Lab no. 1 (INDEPENDENT T TEST)

The operating time of two different brands of mobile is given below:

color	4.6	5.4	3.9	6.0	5.6	7.2	5.6	5.8	6.2
vivo	5.1	6.8	4.9	7.2	7	6.5	5.2	4.8	4

Is there any significant difference between operating time of two brands of mobile?

Hypothesis:

Null hypothesis H0: $\mu 1=\mu 2$ i.e., there is no significant difference between operating time of different brands of mobile.

Alternative hypothesis H1: $\mu 1 \neq \mu 2$ i.e., there is significant difference between operating time of different brands of mobile.

Level of significance:

Alpha= 5%

Test statistics:

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	*Variable 2*
Mean	5.588889	5.722222
Variance	0.881111	1.341944
Observations	9	9
Pooled Variance	1.111528	
Hypothesized Mean Difference	0	
df	16	
t Stat	-0.26828	
P(T<=t) one-tail	0.395957	
t Critical one-tail	1.745884	
P(T<=t) two-tail	0.791914	
t Critical two-tail	2.119905	

Decision:

Tcal<Ttab so, we accept H0

Hence, we conclude that there is no significant difference between operating time of different brands of mobile.

Lab no 2

The reaction time of two different brands of drug of two group of patient is given below:

Drug A	10	14	8	16	13	
Drug B	11	9	12	17	14	16

At alpha = 5%, test whether two brands of drugs are equally efficient.

Hypothesis:

Null hypothesis H0:$\mu 1=\mu 2$ i.e. both brands are equally efficient.

Alternative hypothesis H1:$\mu 1\neq\mu 2$ i.e. both brands aren't equally efficient.

Alpha= 5%

Test statistics:

t-Test: Two-Sample Assuming Equal Variances

	Variable 1	*Variable 2*
Mean	12.2	13.16667
Variance	10.2	9.366667
Observations	5	6
Pooled Variance	9.737037	
Hypothesized Mean Difference	0	
df	9	
t Stat	-0.5116	
P(T<=t) one-tail	0.310624	
t Critical one-tail	1.833113	
P(T<=t) two-tail	0.621248	
t Critical two-tail	2.262157	

Decision

Since Tcal<Ttab so we accept H0

Hence, we conclude that both brands of drugs are equally efficient.

Lab no. 3 (paired t test)

The marks obtained by 8 students in two attempts is given below:

student	1	2	3	4	5	6	7	8
First attempt	50	25	44	45	30	38	55	60
Second attempt	52	23	46	50	27	41	56	66

At 5% level of significance can you conclude that there is no significance difference between score of students in two attempts.

Hypothesis:

Null hypothesis H0: $\mu 1=\mu 2$ i.e. there is no significant difference between score of students in two attempt.

Alternative hypothesis H1: $\mu 1\neq\mu 2$ i.e. there is significant difference between score of students in two attempt.

Level of significance, alpha = 5%

Test statistics:

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	43.375	45.125
Variance	143.4107143	208.6964
Observations	8	8
Pearson Correlation	0.989776148	
Hypothesized Mean Difference	0	
df	7	
t Stat	1.593970119	
P(T<=t) one-tail	0.077485852	
t Critical one-tail	1.894578605	
P(T<=t) two-tail	0.154971704	
t Critical two-tail	2.364624252	

Decision

Here, Tcal<Ttab, so we accept H0

Hence, we conclude that there is no significant difference between score of students in two attempts.

Lab no. 4

The performance score of employees before and after training is given below:

Employee	A	B	C	D	E	F
Before	6	7	6	11	16	12
After	9	8	4	15	21	13

At alpha= 5%, test whether the training is effective or not.

Hypothesis:

Null hypothesis H0: μ1=μ2 i.e. the training isn't effective.

Alternative hypothesis H1: μ2>μ1 i.e. the training is effective.

Level of Significance: Alpha = 5%

Test statistics:

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	9.666666667	11.66667
Variance	16.26666667	35.86667
Observations	6	6
Pearson Correlation	0.946690609	
Hypothesized Mean Difference	0	
df	5	
t Stat	-1.936491673	
P(T<=t) one-tail	0.055283345	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.110566691	
t Critical two-tail	2.570581836	

Decision

Here, Tcal<Ttab, so we accept H0 i.e. We conclude that the training isn't effective.