In [5]:
```
# t test for independent data samples
from numpy.random import seed
from numpy.random import randn
from numpy import mean
from numpy import std
seed(1)         # seed as a  random number generator
data_1 = 5 * randn(100) + 50
data_2 = 5 * randn(100) + 51
print('data1: mean=%.3f stdv=%.3f' % (mean(data_1), std(data_1)))
print('data2: mean=%.3f stdv=%.3f' % (mean(data_2), std(data_2)))
```

```
data1: mean=50.303 stdv=4.426
data2: mean=51.764 stdv=4.660
```

In [6]:
```
          # Student's t-test for dependent data smples
from numpy.random import seed
from numpy.random import randn
from scipy.stats import ttest_ind
seed(1)
stat, p = ttest_ind(data_1, data_2)
print('Statistics=%.3f, p=%.3f' % (stat, p))
alpha = 0.05
if p > alpha:
    print('Same distributions (fail to reject H0)')
else:
    print('Different distributions (reject H0)')
```

```
Statistics=-2.262, p=0.025
Different distributions (reject H0)
```

In [7]:
```
           # Paired Student's t-test
from numpy.random import seed
from numpy.random import randn
from scipy.stats import ttest_rel
seed(1)
stat, p = ttest_rel(data_1, data_2)
print('Statistics=%.3f, p=%.3f' % (stat, p))
alpha = 0.05
if p > alpha:
    print('Same distributions (fail to reject H0)')
else:
    print('Different distributions (reject H0)')
```

```
Statistics=-2.372, p=0.020
Different distributions (reject H0)
```

In [8]:
```
        # Analysis of Variance test
from numpy.random import seed
from numpy.random import randn
from scipy.stats import f_oneway
seed(1)
data_1 = 5 * randn(100) + 50
data_2 = 5 * randn(100) + 50
data_3 = 5 * randn(100) + 52
stat, p = f_oneway(data_1, data_2, data_3)
print('Statistics=%.3f, p=%.3f' % (stat, p))
alpha = 0.05
if p > alpha:
    print('Same distributions (fail to reject H0)')
else:
    print('Different distributions (reject H0)')
```

```
Statistics=3.655, p=0.027
Different distributions (reject H0)
```