Statistical Inference For One and Two Samples:-

t.test ():

Performs one-sample, two-sample, or paired t-test, or a Welch modified two -sample t-test.

Syntax

t-test (x, y=NULL, alternative=" two.sided", mu=0, paired=F, var.equal=T, conf.level=.95)

Example of Usage of t.test():

t.test(x)	**two-sided one-sample t-test**. **The null hypothesis** is that the population mean for 'x' is zero. **The alternative hypothesis** states that it is either greater or less than zero . A confidence interval for the population mean will be computed.
t.test (data.after, date.before, alternative="less", paired=T)	**one-sided paired t-test**. **The null hypothesis** is that the population mean "before" and the one "after" are the same, or equivalently that the mean change ("after" minus "before") is zero. **The alternative hypothesis** is that the mean "after" is less than the one "before", or equivalently that the mean change is negative. A confidence interval for the mean change will be computed.
t.test(x, y, mu=2)	**Two-sided standard two-sample t-test**. **The null hypothesis** is that the population mean for 'x' less that for 'y' is 2. **The alternative hypothesis** is that this difference is not 2. A confidence interval for the true difference will be computed.
t.test(x, y, var.equal=F, conf.level=0.90)	**Two-sided Welch modified two-sample t-test**. **The null hypothesis** is that the population means for 'x' and 'y' are the same. **The alternative** hypothesis is that they are not. The confidence interval for the difference in true means ('x' minus 'y') will have a confidence level of 0.90

Output of t.test():
You get the desired piece of output by t.test() $ option

Option	Description
statistic	Calculated t-statistic
parameters	The degrees of freedom of the t-distribution associated with statistic.
p.value	The p-value for the test.
conf.int	A confidence interval (vector of length 2) for the true mean or difference in means.
estimate	Vector of length 1 or 2, giving the sample mean(s) or mean of differences; these estimate the corresponding population parameters.
null.value	The value of the mean or difference in means specified by the null hypothesis. This equals the input argument mu
alternative	Records the value of the input argument alternative: “greater”, “less” or “ two.sided”.
method	Character string giving the name of the test used.
data.name	A character string (vector of length 1) containing the actual names of the input vectores x and y.

Examples:
Speed light
850 740 900 1070 930 850 980 880 1000 980 930 650 760 810 1000 1000 960 960

Diets (h protein, low protein)
High protein: 134, 146, 104, 119, 124, 161, 107, 83, 113, 129, 97, 123
Low protein: 70, 118, 101, 85, 107, 132, 94

Dependent sample example:
WearA: 14,8.8, 11.2,14.2, 11.8, 6.4, 9.8, 11.3, 9.3, 13.6
WearB: 13.2, 8.2,10.9, 14.3, 10.7, 6.6,9.5,10.8,8.8,13.3

Homogeneity Test:

Var . test (x, y, alternative=”two.sided”, conf.level=.95)
Performs an F test to compare variances of two samples from normal populations.

Syntax:

☐ **var.test (x, y, conf . level= .9)**

The null hypothesis is that ‘x’ and ‘y’ come from populations with the same variance. These populations are assumed to be normal**. The alternative hypothesis** is that the population variances are not equal. The confidence interval for the ratio of the population variances will have a confidence level of 0.90.

☐ var.test(x, y, alternative=”greater”)

The null hypothesis is as above. **The alternative hypothesis** is that the population variance for ‘x’ is greater than that for ‘y’.