2. hospital wants to determine whether there is any difference in the average Turn Around Time (TAT) of reports of the laboratories on their preferred list. They collected a random sample and recorded TAT for reports of 4 laboratories. TAT is defined as sample collected to report dispatch.

Analyze the data and determine whether there is any difference in average TAT among the different laboratories at 5% significance level.

Ans:

Steps for Hypothesis testing

1. Define Null and Alternate hypothesis testing :

Null/H0 -> All means of laboratories are equal (Laboratory\_1,\_2,\_3,\_4)

H0: Mean1 = Mean2 = Mean3 = Mean4

H1: Atleast 1 mean is different

1. Identify the test statics to be used for testing validity of Null hypothesis (Z-test or T-test)

Descriptive statics

|  | **Laboratory\_1** | **Laboratory\_2** | **Laboratory\_3** | **Laboratory\_4** |
| --- | --- | --- | --- | --- |
| **N** | 120 | 120 | 120 | 120 |
| **Mean** | 178.361583 | 178.902917 | 199.91325 | 163.68275 |
| **Standard Deviation** | 13.173594 | 14.957114 | 16.539033 | 15.08508 |

1

| **Grand Mean** | 180.215125 |
| --- | --- |

Is there significant difference in means or it is just by chance ?

1. Significant value(Alpha) to be considered as 0.05
2. Calculate P-value where null hypothesis is true

import scipy

from scipy import stats

stats.f\_oneway(LabTAT\_df.Laboratory\_1, LabTAT\_df.Laboratory\_2, LabTAT\_df.Laboratory\_3, LabTAT\_df.Laboratory\_4)

==>F\_onewayResult(statistic=118.70421654401437, pvalue=2.1156708949992414e-57)

1. Take the decision to reject or accept Null Hypothesis based on P-value and alpha (significant level)

The larger the F value (118.7), the more likely it is that the variation associated with the independent variable is real and not due to chance

[p-value](https://www.scribbr.com/statistics/p-value/) (2.11e-57) of the F-statistic. This shows how likely it is that the F-value calculated from the test would have occurred if the null hypothesis of no difference among group means were true.

Here p-value is very less. So, Accept H0