Lab no. 3 (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:µ1=µ2 i.e. there is no significant difference between operating time of different brands of mobile.

Alternative hypothesis H1:µ1≠µ2 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 4

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Group A | 10 | 14 | 8 | 16 | 13 |  |
| Group B | 11 | 9 | 12 | 17 | 14 | 16 |

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

Hypothesis:

Null hypothesis H0:µ1=µ2 i.e. both brands are equally efficient.

Alternative hypothesis H1:µ1≠µ2 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. 5 (paired t test)

1. 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: µ1=µ2 i.e. there is no significant difference between score of students in two attempt.

Alternative hypothesis H1: µ1≠µ2 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 attempt.

Lab no. 6

1. The performance score of employee 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.

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.