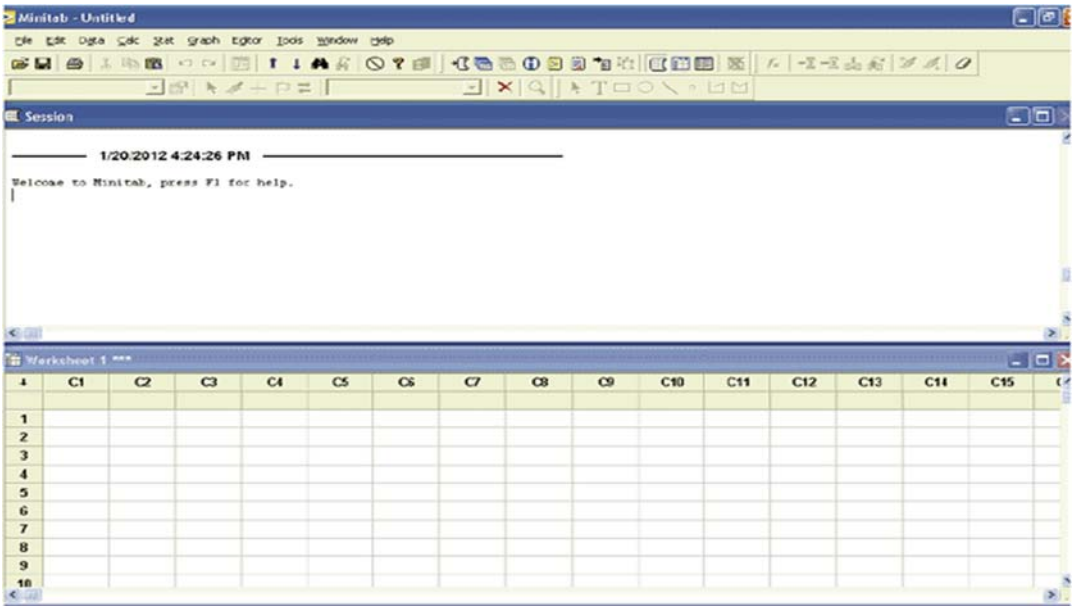
Statistical Analysis Using Minitab

Part (1): Introduction to Using Minitab

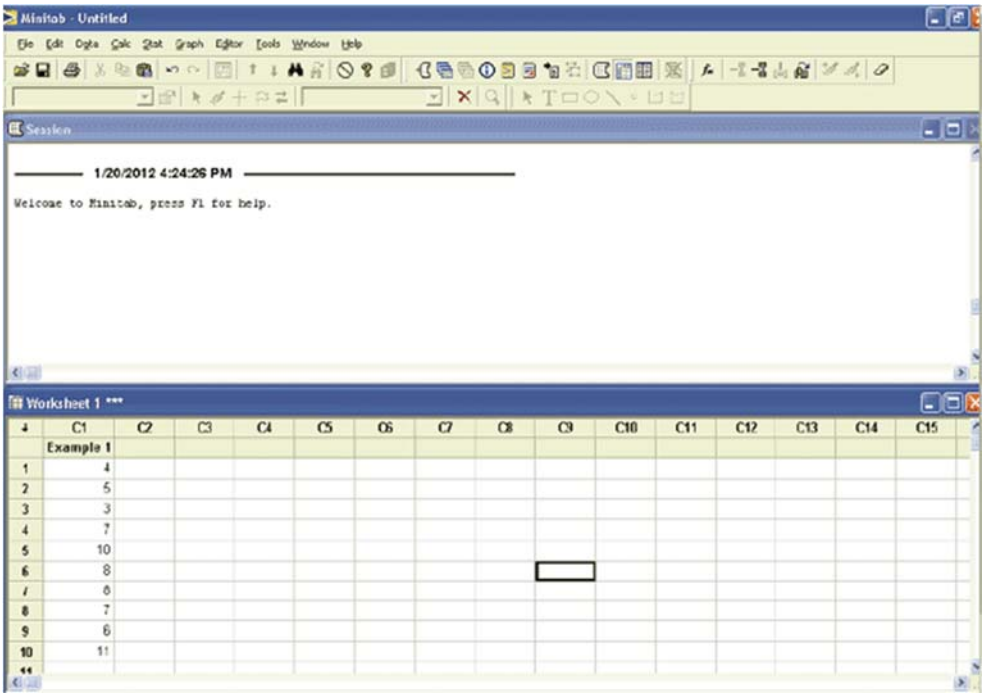
You can download Minitab from www.minitab.com.

Detailed help is available here:
https://www.minitab.com/uploadedFiles/Documents/getting-started/Minitab17_GettingStarted-en.pdf

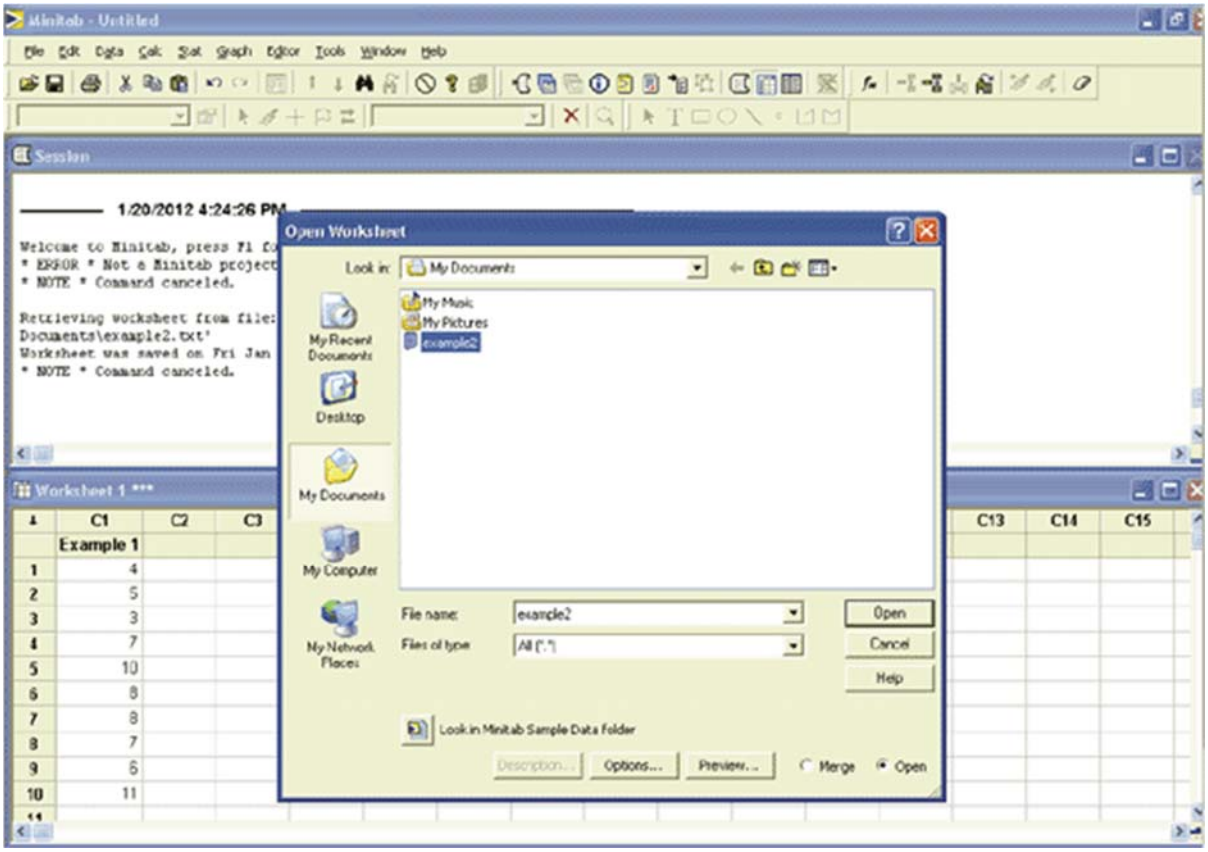
Once Minitab is successfully installed, double click the Minitab icon to launch the program. The software should start and you should see a screen similar to the figure below. As you can see from the figure, the Minitab window is separated into two parts. The top part is called the Session window and the bottom part is called the Worksheet. The Session window allows you to run syntax-based commands and also shows the results from whichever procedure you run. The Worksheet window displays your data. The rows are numbered (1, 2, 3, ...) and the columns are labeled as C1, C2, C3, ... The cell located under the column labels are there to rename the column how you see fit. To rename C1, for example, double click the tan colored cell under C1 and type in a name.



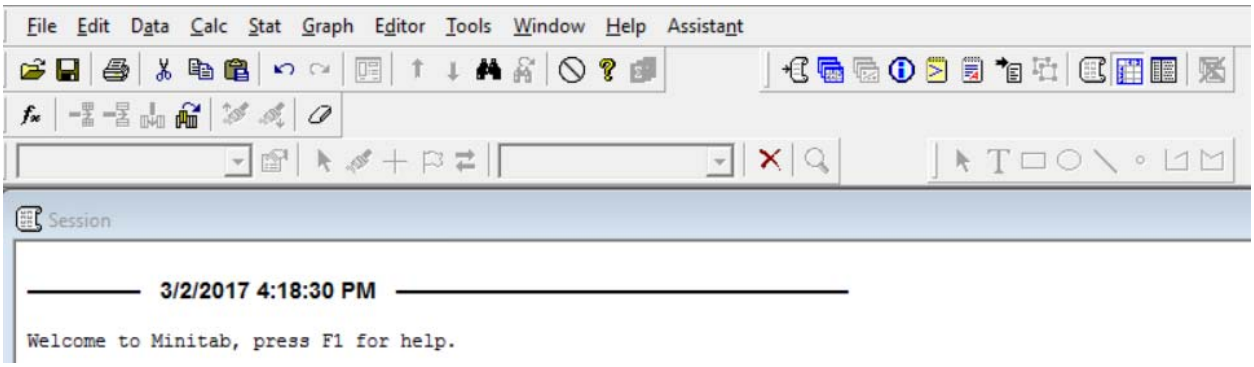
We start with either entering data or loading it from a file. To enter data by hand, simply click on the cell, type in the entry, and click Enter. Try renaming C1 as 'Example 1' and entering the following numbers into the first column: 4, 5, 3, 7, 10, 8, 8, 7, 6, 11. Your screen should look similar to the figure below. Next, let's try loading the data from a file. The data file for this example is located in the Datasets folder labeled as example2.txt. To open this data in Minitab, click on **File > Open Worksheet...**. Go to the location on your computer where the example2.txt file is located. Since the data is not in Minitab format (saved as a .txt file), make sure that **Files of type:** says **All(*.*)**. Click on example2.txt and finally click **Open**. The first figure below shows you what your screen should look like. Once you click open, you should see a new Worksheet in Minitab with the Example 2 data. You are able to use multiple worksheets in Minitab and can click back and forth between them.



Opening a file in Minitab.

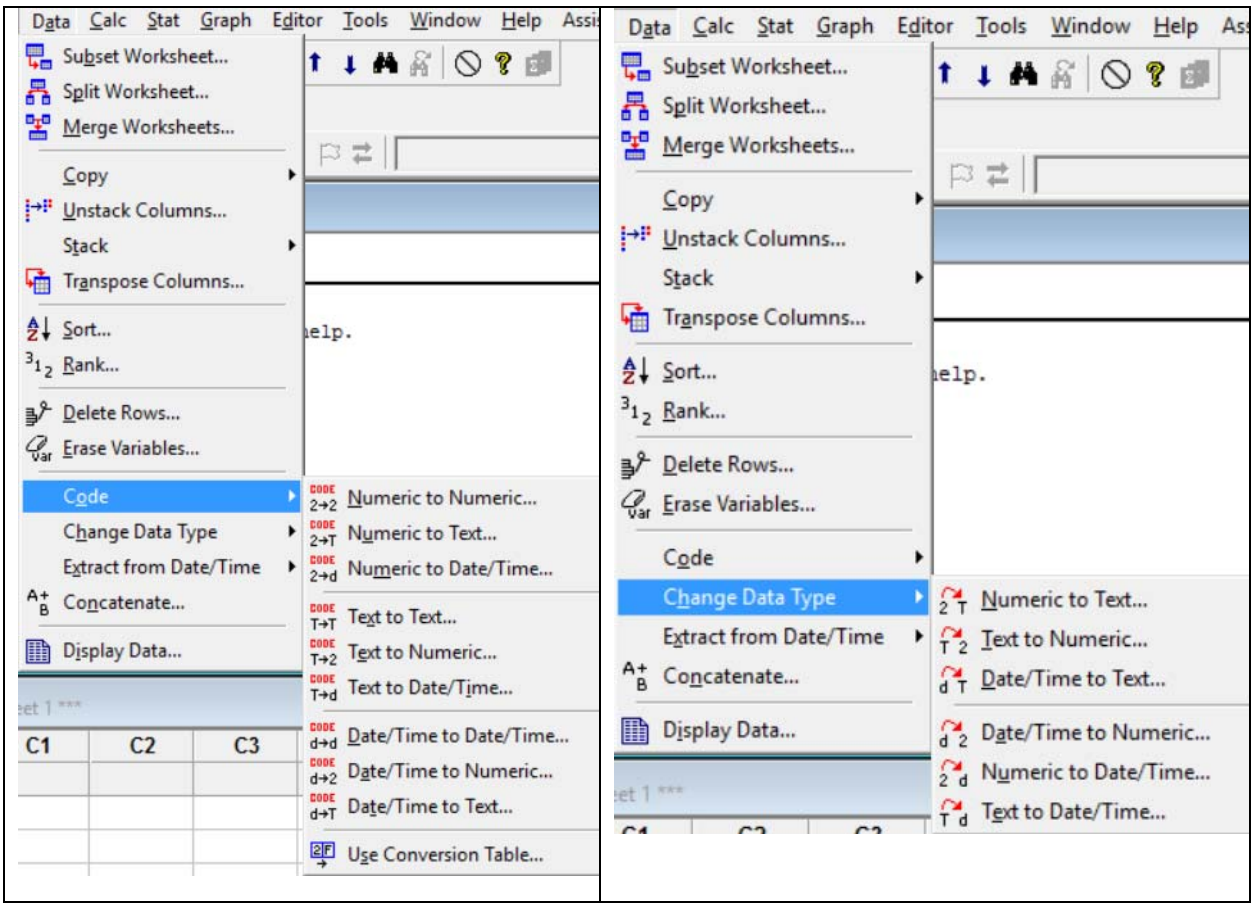


The commands ruler includes many different functions.



1-1 Data manipulation

The data manipulations can be achieved from the following list of commands



We explain how to use data code and change Data Type

1-Data code enables us to use codes for the given data as

Numeric to text

Text to numeric

Example:

If you have 10 students with the variable gender (Male, Female), use the code male=1 and female. Apply Text to numeric and Numeric to text and

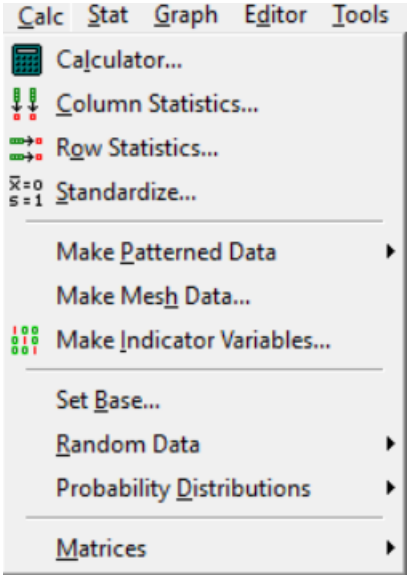
2-Change Data Type enables us to change the entire variable into different data types

Numeric to text

Text to numeric

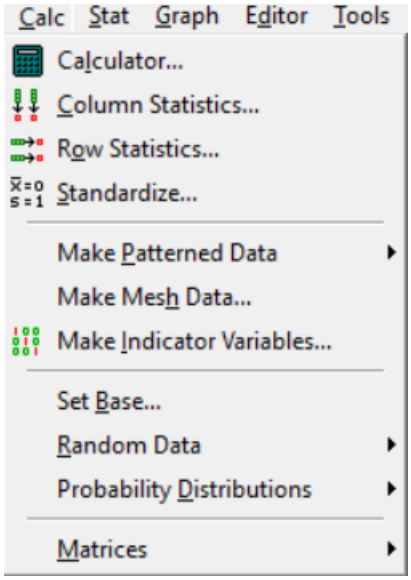
Example:

If you have 10 students with the variable phone number. Apply Text to numeric and Numeric to text to switch between different data types.



1-2 Calculations (Calc)

Many mathematical and statistical calculations can be achieved from the following list of commands



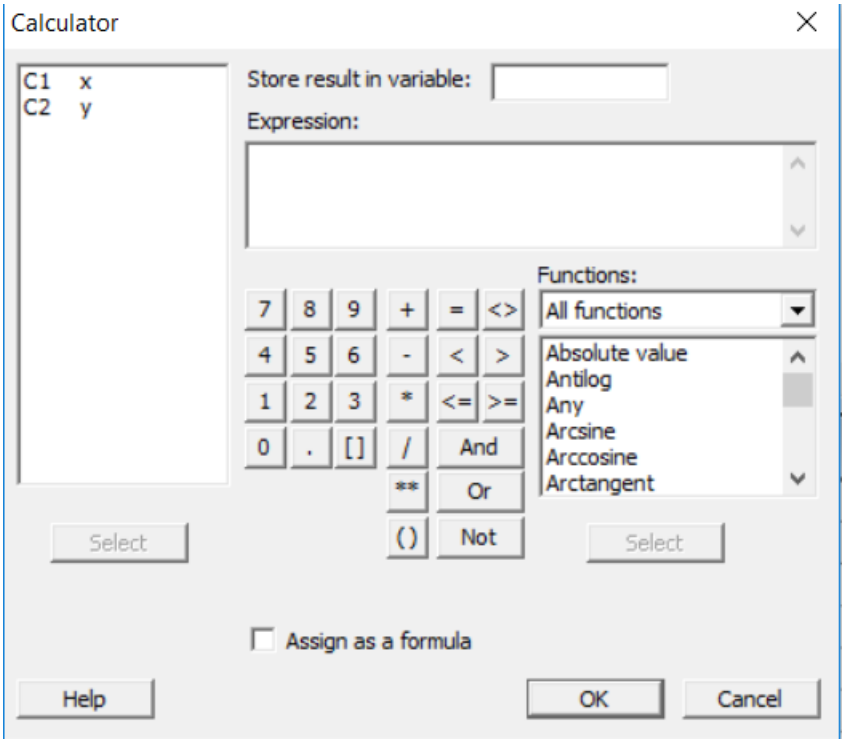
For more details, see the book:

Minitab Cookbook –by Isaac Newton (Author)

We discuss some commends from the above list as:

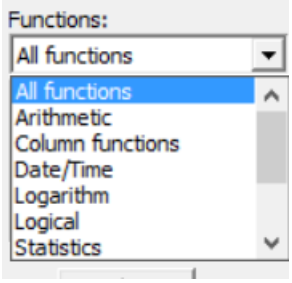
1- Calculator…

The are many mathematical operations can be done for the different columns of data through using the following window (Also, this can be done directly using Minitab editor)



Functions

The list of different functions can be found and categorized into different types as:



- **Arithmetic**

  Example: Find exp(10) and $\sqrt{7}$

```
MTB > let k3=exp(10)
MTB > let k4=sqrt(7)
MTB > print k3

Data Display

K3    22026.5

MTB > print k4

Data Display

K4    2.64575
```

- **Logarithm**

  Example: Find ln(100) and log(100)

```
MTB > let k1=log(100)
MTB > print k1

Data Display

K1    4.60517

MTB > let k2=logt(100)
MTB > print k2

Data Display

K2    2.00000
```

- **Statistics**

Examples (mean)

Column	Calculator expression	Result
C1 contains 6, 3, 15	MEAN (C1)	8
C1 contains 6, C2 contains 3, and C3 contains 15	RMEAN (C1, C2, C3)	8

2- Standardize…

Example of Standardize

1. Open the Standardize dialog box.

   DATA - - > Standardize

2. In **Standardize, enter column(s) need to be standardized.**
3. From **Method**, select **Subtract the mean, then divide by the standard deviation**.
4. Click **OK**.

Results

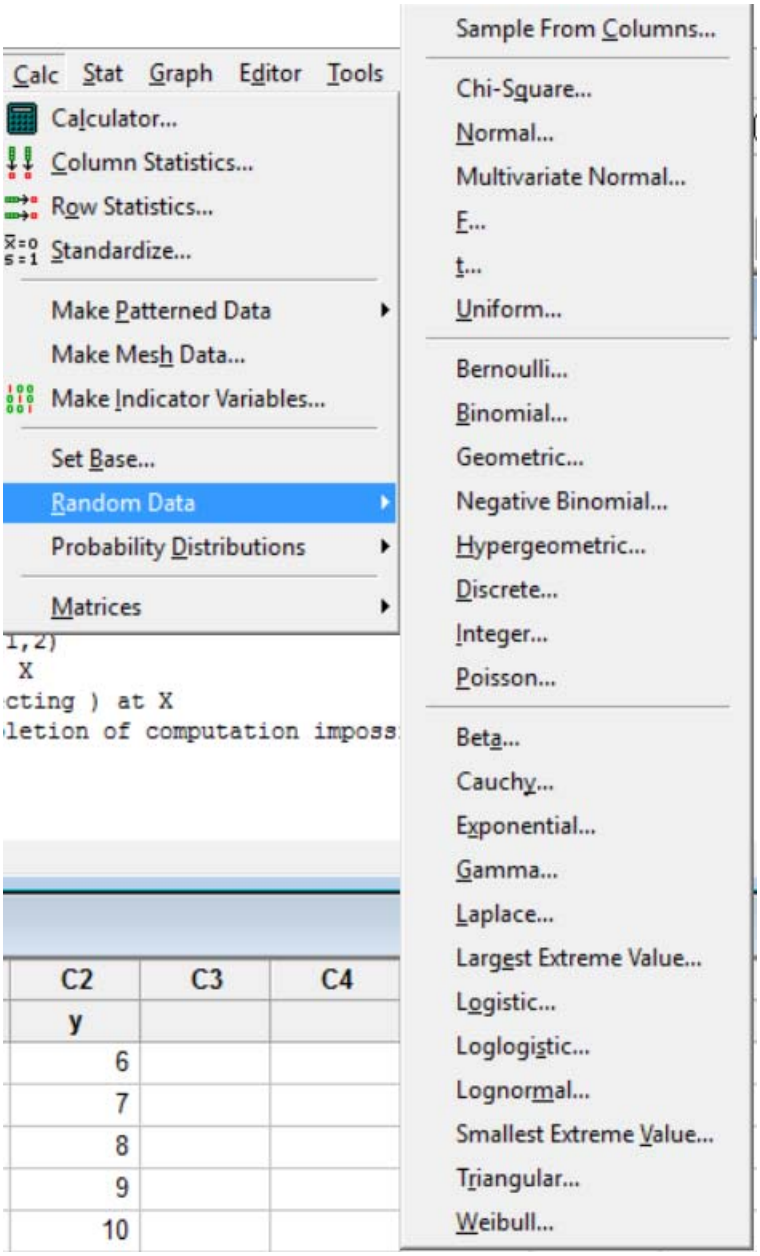
The standardized columns are in the worksheet together with the given data

example

C1	C3	C4	C5
x	y	Standardize x	Standardize y
9.5	70.6	-0.99293	0.95796
8.4	73.3	-1.18466	2.07910
9.8	66.2	-0.94064	-0.86674
11.0	70.1	-0.73147	0.73166

3- Random Data

Generating random samples from both discrete and continuous distribution can be done through the use of the following list of distributions


Calc
Stat
Graph
Editor
Tools
Calculator...
Column Statistics...
Row Statistics...
Standardize...
Make Patterned Data
Make Mesh Data...
Make Indicator Variables...
Set Base...
Random Data
Probability Distributions
Matrices
Sample From Columns...
Chi-Square...
Normal...
Multivariate Normal...
F...
t...
Uniform...
Bernoulli...
Binomial...
Geometric...
Negative Binomial...
Hypergeometric...
Discrete...
Integer...
Poisson...
Beta...
Cauchy...
Exponential...
Gamma...
Laplace...
Largest Extreme Value...
Logistic...
Loglogistic...
Lognormal...
Smallest Extreme Value...
Triangular...
Weibull...
C2
C3
C4
y
6
7
8
9
10