

## Statistics 528: Minitab Handout 1

Throughout the STAT 528-530 sequence, you will be asked to perform numerous statistical calculations with the aid of the Minitab software package. This handout will get you started with Minitab. As the course progresses, you will receive further handouts detailing more of Minitab's commands and illustrating their use. This handout is designed for Minitab 13.1 for PC. Minitab is no longer produced for Macintosh. The handout should work for relatively current versions of Minitab (say versions 10.1 and beyond).

### Data

To perform any statistical analysis, we need data. The key to understanding how Minitab works is to understand the structure of data in the package. Data are entered into Minitab in the form of a spreadsheet. In its basic form, each column of the spreadsheet represents a variable and each row of the spreadsheet represents a case.

Yield	Variety	Field
3.22	1	1
3.04	2	1
3.06	3	1
2.64	4	1
3.19	5	1
2.49	6	1
3.31	1	2
2.99	2	2
3.17	3	2
2.75	4	2
3.40	5	2
2.37	6	2
3.26	1	3
3.27	2	3
2.93	3	3
2.59	4	3
3.11	5	3
2.38	6	3
3.25	1	4
3.20	2	4
3.09	3	4
2.62	4	4
3.23	5	4
2.37	6	4

## Getting Data Into Minitab

The data in the sample session are yields of six varieties of alfalfa grown on four fields. To get these data into Minitab, use the menu sequence **File; Open Worksheet....** Next click on **Alfalfa.MTW**, and then click on the **Open** button. Data should appear in your spreadsheet, and you will get a message in the session window (the top window) that reads something like:

```
Retrieving worksheet from file: C:\Program Files\MTBWIN\Data\Alfalfa.MTW
# Worksheet was saved on Mon Jan 31 2000
```

Data will appear in the data window, labeled **Alfalfa.MTW**. The data consist of 24 cases. Four fields were used for the experiment, with each of the six varieties grown on one plot in each field. The first column tells us what the yield was on a plot; the second column tells us which variety was grown on the plot (1 through 6) and the third column tells us which field the plot lies in (1 through 4).

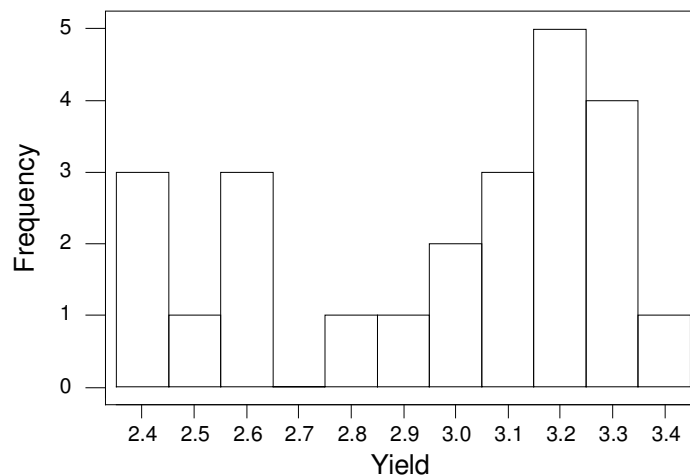
Another way to get the data into Minitab is to type the numbers in by yourself. To do so, work with the table of cells you will find in the data window. This window appears at the bottom of your screen. If you have just begun Minitab, it will be labeled Worksheet 1. Start in the first row and first column and type in the yield, 3.22. You can proceed down the column or across the row, always inputting the correct number. After you have typed in your data (and after you have double checked them to make sure you have the correct data), type in the variable names above each column you have used. The place for a variable name is the gray area, above the data but below the column number (column numbers appear in bold face and are **C1, C2, C3, ...**). Data can be corrected by moving the cursor to the cell with the incorrect entry. The cell will be highlighted. Simply type in the correct value and Minitab will make the change. When you are done entering your data, it is essential that you click on an empty cell in the spreadsheet--just pick any cell that is in a column you are not using. This tells Minitab that you're done with entering data and that you wish to move on to perform some analyses.

There are additional ways to get data into Minitab. Data may be stored as a Minitab Project (as opposed to a Minitab Worksheet). To get the data from a Minitab project, use the menu sequence **File; Open Project...** to get a dialog box. Then select a project from the available projects by clicking on it and open it by clicking on the **Open** button. For data stored in another format such as an ASCII (or plain text) format, use the menu sequence **File; Other Files; Import Special Text....** Since this method is so flexible, you'll need to figure out how to proceed from there. As a tip, you might use **Help** button to figure out how to import your data.

## How to get graphical summaries

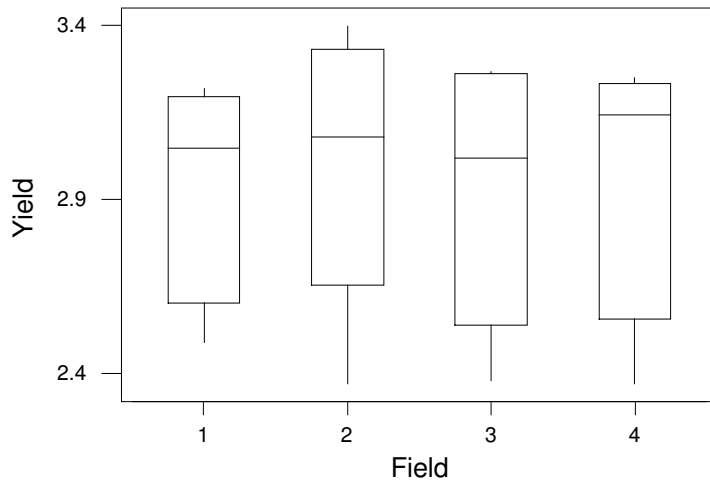
**Histogram.** To get a histogram of the yields, use the menu sequence **Graph; Histogram....** A dialog box will pop up. You will type either Yield or C1 into the first box under **X**. Then click on the **OK** button. A histogram will appear in a new window. A good way to make use of this histogram is to copy it (menu sequence **Edit; Copy Graph**) and then paste it into a word processing program. For example, Ctrl-v was used in MS Word to paste the graph below.

(If you use ReportPad within Minitab for editing your analysis results, you may use the right mouse button and click **Append Graph to Report** to paste the graph in your report.)



**Box plots.** To get a box plot, use the menu sequence **Graph; Boxplot....** When the dialog box pops up, type Yield in the box under **Y** and type Field in the box under **X**. Then click on the **OK** button. The resulting plot appears below. The plot shows one box plot of the yields in each field. The plots are on the same axes, so they're easy to compare by eye. Try another box plot where you leave the box under **X** blank and see what the output is.

Minitab provides many more graphical summaries. Most of them are found under the **Graph** menu. The general "syntax" is to use the variable of interest (Yield in the above example) for **Y** and to split the plot into subplots by **X** variable (Field was used to break a single box plot into four box plots above).



An alternative way to get the appropriate variables into the dialog box, is to click on the variable to highlight it, and then click on the **Select** button. Minitab will type in the variable name. For example, use the menu choices **Graph; Dotplot...** to get a dialog box. The cursor will appear in the big box under **Variables**. Try clicking on C1 Yield and then clicking the **Select** button. The default choice for the dot plot is **No grouping**. Clicking on the **OK** button gives

Dotplot for Yield



## How to get numerical summaries

Use the menu sequence **Stat; Basic Statistics; Display Descriptive Statistics....** A dialog box will appear. Click on Yield to highlight it and then click on the **Select** button. Click on the small box to the left of **By Variable:** A check mark will appear. Then click in the box to the right of **By Variable:** to bring the cursor there. After that, highlight Variety and click on the **Select** button. Then click on the **OK** button. The output appears in the session window and should look like this:

Variable	Variety	N	Mean	Median	TrMean	StDev
Yield	1	4	3.2600	3.2550	3.2600	0.0374
	2	4	3.1250	3.1200	3.1250	0.1318
	3	4	3.0625	3.0750	3.0625	0.0998
	4	4	2.6500	2.6300	2.6500	0.0698
	5	4	3.2325	3.2100	3.2325	0.1223
	6	4	2.4025	2.3750	2.4025	0.0585

Variable	Variety	SE Mean	Minimum	Maximum	Q1	Q3
Yield	1	0.0187	3.2200	3.3100	3.2275	3.2975
	2	0.0659	2.9900	3.2700	3.0025	3.2525
	3	0.0499	2.9300	3.1700	2.9625	3.1500
	4	0.0349	2.5900	2.7500	2.5975	2.7225
	5	0.0612	3.1100	3.4000	3.1300	3.3575
	6	0.0293	2.3700	2.4900	2.3700	2.4625

The numerical summaries that you have just calculated include the number of cases in each group (four, since each variety is grown in one plot of each field), the mean, median and trimmed mean, the standard deviation, the standard error of the mean, the minimum and maximum and the first and third quartiles (also known as the 25th and 75th percentiles). Again, you can cut and paste to get the output from the session window to a file that you then process with a word processor.

## How to save your work.

It is simple to copy and paste the Minitab outputs (in Session window or in Graph window) into a word processing program, or ReportPad within Minitab environment as mentioned before. Alternatively, you can store the outputs in the Session window by using the menu sequence **File; Save Session Window As...** (this will save all text in the session window, but it will not save graphs) and by then proceeding through the dialog box, instructing Minitab where to store the resulting text file. Also, you can save the worksheet that you have created. To do this, use the menu choice **File; Save Current Worksheet** (this overwrites the current worksheet with the same name) or **File; Save Current Worksheet As....** Proceed with the dialog box. End all of your Minitab worksheets with the suffix.MTW. It will make recovering them a little easier and will help you organize your files. You may use the **File; Save Project** or **File; Save Project As...** menu sequences to save or create and save a Minitab project including session, worksheet, and graphs.