

# EXPERIMENT NO : 5

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ROLL NO : 45

**AIM : To solve the problems for continuous random variables using Normal and Uniform Probability Distributions.**

In [95]:

```
import numpy as np
from scipy.stats import norm, uniform
```

## 1.Normal Distribution

In [96]:

```
mu = 0
```

In [97]:

```
sigma = 1
```

In [98]:

```
x = 0
```

In [99]:

```
pdf_value = norm.pdf(x, mu, sigma)
```

In [100]:

```
print("Probability density function at", x, ":", pdf_value)
```

Probability density function at 0 : 0.3989422804014327

In [101]:

```
cdf_value = norm.cdf(x, mu, sigma)
```

In [102]:

```
print("Cumulative distribution function at", x, ":", cdf_value)
```

Cumulative distribution function at 0 : 0.5

In [103]:

```
mean_value = norm.mean(mu, sigma)
print("Mean of the normal distribution:", mean_value)
```

Mean of the normal distribution: 0.0

In [104]:

```
variance_value = norm.var(mu, sigma)
```

In [105]:

```
print("Variance of the normal distribution:", variance_value)
```

Variance of the normal distribution: 1.0

In [106]:

```
std_deviation_value = norm.std(mu, sigma)
print("Standard deviation of the normal distribution:", std_deviation_value)
```

Standard deviation of the normal distribution: 1.0

# SELF QUESTION

In [107]:

```
## Modules to be imported -
import numpy as np
from scipy.stats import norm, uniform
mu = 2
sigma = 3
x = 0
pdf_value = norm.pdf(x, mu, sigma)
print("Probability density function at", x, ":", pdf_value)
cdf_value = norm.cdf(x, mu, sigma)
print("Cumulative distribution function at", x, ":", cdf_value)
mean_value = norm.mean(mu, sigma)
print("Mean of the normal distribution:", mean_value)
variance_value = norm.var(mu, sigma)
print("Variance of the normal distribution:", variance_value)
std_deviation_value = norm.std(mu, sigma)
print("Standard deviation of the normal distribution:", std_deviation_value)
```

Probability density function at 0 : 0.10648266850745075  
Cumulative distribution function at 0 : 0.2524925375469229  
Mean of the normal distribution: 2.0  
Variance of the normal distribution: 9.0  
Standard deviation of the normal distribution: 3.0

## 2.Uniform Distribution

In [108]:

```
a = 0
b = 1
```

In [109]:

```
x = 0.5
pdf_value = uniform.pdf(x, a, b-a)
print("Probability density function at", x, ":", pdf_value)
```

Probability density function at 0.5000000000000000 : 1.0

In [110]:

```
cdf_value = uniform.cdf(x, a, b-a)
print("Cumulative distribution function at", x, ":", cdf_value)
```

Cumulative distribution function at 0.5000000000000000 : 0.5

In [111]:

```
p = 0.7
quantile_value = uniform.ppf(p, a, b-a)
print("Quantile function at", p, ":", quantile_value)
```

Quantile function at 0.7000000000000000 : 0.7

In [112]:

```
mean_value = uniform.mean(a, b-a)
```

In [113]:

```
print("Mean of the uniform distribution:", mean_value)
```

Mean of the uniform distribution: 0.5

In [114]:

```
variance_value = uniform.var(a, b-a)
print("Variance of the uniform distribution:", variance_value)
```

Variance of the uniform distribution: 0.08333333333333333

In [115]:

```
std_deviation_value = uniform.std(a, b-a)
print("Standard deviation of the uniform distribution:", std_deviation_value)
```

Standard deviation of the uniform distribution: 0.28867513459481287

## SELF QUESTION

In [116]:

```
a = 0
b = 1
x = 0.4
pdf_value = uniform.pdf(x, a, b-a)
print("Probability density function at", x, ":", pdf_value)
cdf_value = uniform.cdf(x, a, b-a)
print("Cumulative distribution function at", x, ":", cdf_value)
p = 0.7
quantile_value = uniform.ppf(p, a, b-a)
print("Quantile function at", p, ":", quantile_value)
mean_value = uniform.mean(a, b-a)
print("Mean of the uniform distribution:", mean_value)
variance_value = uniform.var(a, b-a)
print("Variance of the uniform distribution:", variance_value)
std_deviation_value = uniform.std(a, b-a)
print("Standard deviation of the uniform distribution:", std_deviation_value)
```

Probability density function at 0.4000000000000000 : 1.0  
Cumulative distribution function at 0.4000000000000000 : 0.4  
Quantile function at 0.7000000000000000 : 0.7  
Mean of the uniform distribution: 0.5  
Variance of the uniform distribution: 0.08333333333333333  
Standard deviation of the uniform distribution: 0.28867513459481287

**Conclusion: The problems for continuous random variables using Normal and Uniform Probability Distributions are studied successful.**