

Guide to MINITAB Commands

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Introduction

Minitab for Windows is a statistical software package that provides a broad range of basic and advanced data analysis capabilities. This software is provided for Math602 students along with the textbook(s). Please follow the instructions in the package for the system requirement as well for installation instructions. For on-campus students, if you prefer you can access this software through the *Applied Mathematics Laboratory* (located in Room 3-335AB). In this handout you will be given a brief introduction to Minitab. You have to try yourself to get familiar with Minitab. We will be using this software extensively in our course. Minitab has an online help and feel free to use this whenever you need more information on any specific command. What you are seeing is only the tip of the iceberg and you have to explore at your leisure to get the full benefit. We will discuss other commands in the class/lab. But you should definitely know at a minimum the commands listed in this handout.

BASIC RULES (for those who will be using Applied Mathematics Laboratory):

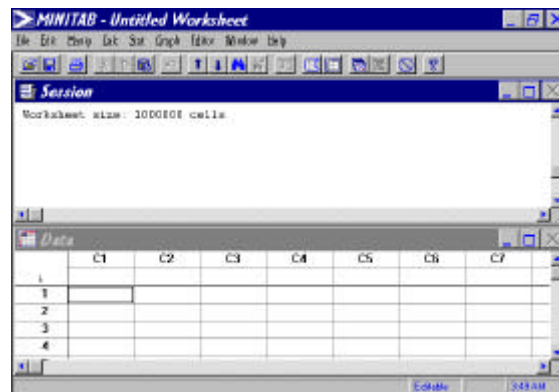
1. Follow the procedures listed in the laboratory to log on to the computer.
2. Bring your own diskette to save your files.
3. Do **not** save your work on the hard drive.
4. As a courtesy to fellow users, please logout from Minitab before you exit the lab.
5. Feel free to use the lab whenever you have to and when the lab is not being used by other classes. Classroom usage has the highest priority and when instructed (by the professor) to leave the lab, please log out immediately. The classroom schedule is usually posted outside the room and check that before you enter the lab.

Getting Started on Minitab

In this chapter, we will briefly discuss the basic commands to get started on Minitab. In the following the commands that are indicated in boldfaced characters indicate the option that you need to highlight using the mouse. The symbol “►” will indicate the subcommand that follows the previous one.

First activate Minitab. To do this, from the taskbar, choose **Start ► Programs ► Minitab 12 for Windows**.

When you are successful, your screen should look like the one shown on the right side. There are two windows: *Session* and *Data*. The Session window displays text output such as worksheet size, tables of statistics, etc. The Data window is where you enter/edit the data. There are other windows too, which we will talk when we get to those.

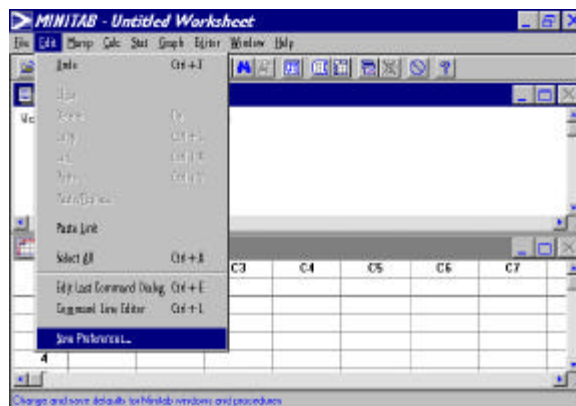


The Menu Bar, Status Bar and Toolbar: The menu bar is where the commands are chosen. In the figure to the right, you see

Edit ► Save Preferences ...

commands were chosen (and so are highlighted).

The Toolbar appears immediately below the Menu bar. The Status bar is at the bottom and shows the text for the current menu selection.



Issue Commands: There are basically two ways of issuing commands in Minitab; using menu commands and session commands. The Toolbar can also be used to issue commands such as moving columns, inserting columns, executing the last command, etc.

In order to activate the session window to accept commands for Minitab to execute, you have to choose

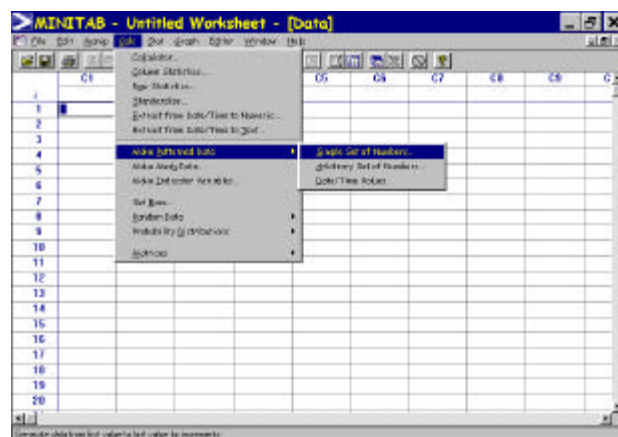
Edit ► Save Preferences ► Session Window

and click on “Enable” option under Command Language and press OK. See the figure on the right side. After this, you will see the prompt “>MTB” indicating that your session window is now active. Any (legal) command you type in this window will be executed.

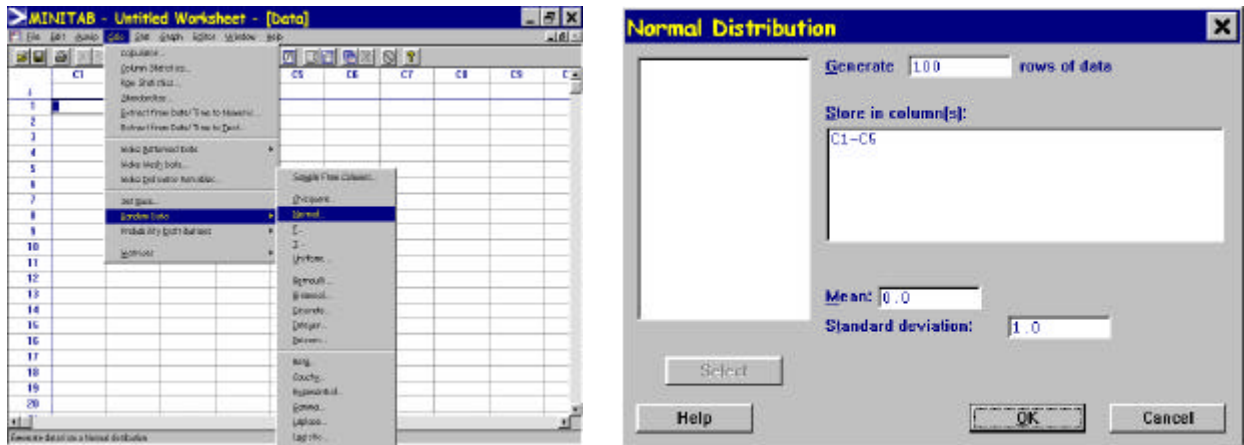


CONVENTION OF THE VARIABLES: Minitab stores columns of data in variables labeled C1, C2, and so on. Constants are stored in K1, K2, and so on. Matrices are stored under M1, M2, etc. Names can be assigned to these variables.

ENTERING DATA: Data can be typed into the columns directly in the DATA session. Data can be imported from a file (plain text, Excel type, etc). Data can also be entered using “cut and paste” method; data can be generated randomly or using patterned option. See the following figures.



The following figures illustrate how to generate random samples from normal distribution. In this example, the experiment is conducted 5 times and the data is stored in columns C1-C5.



TYPES OF FILES IN MINITAB: The files saved in Minitab are categorized into one of the following types. Suppose we call the filename as Example. Note that Minitab is not case sensitive.

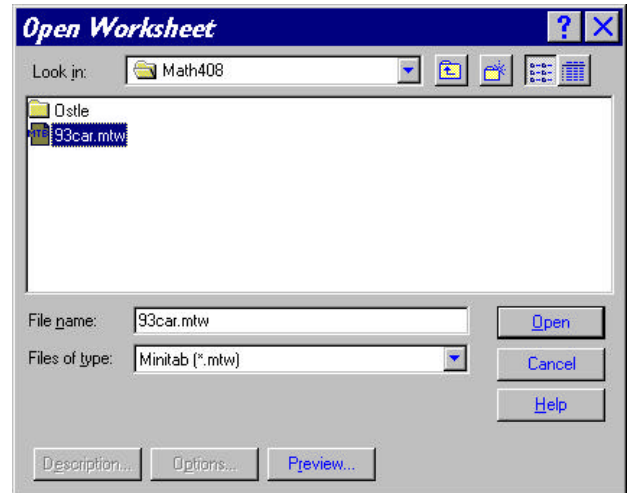
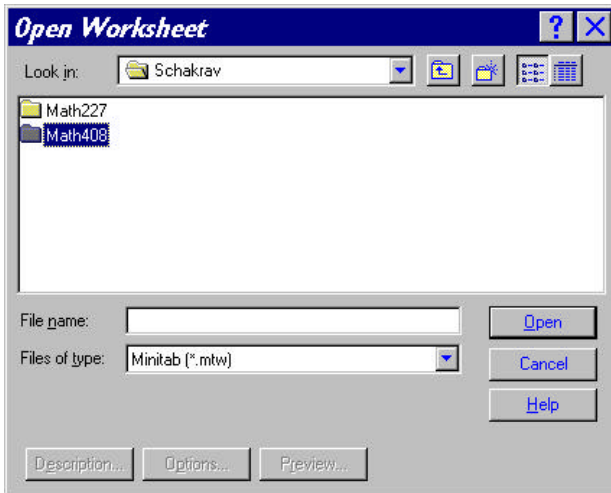
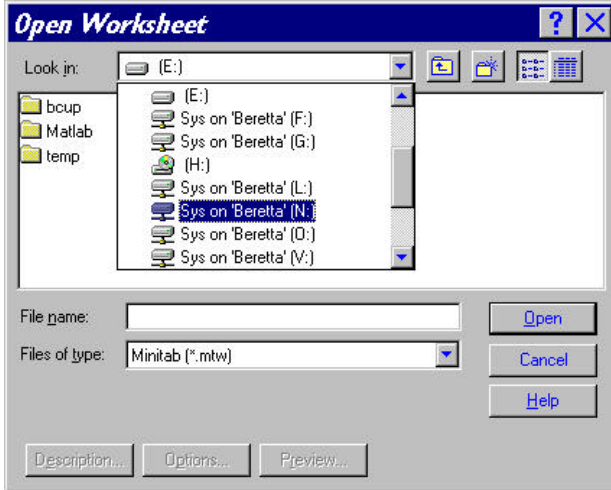
Example.MTW: Worksheet file. Only Minitab can read this file. Worksheet file contains all your data: columns, constants, and matrices.

Example.MPJ: Project file. Only Minitab can read this file. This contains Session window output, graphs, and worksheets.

Example.TXT: Text file. The information stored in this file is in ASCII form.

Example.MGF: Graphics file. Only Minitab can read this file.

RETRIEVING A WORKSHEET FILE: To retrieve a worksheet file that was saved earlier, perform **File ► Open Worksheet** and open the worksheet file from the directory where it is residing. In the example below, we will open the worksheet 93CAR.MTW that is located in the folder “N:\DEPT\SCHAKRAV\MATH408”. To get into this folder, follow the instructions highlighted in the figures below.



Chapter 3

Analyzing the Data

We will use the data set stored in 93CAR.MTW to illustrate some of the basic commands to do statistical analysis.

BASIC DESCRIPTIVE STATISTICS:

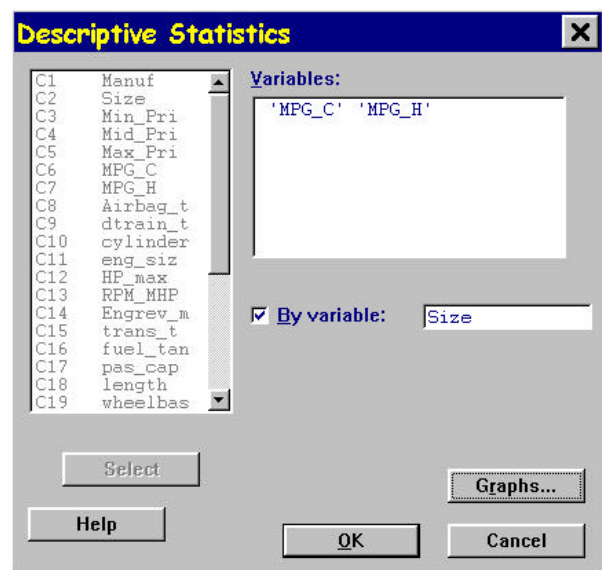
Choose

Stat > Basic Statistics > Descriptive Statistics.

After executing the above command you will see the output that is shown on the right (except for the entries in the windows labeled **Variables** and **By variable**).

In **Variables** enter one or more variables listed on the left side. In our case, we have chosen MPG_C and MPG_H. The window labeled **By variable** is an optional one, which is useful if the data is to be described according to some characteristic. For our example, that characteristic is the SIZE of the car. After pressing OK in that window, Minitab displays the output in the Session window.

That window is shown on the right. Note the types of statistics displayed in that window. Also, you will see that these statistics are displayed according to the six sizes. Discussion, interpretation and computation of these statistics will be presented in the class.

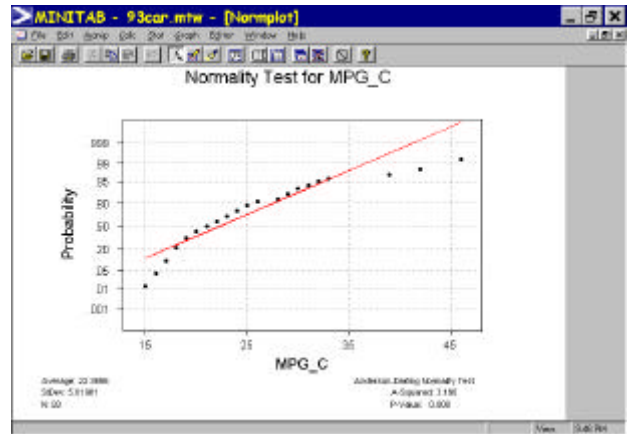
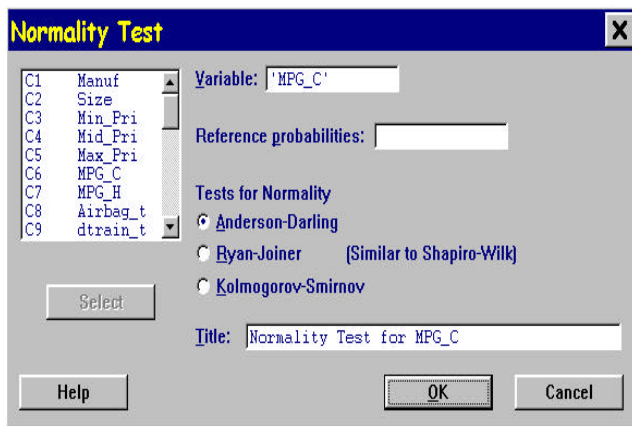


Variable	Size	N	Mean	Median	Tr Mean	St Dev	SE Mean
MPG_C	2	21	19.00	19.00	19.42	4.22	0.79
	3	14	21.50	23.000	22.443	4.12	0.484
	4	22	19.545	19.000	19.550	3.896	0.484
	5	11	18.364	19.000	18.444	3.812	0.453
	6	14	21.79	22.50	21.50	3.91	0.484
	7	9	17.000	17.000	17.000	3.229	0.488
MPG_H	2	21	18.86	19.00	19.05	4.82	0.77
	3	14	28.929	30.000	29.734	3.441	0.516
	4	22	24.227	26.500	24.750	3.512	0.512
	5	11	24.727	26.000	26.778	3.712	0.484
	6	14	28.786	29.500	28.563	3.442	0.573
	7	9	21.999	22.000	22.889	3.413	0.484
MPG_C	2	22.88	49.00	50.00	51.00		
	3	28.888	24.000	21.000	24.000		
	4	14.888	23.000	19.000	21.000		
	5	14.888	28.000	17.000	20.000		
	6	17.888	19.000	19.000	18.000		
	7	11.888	18.000	14.000	16.000		
MPG_H	2	28.88	19.00	32.00	27.00		
	3	24.888	24.000	27.250	21.000		
	4	22.888	31.000	25.000	29.000		
	5	24.888	28.000	26.000	28.000		
	6	24.888	18.000	19.000	21.000		
	7	24.888	24.000	20.000	23.000		

NORMALITY TEST: Normality assumption plays an important role in Probability and Statistics. The test for normality is carried out as follows: Choose

Stat > Basic Statistics > Normality Test.

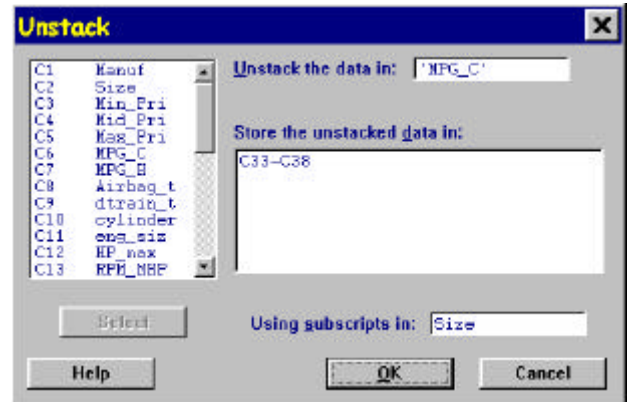
In **Variable** window, choose a variable (here it is MPG_C) and type in the Title (an option) and press OK. The Minitab output is displayed below on the right.



To UNSTACK the data according to specific criteria, choose

Manip > Stack/Unstack > Unstack.

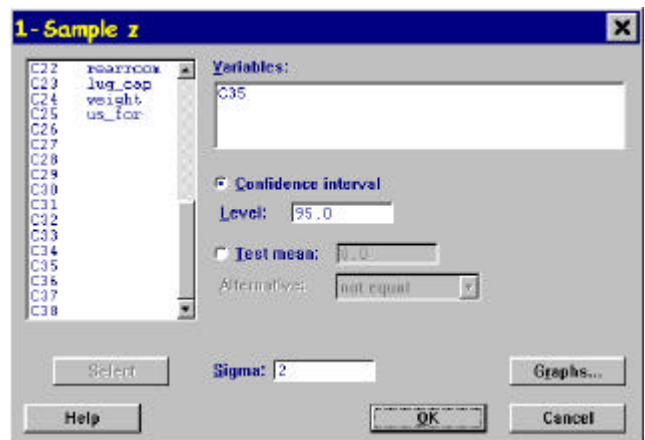
In the “Unstack the data in” enter a variable (here we entered MPG_C); type in the columns where the unstacked data will be stored (the number of columns should be equal to the number of categories); in “Using subscripts in” window, enter the variable that contains the different categories.



CONFIDENCE INTERVALS and TESTS OF HYPOTHESES: These are the two pillars of inferential statistics. To perform these, choose

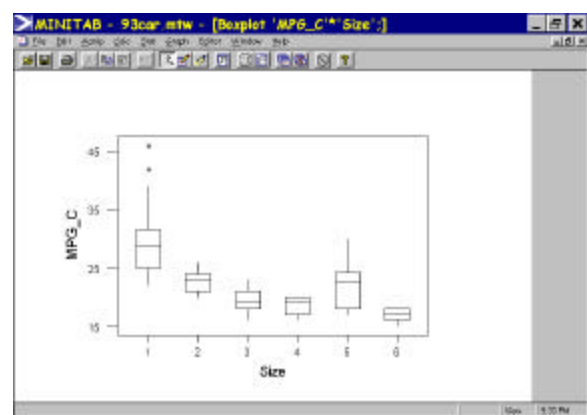
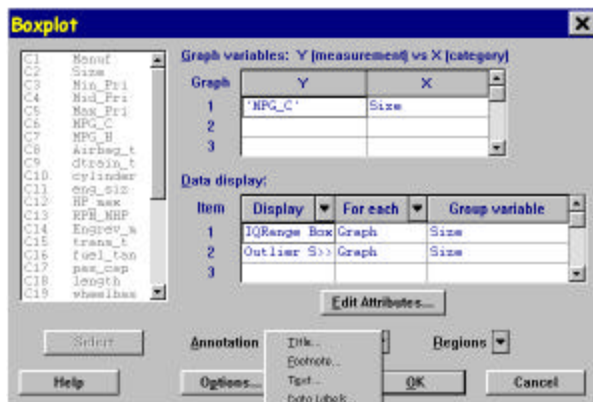
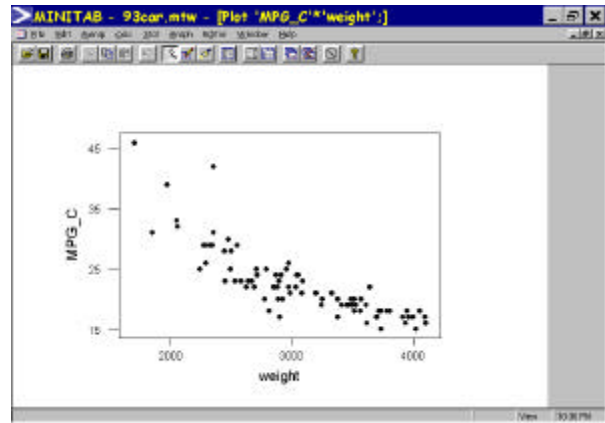
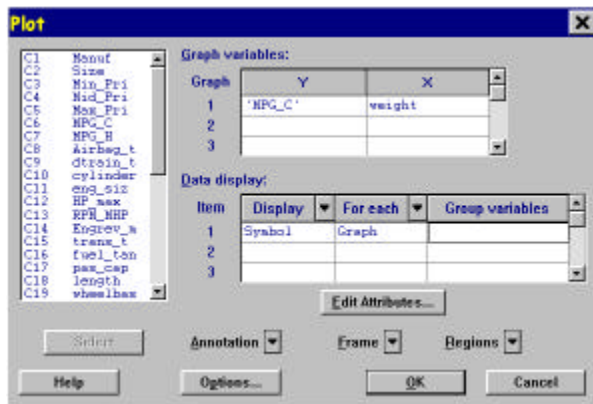
Stat > Basic Statistics > 1-Sample z.

Enter the variable in **Variables** (here we have C35, that corresponds to Size 3 car – Why?). By default the level of confidence is taken as 95%. You can enter a different number depending on the level you are interested in. For 1-Sample z, you also need to enter a value in **Sigma** window (here it is 2).



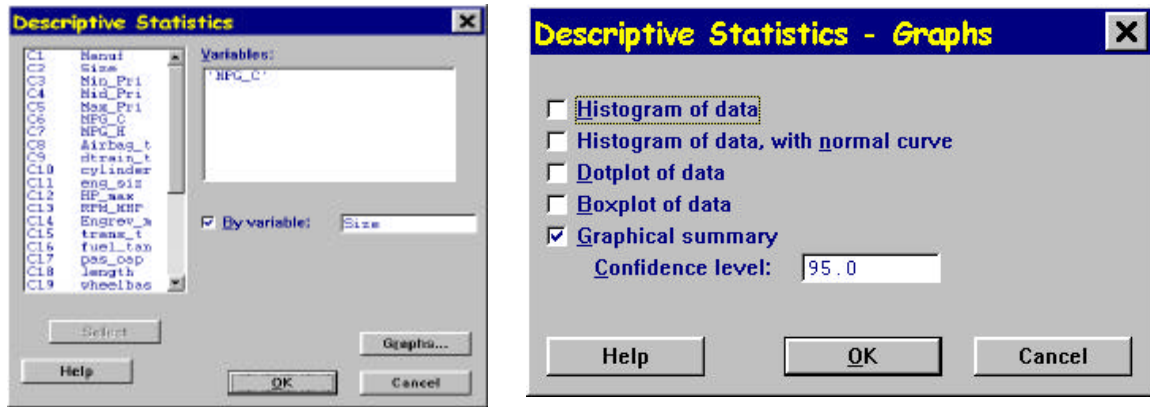
Graphing the Data

As the Chinese adage says, “One picture says thousand words”, it is very important to describe the data using graphical methods. There are a variety of graphs available and here we will give a small sample of these. Again, we will use the data in 93CAR.MTW.

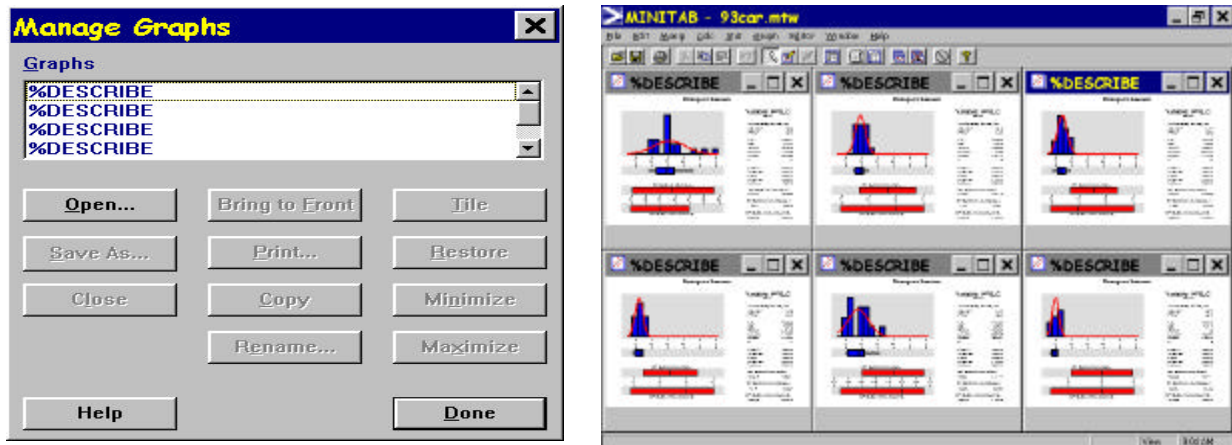


GRAPHS USING DESCRIPTIVE STATISTICS: Interesting summary statistics in the form of graphical display can be obtained by choosing

Stat ► Basic Statistics ► Graphs.

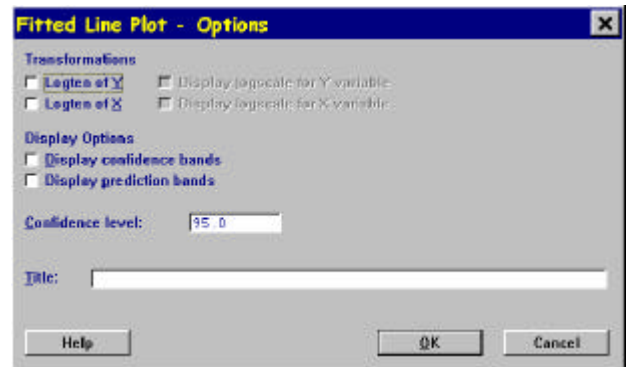
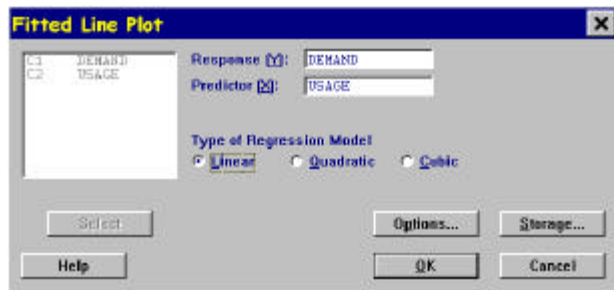
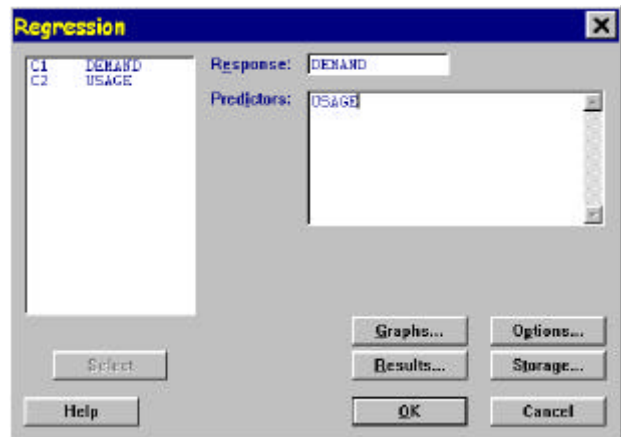
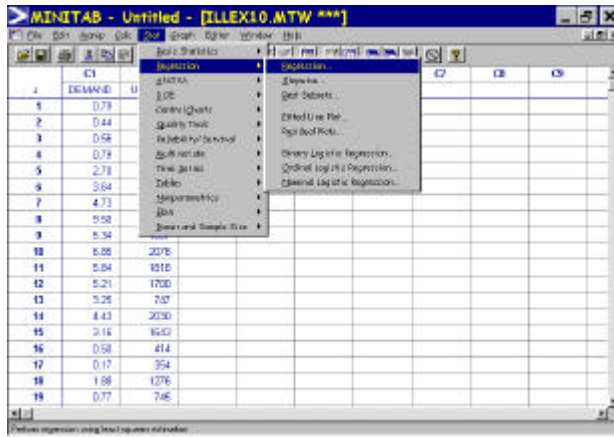


In the graphs option, you have several options (see the figure above on the right). In our case, we have chosen “Graphical summary”. Since we are looking at graphical summary of MPG_C by Size, this will produce six graphs, one for each size. To get all six in one frame, we used the option “Manage graphs” which is shown in the Toolbar. This will produce the window that is displayed in the left below. Highlight in that window, the ones you want to manage and click on Tile option. In our case we chose all six of them and that produced the figure shown on the right below.



Regression Commands

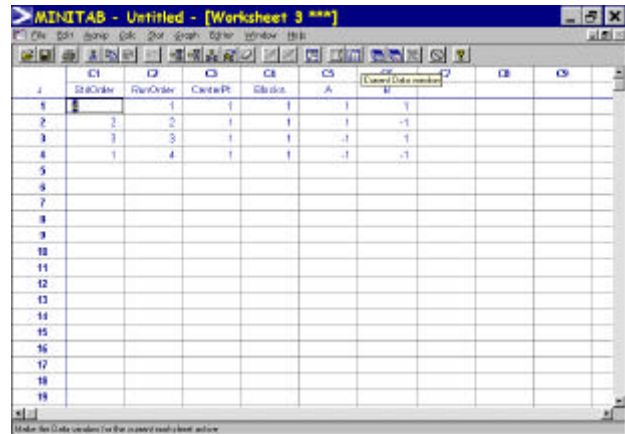
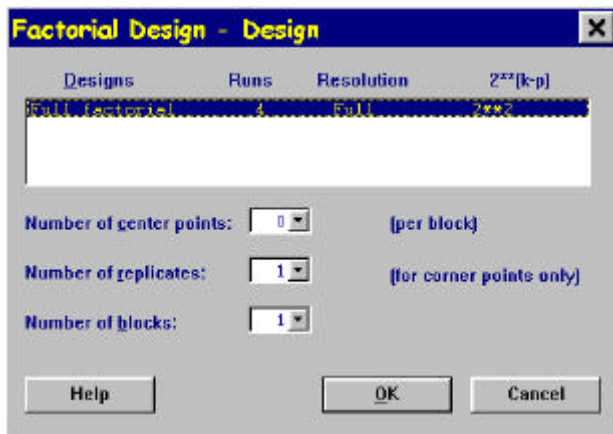
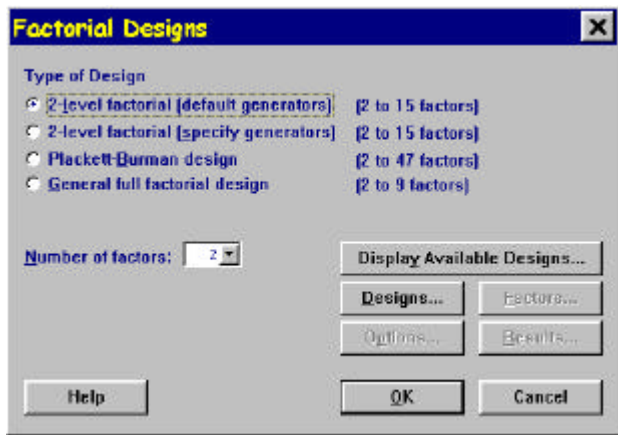
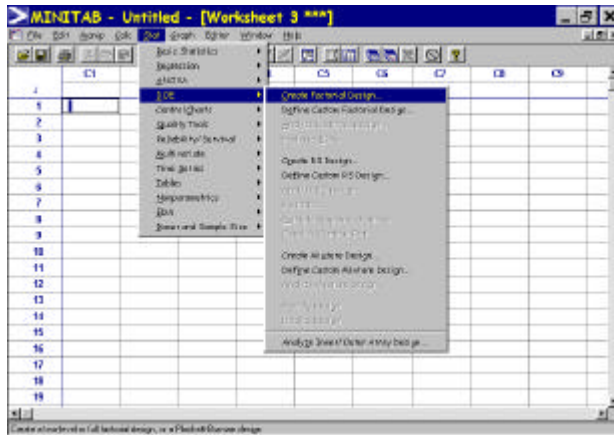
Looking at the example (see illustrative example 10) dealing with peak hour demand (Y) as a function of total energy usage (X), the appropriate Minitab commands for getting started with regression analysis are displayed below.



Chapter 6

Design of Experiments Commands

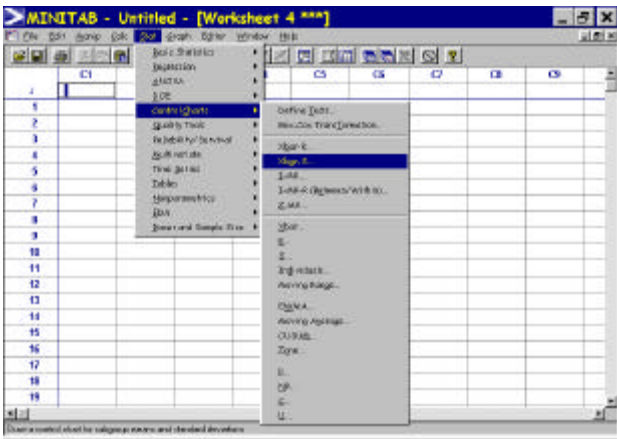
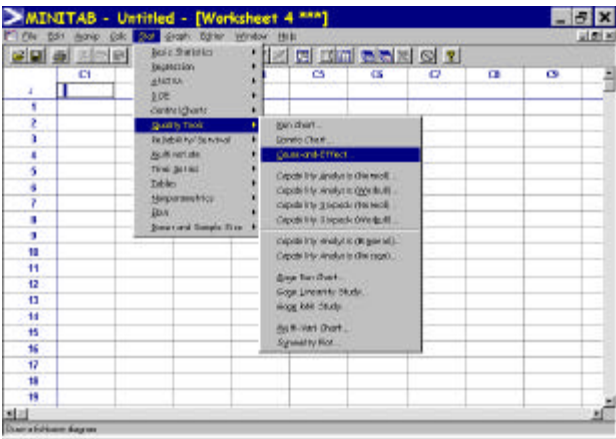
The following figures will help you to get started on DOE commands.



Chapter
7

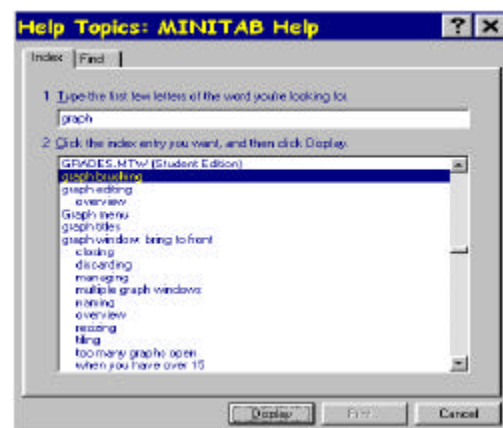
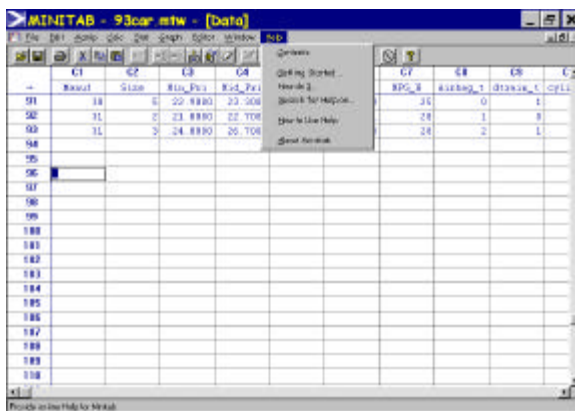
Statistical Process Control Commands

The following figures will help you to get started on SPC commands.



Getting Online Help

Minitab has an online help that can be used to get help on various commands. To invoke this option, choose Help from the Menu bar. You will see six options, of which you can use the first five to get various forms of help (see figure below on the left). The option “Search for Help on” produces the window that is displayed on the right below. In this window help is sought for Graph command.



CONCLUDING REMARKS: In this brief introduction you are given just a few tips to get started on MINITAB. We will be going over these with several examples related to class projects and the textbook(s) examples. You should bring this handout to the classes so that you can follow the demonstration very easily. Again, you have to get into Minitab and explore with various examples. That is the only way, you will get familiarized with the basic commands.