MINITAB BASICS

After starting MINITAB, you'll see a **Session window** above and a **worksheet** below. The Session window displays non-graphical output such as tables of statistics and character graphs. A worksheet is where we enter, name, view, and edit data. At any point, the session or worksheet window (whichever is currently active) may be printed by clicking on the print icon (third from left at top of screen) and clicking on **OK**.

The menu bar across the top contains the main menus: File, Edit, Manip, Calc, Stat, Graph, Editor, Window, and Help. Beneath the menu bar is the Toolbar which provides shortcuts for several important actions.

In the instructions that follow, text to be typed will be underlined. Menu instructions will be set in boldface type with the entries separated by pointers.

STORING DATA

Each data set is stored in a **column**, designated by a "C" followed by a number. For example, C1 stands for Column 1. The column designations are displayed along the top of the worksheet. The numbers at the left of the worksheet represent positions within a column and are referred to as **rows**. Each rectangle occurring at the intersection of a column and a row is called a **cell**. It can hold one observation.

The **active cell** has the worksheet cursor inside it and a dark rectangle around it. To enter or change an observation in a cell, we first make the cell active and then type the value.

Directly below each column label in the worksheet is a cell optionally used for naming the column. To name the column, we click on this cell and type the desired name.

Example A: Suppose we want to store heights, in inches, of female recitation members [64, 65, 61, 70, 65, 66, ...] into column C1 and name the column 'FHTS'. Just click in the name cell for this column, type <u>FHTS</u>, and press the "Enter" key. Then type <u>64</u>, Enter, <u>65</u>, Enter, <u>61</u>, Enter, and so on.

Example B: To store male heights, name column C2 "MHTS" and enter those data values in this column.

DESCRIPTIVE STATISTICS AND GRAPHS

Example C: For sample size, mean, median, 5% trimmed mean, standard deviation, minimum, maximum, and quartiles of female height data,

1. Choose **Stat>Basic Statistics>Display Descriptive Statistics**...
2. Specify FHTS in the **Variables** text box
3. Click **OK**

For histogram(**D**), stemplot(**E**), and boxplot(**F**) of female height data,

Example D:
1. Choose **Graph>Histogram**...
2. Specify FHTS in the **X** text box for **Graph 1**
3. Click **OK**

Example E:
1. Choose **Graph>Stem-and-Leaf**...
2. Specify FHTS in the **Variables** text box
3. Click **OK**

Example F:
1. Choose **Graph>Boxplot**...
2. Specify FHTS in the **Y** text box for **Graph 1**
3. Click **OK**

Example G: To combine female and male recitation members' heights and find their 10% trimmed mean,
1. Choose **Manip>Stack/Unstack>Stack Columns**
2. Specify FHTS and MHTS with a space between them as columns to be stacked and HTS in the **Store the stacked data in:** box (Click **OK)**
3. Choose **Manip>Sort**
4. Specify HTS as column to be sorted, specify SORTEDHTS in the **Store sorted columns in:** box, and HTS in the **Sort by column** box
5. Make a new column for the trimmed data as follows: Choose **Manip>Copy columns** and specify SORTEDHTS in the **Copy from columns:** box; specify TRIMMEDHTS in the **To columns** box.

Since 10% of about 20 values is about 2, delete the smallest two and largest two heights by choosing **Manip>Delete rows**, specifying <u>1:2 19:20</u> in the **Delete rows** box and TRIMMEDHTS in the **From columns** box
6. Choose **Stat>Basic Statistics>Display Descriptive Statistics**
7. Specify TRIMMEDHTS in the **Variables** box
8. Click **OK**

The "mean" of this reduced data set is actually the 10% trimmed mean.

RANDOM SAMPLING

Example H: We can use MINITAB to randomly select 5 from 100 students. Assume their names are in an alphabetical list, where the first name corresponds to the number 1 and the last corresponds to the number 100.

1. Choose **Calc>Make Patterned Data>Simple Set of Numbers...**
2. Type NUMBERS in the **Store Patterned Data** text box
3. Click in the **From first value** text box and type 1
4. Click in the **To last value** text box and type 100
5. Click **OK**
6. Choose **Calc>Random Data>Sample From Columns...**
7. Type 5 in the small text box after **Sample**
8. Click in the **Sample...rows from columns** text box and specify NUMBERS
9. Click in the **Store sample in** text box and type SAMPLE
10. Click **OK**

STATISTICAL INFERENCE; CONFIDENCE INTERVALS

Example I: Assume heights (in inches) of female recitation members to be a random sample taken from heights of all female college students, whose mean height is unknown [actually, it is about 65] and standard deviation is 2.5. Use sample heights to obtain a 90% confidence interval for population mean height.

1. Choose **Stat>Basic Statistics>1-Sample Z...**
2. Specify FHTS in the **Variables** text box
3. Select the **Confidence interval** option button
4. Click in the **Level** text box and type 90
5. Click in the **Sigma** text box and type 2.5
6. Click **OK**

Example J: Assume heights (in inches) of male recitation members to be a random sample taken from heights of all male college students, whose mean **and** standard deviation are unknown. Use sample heights to obtain a 99% confidence interval for population mean height.

1. Choose **Stat>Basic Statistics>1-Sample t...**
2. Specify MHTS in the **Variables** text box
3. Select the **Confidence interval** option button
4. Click in the **Level** text box and type 99
5. Click **OK**

STATISTICAL INFERENCE; HYPOTHESIS TESTS

Example K: Test the null hypothesis that heights (in inches) of female recitation members are a random sample taken from a population with mean 65 against the alternative that the mean is different from 65. Assume population standard deviation to be 2.5.

1. Choose **Stat>Basic Statistics>1-Sample Z...**
2. Specify FHTS in the **Variables** text box
3. Select the **Test mean** option button
4. Click in the **Test mean** text box and type 65
5. Click the arrow button at the right of the **Alternative** drop-down list box and select **not equal to**
6. Click in the **Sigma** text box and type 2.5
7. Click **OK**

Example L: Do sons tend to be taller than their fathers? Test the null hypothesis that the difference: (heights of male recitation members minus heights of their fathers) is zero vs. the alternative that the difference is positive. First enter male recitation members' heights in a column 'SONS' and their corresponding fathers' heights in a column 'FATHERS'.

1. Choose **Stat>Basic Statistics>Paired t...**
2. Click in the **First Sample** text box and specify SONS
3. Click in the **Second Sample** text box and specify FATHERS
4. Click in the **Options** button
5. Click in the **Test Mean** text box and type 0
6. Click the arrow button at the right of the **Alternative** drop-down list box and select **greater than**
7. Click **OK**
8. Click **OK**

Example M: Use MINITAB to verify that female heights are significantly less than male heights.

1. Choose **Stat>Basic Statistics>2-Sample t...**
2. Select the **Samples in different columns** option button
3. Click in the **First** text box and specify FHTS
4. Click in the **Second** text box and specify MHTS
5. Click the arrow button at the right of the **Alternative** drop-down list box and select **less than**
6. Unselect the **Assume equal variances** check box if it is selected (to indicate that we are not assuming populations of female and male heights to have equal standard deviations)
7. Click **OK**

REGRESSION

Example N: Use MINITAB to examine the relationship between heights of male recitation members and heights of their fathers.

1. Choose **Graph>Plot**
2. Specify SONS in the **Y** text box for **Graph 1**
3. Click in the **X** text box for **Graph 1** and specify FATHERS
4. Click **OK**
5. Choose **Stat>Regression>Regression...**
6. Specify SONS in the **Response** text box
7. Click in the **Predictors** text box and specify FATHERS
8. Click **OK**