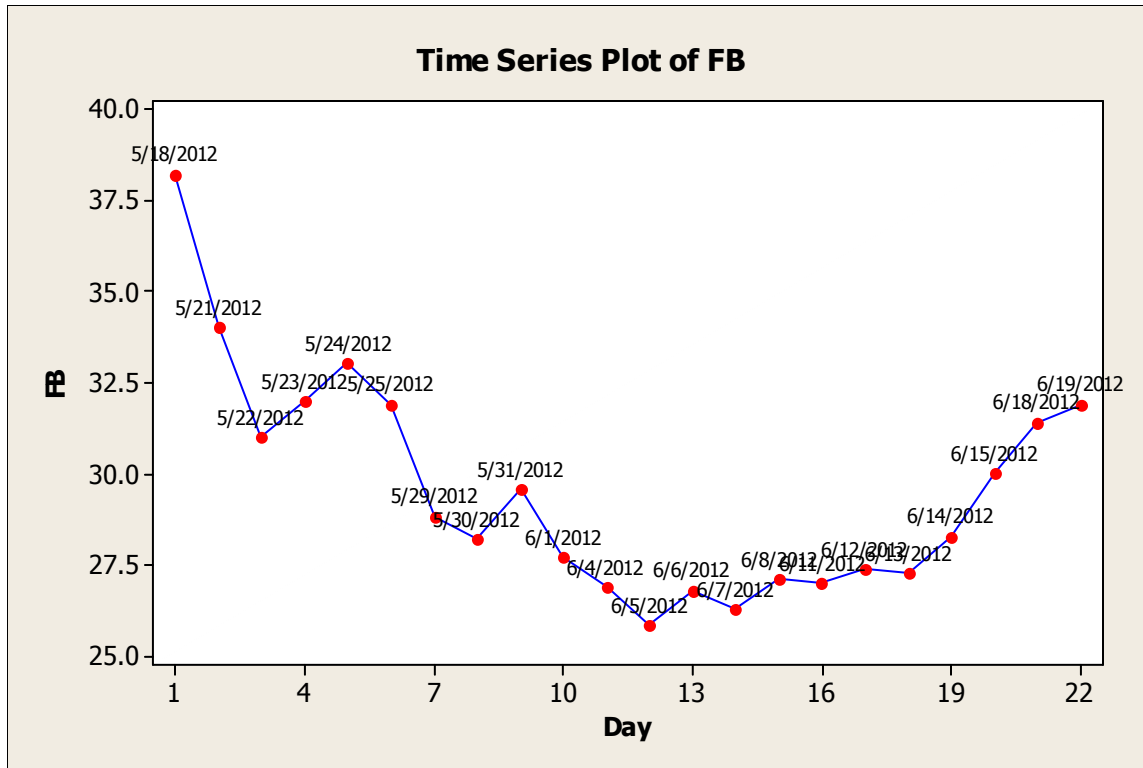
```
MTB > Plot 'INCOME'*'Age of MBA';  
SUBC> Grid 2;  
SUBC> Symbol.
```



2.7 The Time-Series Plot → Values of a variable are plotted over a time period scale.

Time Series Plot of FB

```
MTB > TSPlot 'FB';  
SUBC> Day;  
SUBC> DatLab 'DATE';  
SUBC> Symbol;  
SUBC> Connect.
```



Business Statistics using Minitab (Current version Minitab 16 for Windows)

3. Descriptive Statistics using Minitab

3.1 Descriptive Statistics

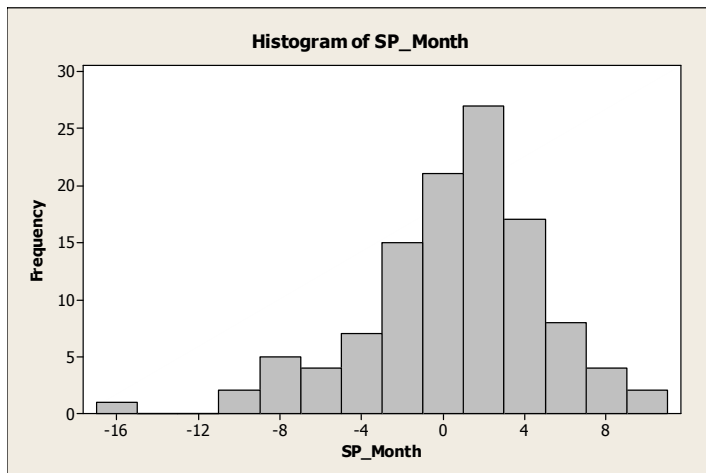
Stat -> Basic Statistics -> Display Descriptive Statistics, and select all statistics and a histogram Graph from the options.

Descriptive Statistics: SP_Month

| | | Total | | | | | | | | | |
|----------|-------|-------|----|------|---------|--------|-------|---------|--------|-------|--|
| Variable | Count | N | N* | CumN | Percent | CumPct | Mean | SE Mean | TrMean | StDev | |
| SP_Month | 113 | 113 | 0 | 113 | 100 | 100 | 0.506 | 0.411 | 0.660 | 4.374 | |

| | | Sum of | | | | | | | |
|----------|----------|---------|--------|----------|---------|--------|--------|-------|--|
| Variable | Variance | CoefVar | Sum | Squares | Minimum | Q1 | Median | Q3 | |
| SP_Month | 19.128 | 863.73 | 57.219 | 2171.352 | -16.942 | -1.737 | 1.110 | 3.221 | |

| | | N for | | | | | | |
|----------|---------|--------|-------|------|------|----------|----------|--------|
| Variable | Maximum | Range | IQR | Mode | Mode | Skewness | Kurtosis | MSSD |
| SP_Month | 10.772 | 27.715 | 4.958 | * | 0 | -0.78 | 1.96 | 14.876 |



3.2 Descriptive Statistics by Group

The data has a dummy variable before and after June of 2007 to find out the statistics before and after financial crisis. Stat -> Basic Statistics -> Display Descriptive Statistics, and select dummy as by variable.

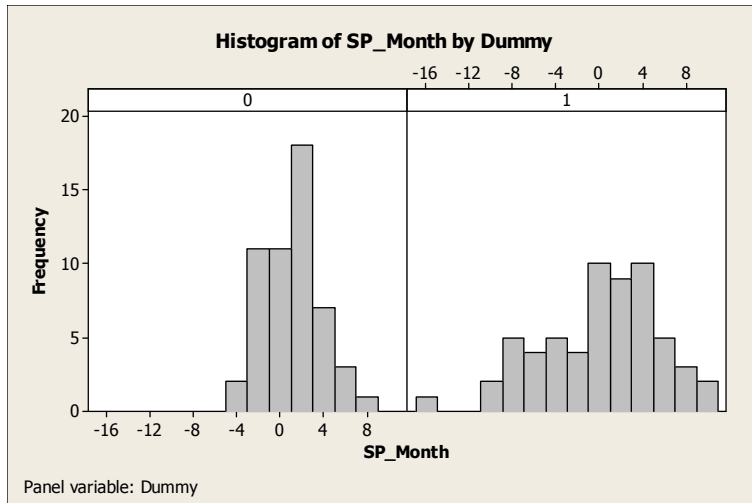
Descriptive Statistics: SP_Month

| Variable | Dummy | Total | | | | | Mean | SE Mean | TrMean | |
|----------|-------|-------|----|----|------|---------|---------|---------|--------|-------|
| | | Count | N | N* | CumN | Percent | | | | |
| SP_Month | 0 | 53 | 53 | 0 | 53 | 46.9027 | 46.903 | 1.096 | 0.326 | 1.031 |
| | 1 | 60 | 60 | 0 | 113 | 53.0973 | 100.000 | -0.015 | 0.716 | 0.134 |

| Variable | Dummy | StDev | Variance | CoefVar | Sum | Sum of | | Minimum | Q1 |
|----------|-------|-------|----------|-----------|--------|----------|---------|---------|----|
| | | | | | | Squares | Minimum | | |
| SP_Month | 0 | 2.370 | 5.619 | 216.27 | 58.092 | 355.865 | -3.429 | -0.609 | |
| | 1 | 5.547 | 30.771 | -38122.47 | -0.873 | 1815.486 | -16.942 | -3.642 | |

| Variable | Dummy | Median | Q3 | Maximum | Range | IQR | Mode | N for | |
|----------|-------|--------|-------|---------|--------|-------|------|-------|----------|
| | | | | | | | | Mode | Skewness |
| SP_Month | 0 | 1.208 | 2.502 | 8.104 | 11.533 | 3.110 | * | 0 | 0.36 |
| | 1 | 0.818 | 3.622 | 10.772 | 27.715 | 7.264 | * | 0 | -0.52 |

| Variable | Dummy | Kurtosis | MSSD | |
|----------|-------|----------|--------|------|
| | | | MSSD | MSSD |
| SP_Month | 0 | 0.36 | 5.311 | |
| | 1 | 0.32 | 23.542 | |



3.2 Covariance and Correlation

Stat -> Basic Statistics -> Covariance

MTB > Covariance 'HousePrice10' 'HomePrice20' 'SP500'.

Covariances: HousePrice10, HomePrice20, SP500

| | HousePrice10 | HomePrice20 | SP500 |
|--------------|--------------|-------------|-----------|
| HousePrice10 | 791.153 | | |
| HomePrice20 | 701.231 | 623.427 | |
| SP500 | 2998.718 | 2587.880 | 31837.568 |

Stat -> Basic Statistics -> Correlation

Correlations: SP500, HousePrice10, HomePrice20

| | SP500 | HousePrice10 |
|--------------|-------|--------------|
| HousePrice10 | 0.597 | 0.000 |
| HomePrice20 | 0.581 | 0.998 |
| | 0.000 | 0.000 |

Cell Contents: Pearson correlation
P-Value

Lab Assignment : Minitab 1

Copy and paste your results from Minitab. Submit the file before leaving the lab class

The Bar Chart: Breakfast (c1)

The Pie Chart: Breakfast (c1)

The Stem-and-Leaf Display: Age of MBA (C3)

The Histogram : Age of MBA (C3)

The Side-by-Side Bar Chart (C8 and C10)

The Time-Series Plot: (C6)

Descriptive Statistics(C8 and C11)

Covariance and Correlation (C8 and C11)