```
#Hypothesis testing:
#import
import numpy as np
from scipy import stats


data1=np.array([28,21,26,29,23])
data2=np.array([21,27,25,28,19])
print(data1.mean())
print(data2.mean())
```

```
     25.4
     24.0
```

```
#peform t-test assuming unequal variances
t_stat,p_value=stats.ttest_ind(data1,data2,equal_var=False)


#print the results
print("T-statistic:",t_stat)
print("P-Value:",p_value)
```

```
     T-statistic: 0.6104290082757257
     P-Value: 0.5588425874104368
```

```
alpha=0.05


if p_value<alpha:
  print("Reject the null hypothesis. The means are significant")
else:
  print("Fail to reject the null hypothesis. The means are not significant")
```

```
     Fail to reject the null hypothesis. The means are not significant
```

```
import pandas as pd
df=pd.read_csv("/content/Vaccine.csv")
df
```

	Vaccine	Efficiency	Rec_Rate
0	A	12.025883	9.605293
1	B	12.122548	10.028289
2	C	11.785866	9.907720
3	C	11.921134	10.266012
4	B	11.924151	10.067632

```
group_A=df["Efficiency"]
group_B=df["Rec_Rate"]
t_stat,p_value=stats.ttest_ind(group_A,group_B)
print("t-val:",t_stat)
print("p-val:",p_value)
```

```
t-val: 43.144276880141796
p-val: 8.95811181993363e-46
```

```
alpha=0.05
if p_value>alpha:
  print("H0-related")
else:
  print("H1-not related")
```

```
H1-not related
```

ANOVA(One-Way ANOVA)

```
dfA=df[df['Vaccine']=='A']['Efficiency']
dfB=df[df["Vaccine"]=='B']['Efficiency']
f_stat,p_value=stats.f_oneway(dfA,dfB)
print("F-statistic:",f_stat)
print("P-value:",p_value)
```

```
F-statistic: 1.0757234023273485
P-value: 0.3133894618484353
```

```
alpha=0.05
if p_value>alpha:
  print("H0-related")
else:
  print("H1-not related")
```

```
H0-related
```

```
from scipy import interpolate
#Interpolation
x_data=np.array([0,1,2,3,4])
y_data=np.array([0,2,1,3,5])
interp_func=interpolate.interp1d(x_data,y_data,kind="linear")
interp_result=interp_func(2.5)#value should be given in range of 0 and 4
print("Interpolation result:",interp_result)
```

```
Interpolation result: 2.0
```