About Minitab
(Rupali Akerkar)

FOR PRACTICALS :

Mintab is an easy-to-use statistical package which can carry out a wide variety of statistical tasks.

There are three basic kinds of object that Minitab works with.
Data column: This is the most frequently used object type in Minitab. Columns are denoted C1, C2, C3, etc. They each store a collection of observations relating to a particular variable.
We will be using data columns

Constants: These are denoted K1, K2, K3, etc., and each store a single number of interest.

Data arrays: These are matrices of numbers, and are denoted by M1, M2, M3, etc. All of the data columns, constants and data arrays relating to a particular problem are stored in a working environment called a worksheet. Worksheets can be saved to and loaded from disk, for later use. Several worksheets may be opened simultaneously, and these can be saved together as a project.

There are two different ways to use Minitab. The simplest way is to select operations from Minitab's menus using the mouse. The other way is to type commands directly into Minitab via the Session.(This we will use for macros!!!!!!)

Window. When you select an operation using the menus, this is automatically translated into a Minitab command, which is displayed in the session window (if commands are enabled — see later) before being executed — examining the command displayed in the session window is a good way to learn Minitab commands. **Minitab commands generally accomplish one of three things.**
- They manipulate a worksheet,
- They perform an analysis,
- The results of which are displayed in the session window, or they produce a plot.

Data entry and loading a worksheet

When Minitab is first started, there are two main Mintab windows. One is the session window and the other main window is the Data or Worksheet Window. This allows you to view and edit the data columns of the current worksheet. Data can be entered directly into this window.
  In Minitab, the data are stored in columns, which are called C1,C2,... in the Worksheet window. The rows will contain individual cases. All variables can be divided into two types:
• Numerical (or quantitative; Minitab calls them numeric) and
• Categorical (or qualitative, Minitab calls them text).

The space at the top of each column (directly below the column number) is provided for you to name the columns you use. You should get into the habit of always naming your columns, as it is easy to forget what each represents. After entering data, always check each entry carefully, as it is easy to make mistakes.

OPEN a new project:
You will see two parts:
UPPER : session

LOWER : worksheet

There is some data given with minitab for tutorial purpose for getting it on the work sheet.
Press start - press My computer – go to local disk C: - go to program files – Minitab 15 – English- sample data - drag the sample data called Tumor.
Check : see how the values are given.

Time   Size
14   1,25
16   1,90
19   4,75
21   5,45
23   7,53
26   14,50
28   16,70
30   21,00
33   27,10
35   30,30
37   40,50
41   51,40

Remove this, do not save.

EXAMPLE1:
FOR demonstration, we will use data from example 11.4, (from H&R book) on page 472.
You will insert the data:
C1   C2
Item   Lifetimes(months)

In first column write numbers 1 to 16.
In second column write the lifetimes.

Simple data summaries

To obtain some useful summary statistics, select Stat → Basic Statistics → Display Descriptive Statistics, This will give the number of observations, mean, median, trimmed mean, standard deviation, standard error of mean, minimum, maximum, lower and upper quartiles.

Descriptive Statistics: Lifetimes(months)

```
Variable              N   N*    Mean  SE Mean   StDev  Minimum      Q1  Median
Lifetimes(months)    16    0   81,64     6,69   26,78    31,70   65,20   81,45

Variable                 Q3  Maximum
Lifetimes(months)    104,77   130,00
```

Scatter plot

A scatter plot can be produced by selecting Graph → Scatterplot → OK, then selecting the required y variable and the required x variable . Before clicking on OK, you may select Labels..., and enter a title.

If you wish to **save plots**, these may be saved individually, or as part of a project (see below). To save a plot, select it and then File → Save Graph As..., and give an appropriate filename .
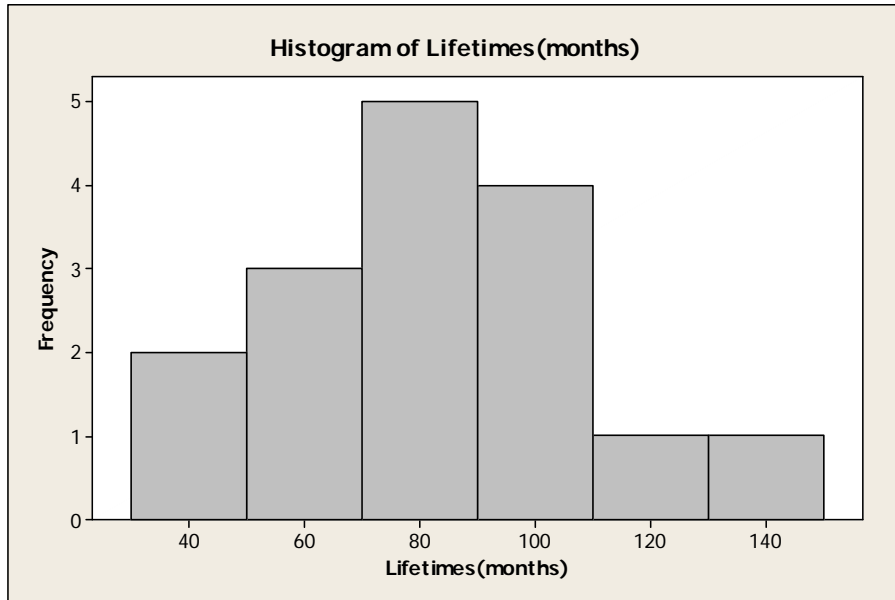
OR

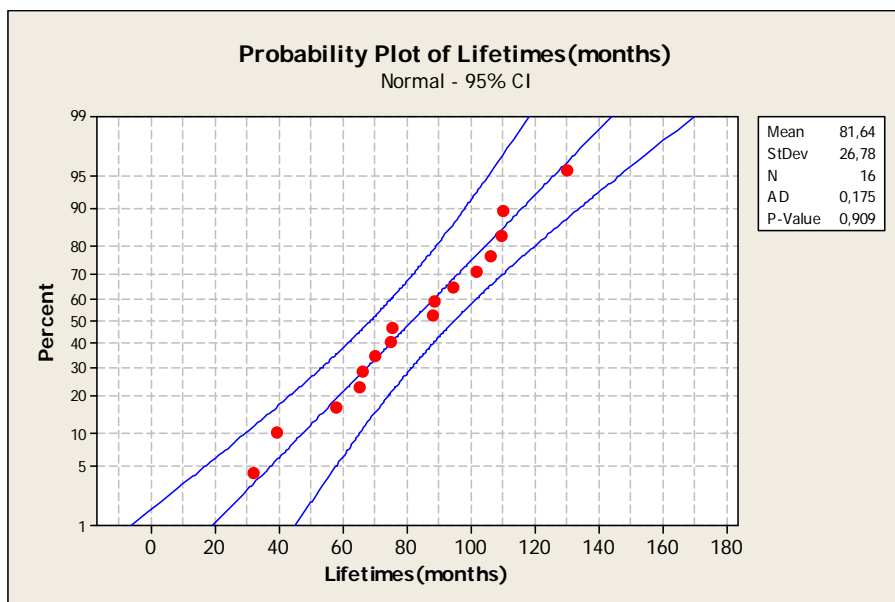Right click the graph and cut and paste where you want.
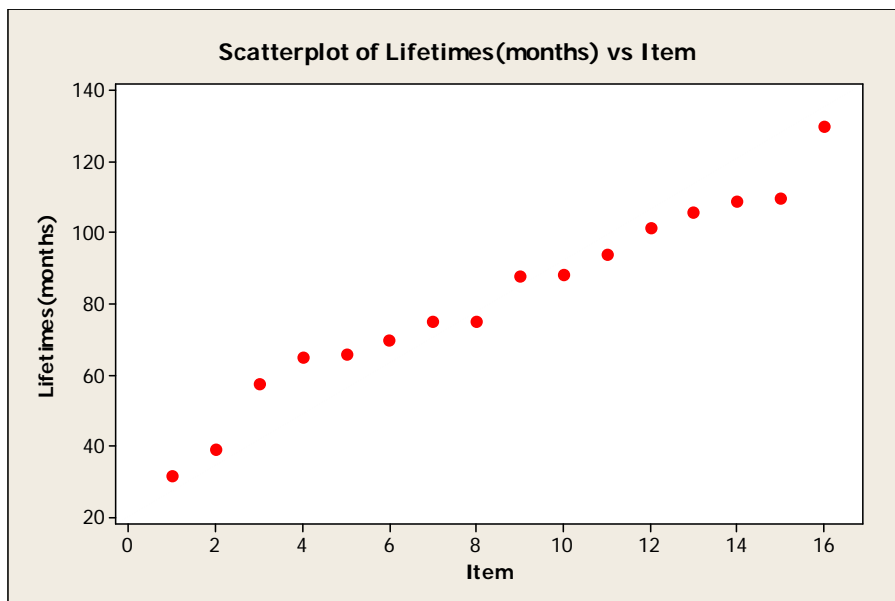
Histogram

To produce a histogram, select Graph → Histogram → OK and the variable to be plotted .

Histogram of Lifetimes(months)

Probability plot:

Graph > probability plot

Probability Plot of Lifetimes(months)
Normal - 95% CI

Mean	81,64
StDev	26,78
N	16
AD	0,175
P-Value	0,909

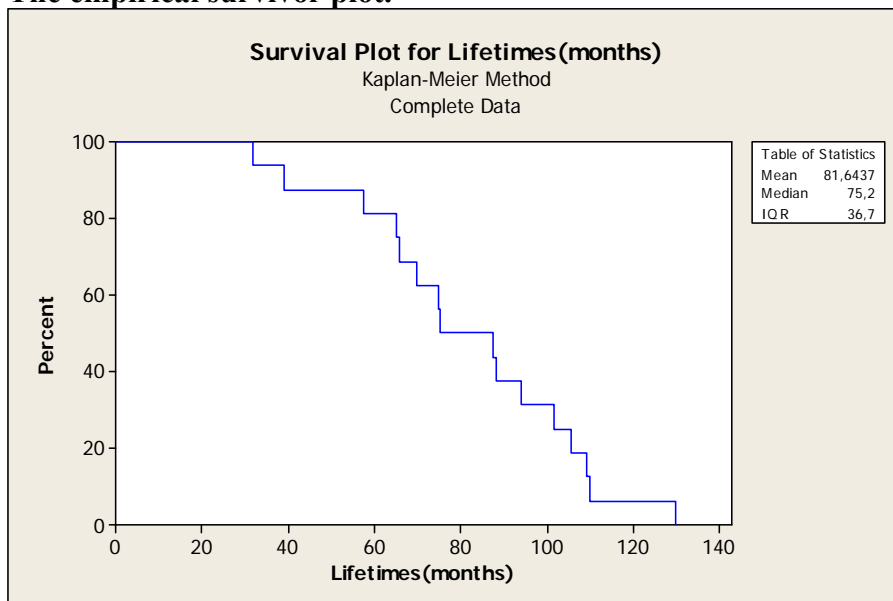**The empirical distribution function:**

Graph > empirical CDF
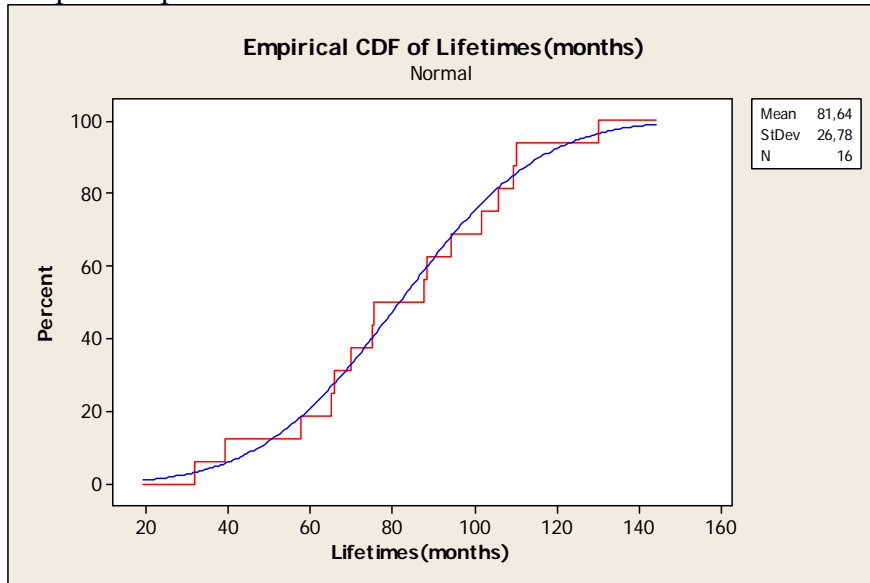
The empirical survivor plot.

The Kaplan –Meier Estimator

Stat > Reliability/ Survival > Distribution Analysis (Right Censored) > Non parametric analysis (Kaplan Meier)

The description is:

Nonparametric Cumulative Failure Plot for Lifetimes(months)
Distribution Analysis: Lifetimes(months)

```
Variable: Lifetimes(months)

Censoring Information  Count
Uncensored value          16


Nonparametric Estimates


Characteristics of Variable

           Standard    95,0% Normal CI
Mean(MTTF)    Error    Lower     Upper
   81,6437   6,69397  68,5238   94,7637


Median = 75,2
IQR = 36,7  Q1 = 65  Q3 = 101,7


Kaplan-Meier Estimates

        Number  Number   Survival   Standard    95,0% Normal CI
  Time  at Risk Failed  Probability     Error     Lower     Upper
  31,7      16     1      0,9375   0,060515  0,818892  1,00000
  39,2      15     1      0,8750   0,082680  0,712951  1,00000
  57,5      14     1      0,8125   0,097578  0,621250  1,00000
  65,0      13     1      0,7500   0,108253  0,537828  0,96217
  65,8      12     1      0,6875   0,115878  0,460383  0,91462
  70,0      11     1      0,6250   0,121031  0,387784  0,86222
  75,0      10     1      0,5625   0,124020  0,319426  0,80557
  75,2       9     1      0,5000   0,125000  0,255005  0,74500
  87,7       8     1      0,4375   0,124020  0,194426  0,68057
  88,3       7     1      0,3750   0,121031  0,137784  0,61222
  94,2       6     1      0,3125   0,115878  0,085383  0,53962
 101,7       5     1      0,2500   0,108253  0,037828  0,46217
 105,8       4     1      0,1875   0,097578  0,000000  0,37875
 109,2       3     1      0,1250   0,082680  0,000000  0,28705
 110,0       2     1      0,0625   0,060515  0,000000  0,18111
 130,0       1     1      0,0000   0,000000  0,000000  0,00000
```

Nonparametric Survival Plot for Lifetimes(months)
Nonparametric Cumulative Failure Plot for Lifetimes(months)

These graphs can be seen on Minitab windows.

For NELSON Plot :
Follow instructions given on course web page under the title:
MINITAB14 macros

NOTE: Copy the required file in your folder. Do not copy it in C:, it is reserved for document and setting purposes.
GO TO MY Computer -> then On network Drives -> check your folder, double click it. ->
make a folder for TMA4275, and saved the required file.

Give commands in session window:
```
MTB >  %M:\your name\TMA4274\TMA4275nelson.txt C3-C9
```


```
MTB >  %M:\minitab09\macros\TMA4275nelson.txt C3-C9
Executing from file: M:\minitab09\macros\TMA4275nelson.txt
```

Distribution Analysis: C3

```
Variable: C3

Censoring Information  Count
Uncensored value          16

Censoring value: Censoring = 0


Nonparametric Estimates


Characteristics of Variable

          Standard   95,0% Normal CI
Mean(MTTF)    Error    Lower    Upper
  81,6437   6,69397  68,5238  94,7637


Median = 75,2
IQR = 36,7  Q1 = 65  Q3 = 101,7


Kaplan-Meier Estimates

       Number  Number    Survival  Standard   95,0% Normal CI
 Time  at Risk Failed  Probability    Error    Lower    Upper
 31,7       16      1      0,9375  0,060515  0,818892  1,00000
 39,2       15      1      0,8750  0,082680  0,712951  1,00000
 57,5       14      1      0,8125  0,097578  0,621250  1,00000
 65,0       13      1      0,7500  0,108253  0,537828  0,96217
 65,8       12      1      0,6875  0,115878  0,460383  0,91462
 70,0       11      1      0,6250  0,121031  0,387784  0,86222
 75,0       10      1      0,5625  0,124020  0,319426  0,80557
 75,2        9      1      0,5000  0,125000  0,255005  0,74500
 87,7        8      1      0,4375  0,124020  0,194426  0,68057
 88,3        7      1      0,3750  0,121031  0,137784  0,61222
```

```
 94,2        6        1        0,3125   0,115878  0,085383  0,53962
101,7        5        1        0,2500   0,108253  0,037828  0,46217
105,8        4        1        0,1875   0,097578  0,000000  0,37875
109,2        3        1        0,1250   0,082680  0,000000  0,28705
110,0        2        1        0,0625   0,060515  0,000000  0,18111
130,0        1        1        0,0000   0,000000  0,000000  0,00000
```

Data Display

```
            Cum Haz   Survival  Survival
Row   Time   Nelson    Nelson        KM
  1   31,7  0,06250  0,939413    0,9375
  2   39,2  0,12917  0,878827    0,8750
  3   57,5  0,20060  0,818244    0,8125
  4   65,0  0,27752  0,757662    0,7500
  5   65,8  0,36085  0,697082    0,6875
  6   70,0  0,45176  0,636506    0,6250
  7   75,0  0,55176  0,575935    0,5625
  8   75,2  0,66287  0,515369    0,5000
  9   87,7  0,78787  0,454812    0,4375
 10   88,3  0,93073  0,394266    0,3750
 11   94,2  1,09740  0,333739    0,3125
 12  101,7  1,29740  0,273242    0,2500
 13  105,8  1,54740  0,212801    0,1875
 14  109,2  1,88073  0,152479    0,1250
 15  110,0  2,38073  0,092483    0,0625
 16  130,0  3,38073  0,034023    0,0000
```

Scatterplot of Survival Nelson vs Time

Nelson Survival Function
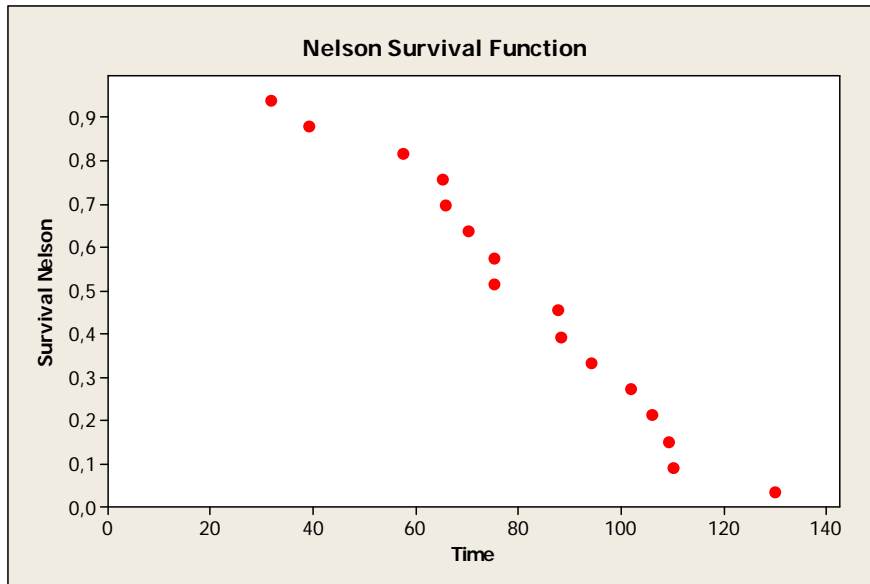
```
Will also get these graphs.
```
Scatterplot of Survival KM vs Time
Scatterplot of Cum Haz Nelson vs Time

Parametric Distribution:

Stat > Reliability/ Survival> Distribution Analysis (Right censoring)
> Exponential
> Weibull
> Lognormal

Saving and retrieving worksheets and projects
When you have been working with Minitab, you will usually want to save the contents of your worksheet for future use. To save a worksheet, first click on it in order to make it active, and then select File → Save Current Worksheet As. Note that under Windows XP, file names may be longer than 8 letters, may be of mixed case, and may contains spaces and hyphens. You should try to avoid using other symbols, especially those which have special meaning (such as \) and are not permitted. Note that saving a worksheet only saves the worksheet contents. It does not save any plots you have produced, or the contents of the session window. To save your complete workspace, including the session window, all open worksheets, and any plots, select File → **Save Project** ... and select an appropriate directory and file name. This can be re-loaded at a later date by selecting File → Open Project..., or by clicking on the small yellow "open file" icon on the Minitab tool-bar. Projects are often more convenient than worksheets for a "project" you are currently working on. However, they are less useful for long term data storage, as the project files

tend to be very large, and so you may eventually run out of disc storage space. Worksheets must be re-loaded by selecting File → Open Worksheet — they can't be opened by clicking on the open file icon on the toolbar.

Printing and copying files and plots

In fact, you will usually want to "Copy-and-Paste" a plot, or some session window output into a Microsoft Word document, and then print the Word document when it is complete. In Word, it is easy to format output and re-size plots for more efficient use of paper. For example, it is easy to copy several plots into a Word document, and arrange them so that they all print together on a single page.
Try this now by running Microsoft Word from the Start menu (Start → Programs → Office XP → Microsoft Word), without quitting Minitab. Then switch back to Minitab (click on the Minitab button on the task bar), select a Graph Window, and then choose Edit → Copy Graph. Switch back to Word (the Word button on the task bar) and Edit → Paste the graph into your Word document. By double-clicking on the graph you can resize it and edit it in other ways (such as adding a title).You can also copy bits of the Session Window into Word. Scroll back through your Session Window output to find a Stem-and-Leaf plot. Click and hold the mouse button at the top of the plot, and then holding down the button, drag the pointer down to the bottom of the plot, highlighting it in the process.
Select Edit → Copy in Minitab then Edit → Paste in Word as before. If you are pasting a graph into a Word document containing lots of text, you may wish to control the way text wraps around it. For example, selecting the plot in your Word document and choosing Format → Object...→ Layout → Square → Left → OK is one possibility.