Importing Libraries

In [6]:
```
from scipy.stats import t

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [ ]:
```

```

In [2]:
```
1-t.cdf((70-65)/(4/np.sqrt(2)),df=1)
```

Out[2]:
```
0.16386782490892456
```

In [3]:
```
1-t.cdf((70-65)/(4/np.sqrt(10)),df=9)
```

Out[3]:
```
0.0016701342010111364
```

In [ ]:
```

```

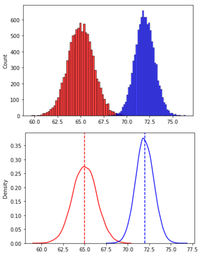
Simulations

In [7]:
```
def simulate_two_gaussians(n_samples, n_simulations=1000, mu1=0, mu2=1, s1=1, s2=1):
    samples_1 = [np.random.normal(loc=mu1, scale=s1, size=n_samples) for i in range(n_simulations )]
    means_1 = np.mean(samples_1, axis=1)

    samples_2 = [np.random.normal(loc=mu2, scale=s2, size=n_samples) for i in range(n_simulations)]
    means_2 = np.mean(samples_2, axis=1)


    sns.histplot(means_1, bins=50, color="red")
    sns.histplot(means_2, bins=50, color="blue")
    plt.show()
    sns.kdeplot(means_1, color="red")
    sns.kdeplot(means_2, color="blue")
    plt.axvline(means_1.mean(), color="red",linestyle="--")
    plt.axvline(means_2.mean(), color="blue",linestyle="--")
```

In [39]:
```
n_samples = 8
n_simulations = 10000
mu1 = 65
mu2 = 72
s1 = 4
s2 = 3
simulate_two_gaussians(n_samples=n_samples, n_simulations=n_simulations, mu1=mu1, mu2=mu2, s1=s1, s2=s2)
```



In [ ]:
```

```

Standardisation and Normalisation

In [16]:
```
df=pd.read_csv("weight-height.csv")
df
```

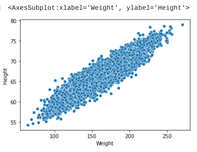
Out[16]:

	Gender	Height	Weight
0	Male	73.847017	241.893563
1	Male	68.781904	162.310473
2	Male	74.110105	212.740856
3	Male	71.730978	220.042470
4	Male	69.881796	206.349801
...	...	...	...
9995	Female	66.172652	136.777454
9996	Female	67.067155	170.867906
9997	Female	63.867992	128.475319
9998	Female	69.034243	163.852461
9999	Female	61.944246	113.649103

10000 rows × 3 columns

In [19]:
```
sns.scatterplot(x=df["Weight"],y=df["Height"])
```

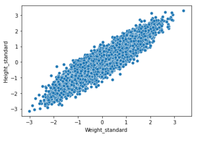
Out[19]:
```
<AxesSubplot:xlabel='Weight', ylabel='Height'>
```



In [20]:
```
df["Weight_standard"]= (df["Weight"]-df["Weight"].mean())/df["Weight"].std()
df["Height_standard"]= (df["Height"]-df["Height"].mean())/df["Height"].std()
```

In [21]:
```
sns.scatterplot(x=df["Weight_standard"],y=df["Height_standard"])
```

Out[21]:
```
<AxesSubplot:xlabel='Weight_standard', ylabel='Height_standard'>
```



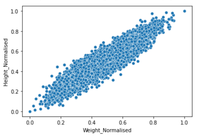
In [ ]:
```

```

In [22]:
```
df["Weight_Normalised"]= (df["Weight"]-df["Weight"].min())/(df["Weight"].max()-df["Weight"].min())
df["Height_Normalised"]= (df["Height"]-df["Height"].min())/(df["Height"].max()-df["Height"].min())
```

In [23]:
```
sns.scatterplot(x=df["Weight_Normalised"],y=df["Height_Normalised"])
```

Out[23]:
```
<AxesSubplot:xlabel='Weight_Normalised', ylabel='Height_Normalised'>
```



In [24]:
```
from sklearn.preprocessing import StandardScaler,MinMaxScaler
```

In [27]:
```
df1=pd.read_csv("weight-height.csv")
df1
```

Out[27]:

	Gender	Height	Weight
0	Male	73.847017	241.893563
1	Male	68.781904	162.310473
2	Male	74.110105	212.740856
3	Male	71.730978	220.042470
4	Male	69.881796	206.349801
...	...	...	...
9995	Female	66.172652	136.777454
9996	Female	67.067155	170.867906
9997	Female	63.867992	128.475319
9998	Female	69.034243	163.852461
9999	Female	61.944246	113.649103

10000 rows × 3 columns

In [28]:
```
df1.columns
```

Out[28]:
```
Index(['Gender', 'Height', 'Weight'], dtype='object')
```

In [30]:
```
df1.drop(columns=["Gender"],inplace=True)
```

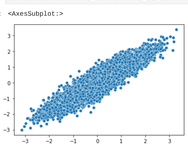
In [31]:
```
df1_m=StandardScaler().fit_transform(df1)
```

In [32]:
```
df1_m
```

Out[32]:
```
array([[ 1.94406149,  2.50579697],
       [ 0.62753668,  0.02710064],
       [ 2.01244346,  1.59780623],
       ...,
       [-0.64968792, -1.02672965],
       [ 0.69312469,  0.07512745],
       [-1.14970831, -1.48850724]])
```

In [34]:
```
sns.scatterplot(x=df1_m[:,0],y=df1_m[:,1])
```

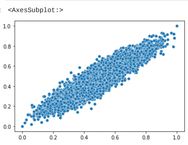
Out[34]:
```
<AxesSubplot:>
```



In [35]:
```
df2_m=MinMaxScaler().fit_transform(df1)
```

In [36]:
```
sns.scatterplot(x=df2_m[:,0],y=df2_m[:,1])
```

Out[36]:
```
<AxesSubplot:>
```



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