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Normal Distribution:

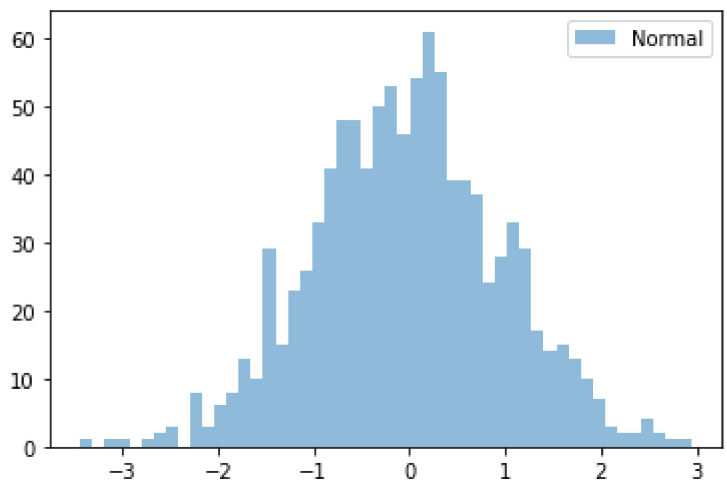
The normal distribution, also known as the Gaussian distribution, is a continuous probability distribution that is commonly used in data science. It is defined by its mean (μ) and standard deviation (σ), and has a bell-shaped curve symmetrical around the mean.

In [8]:

```
import numpy as np
import matplotlib.pyplot as plt

# Generate data for normal distribution
mean, std = 0, 1
normal_data = np.random.normal(mean, std, 1000)

# Plot the data
plt.hist(normal_data, bins=50, alpha=0.5, label='Normal')
plt.legend()
plt.show()
```



Binomial Distribution:

The binomial distribution is a discrete probability distribution that models the number of successes in a fixed number of independent Bernoulli trials. A Bernoulli trial is a binary experiment where the outcome is either a success (1) or a failure (0). The binomial distribution is defined by two parameters: 'n', the number of trials, and 'p', the probability of success in each trial.

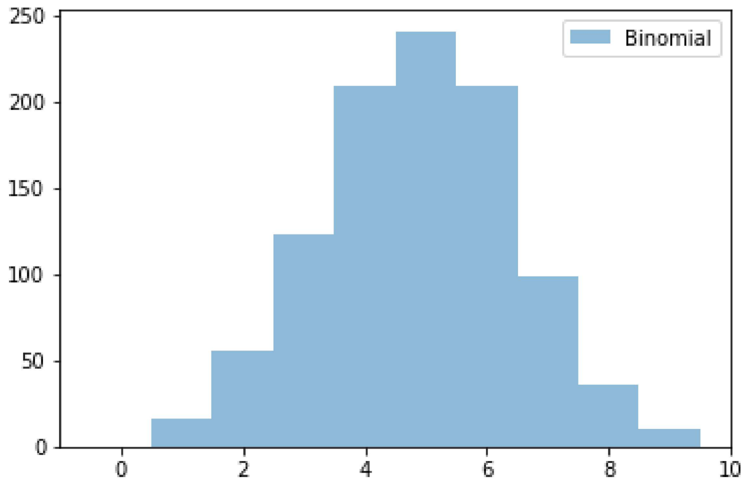
In [9]:

```
import numpy as np
import matplotlib.pyplot as plt

# Generate data for binomial distribution
```

```
n, p = 10, 0.5
binomial_data = np.random.binomial(n, p, 1000)

# Plot the data
plt.hist(binomial_data, bins=np.arange(n+1)-0.5, alpha=0.5, label='Binomial')
plt.legend()
plt.show()
```



Poisson Distribution:

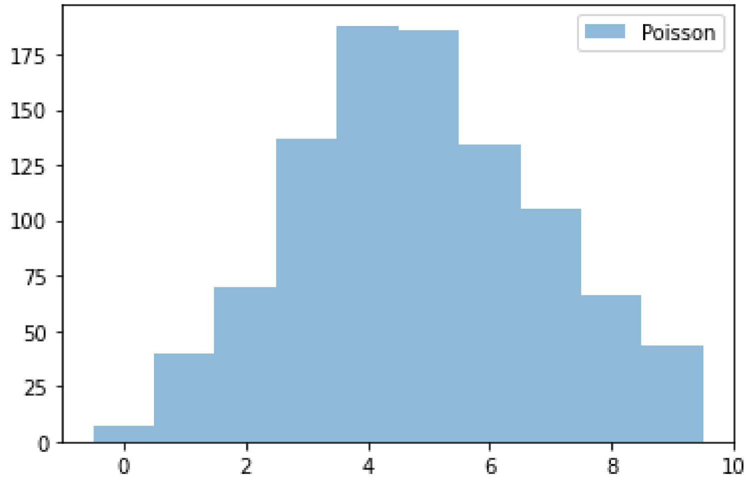
The Poisson distribution is a discrete probability distribution that models the number of events that occur in a fixed interval of time or space. The Poisson distribution is defined by a single parameter, 'lambda' , which represents the average number of events per interval.

In [10]:

```
import numpy as np
import matplotlib.pyplot as plt

# Generate data for Poisson distribution
lambda_ = 5
poisson_data = np.random.poisson(lambda_, 1000)

# Plot the data
plt.hist(poisson_data, bins=np.arange(lambda_*2+1)-0.5, alpha=0.5, label='Poisson')
plt.legend()
plt.show()
```



Difference between Normal & Binomial Distribution:

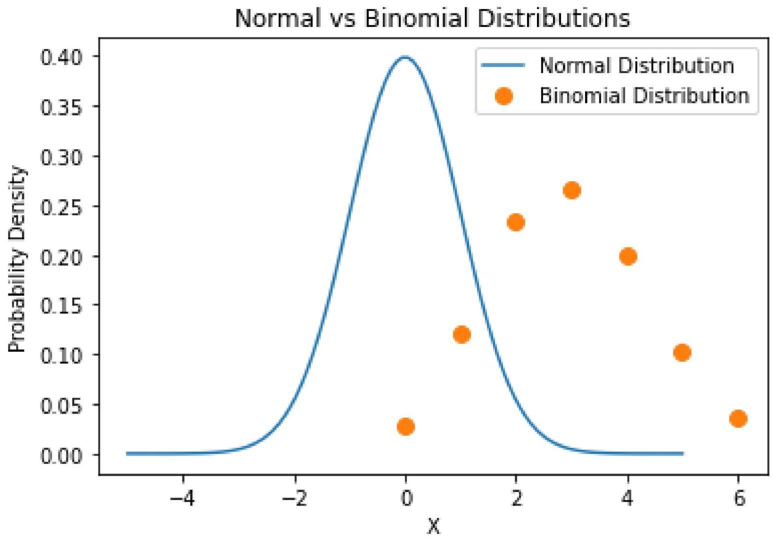
In [11]:

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm
from scipy.stats import binom

# Generate data for normal distribution
mean, std = 0, 1
x_norm = np.linspace(-5, 5, 100)
y_norm = norm.pdf(x_norm, mean, std)

# Generate data for binomial distribution
n, p = 10, 0.3
x_binom = np.arange(binom.ppf(0.01, n, p), binom.ppf(0.99, n, p))
y_binom = binom.pmf(x_binom, n, p)

# Plot normal and binomial distributions
plt.plot(x_norm, y_norm, label='Normal Distribution')
plt.plot(x_binom, y_binom, 'o', ms=8, label='Binomial Distribution')
plt.xlabel('X')
plt.ylabel('Probability Density')
plt.title('Normal vs Binomial Distributions')
plt.legend()
plt.show()
```



Here, the Blue plotting shows "Normal Distribution" & the Orange plotting shows "Binomial Distribution"

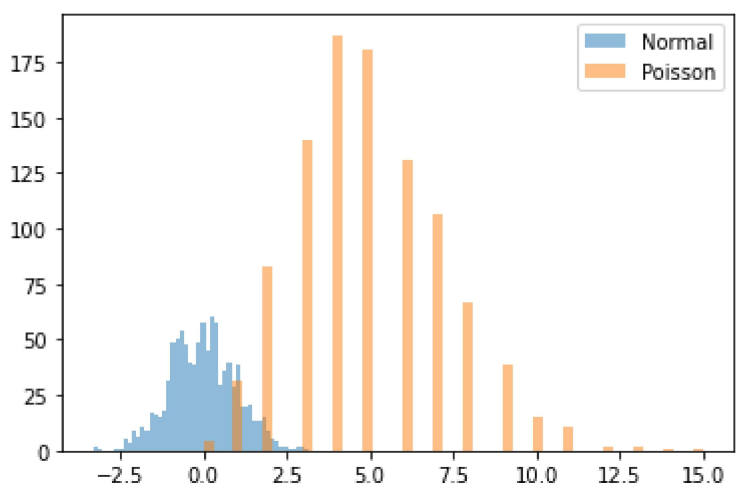
Normal vs Poisson Distribution:

In [7]:
```
import numpy as np
import matplotlib.pyplot as plt

# Generate data for normal distribution
mean, std = 0, 1
normal_data = np.random.normal(mean, std, 1000)

# Generate data for Poisson distribution
lambda_ = 5
poisson_data = np.random.poisson(lambda_, 1000)

# Plot the data
plt.hist(normal_data, bins=50, alpha=0.5, label='Normal')
plt.hist(poisson_data, bins=50, alpha=0.5, label='Poisson')
plt.legend()
plt.show()
```



Conclusion:

Normal Distribution:

Bell-shaped curve

> Symmetrical around mean ?Measures the likelihood of continuous data

Binomial Distribution:

> Models binary outcomes (success/failure) Depends on number of trials & probability of success

Poisson Distribution:

> Models count data Reflects the number of occurrences of an event over a fixed interval of time/space Characterized by the average number of occurrences.

In [ ]:

```

```