Assessment2 : Probability Distribution

1. Calculate Probabilities Using a Binomial Distribution

In [ ]:
```
Q1.1. Pavan kumar makes 65% of his free-throw attempts.
If he shoots 15 free throws, what is the probability that he makes exactly 10?
```

In [4]:
```
from scipy.stats import binom
binom.pmf(k=10,n=15,p=0.65)
```

Out[4]:
```
0.2123386834880357
```

In [ ]:
```
Q1.2.Shivam flips a fair coin 6 times. What is the probability that the coin lands on heads 3 times or fewer?
```

In [5]:
```
binom.cdf(k=3,n=6,p=0.5)-binom.cdf(k=0,n=6,p=0.5)
```

Out[5]:
```
0.640625
```

In [ ]:
```
Q1.3.It is known that 65% of individuals support a certain law.
If 10 individuals are randomly selected,
what is the probability that between 3 and 6 of them support the law?
```

In [6]:
```
binom.cdf(k=6,n=10,p=0.65)-binom.cdf(k=3,n=10,p=0.65)
```

Out[6]:
```
0.4601487031476562
```

2.Calculate Probabilities Using a Poisson Distribution

In [ ]:
```
Q2.1. A store sells 4 apples per day on average. What is the probability that they will sell 6 apples on a given day?
```

In [7]:
```
from scipy.stats import poisson
poisson.pmf(6,4)
```

Out[7]:
```
0.10419563456702102
```

In [ ]:
```
Q2.2. A certain store sells seven footballs per day on average.
What is the probability that this store sells four or less footballs in a given day?
```

In [8]:
```
poisson.cdf(4,7)-poisson.cdf(0,7)
```

Out[8]:
```
0.17207972591651693
```

In [ ]:
```
Q2.3. A certain store sells 15 cans of tuna per day on average.
What is the probability that this store sells more than 20 cans of tuna in a given day?
```

In [9]:
```
1-poisson.cdf(20,15)
```

Out[9]:
```
0.08297091003146029
```

3.Calculate Probabilities Using a Uniform Distribution

In [ ]:
```
Q3.1. Suppose a bus shows up at a bus stop every 20 minutes.
If you arrive at the bus stop, what is the probability that the bus will show up in 8 minutes or less?
```

In [10]:
```
from scipy.stats import uniform
uniform.cdf(x=8,loc=0,scale=20)-uniform.cdf(x=0,loc=0,scale=20)
```

Out[10]:
```
0.4
```

In [ ]:
```
Q3.2.The weight of a certain species of frog is uniformly distributed between 15 and 25 grams.
If you randomly select a frog, what is the probability that the frog weighs between 17 and 19 grams?
```

In [11]:
```
uniform.cdf(x=19,loc=15,scale=10)-uniform.cdf(x=17,loc=15,scale=10)
```

Out[11]:
```
0.2
```

In [ ]:
```
Q3.3.The length of an NBA game is uniformly distributed between 120 and 170 minutes.
What is the probability that a randomly selected NBA game lasts more than 150 minutes?
```

In [12]:
```
1-uniform.cdf(x=150,loc=120,scale=50)
```

Out[12]:
```
0.4
```

4.Calculate Probabilities Using a Normal Distribution

In [ ]:
```
Q4.1.A radar unit is used to measure speeds of cars on a motorway.
The speeds are normally distributed with a mean of 90 km/hr and a standard deviation of 10 km/hr.
What is the probability that a car picked at random is travelling at more than 100 km/hr?
```

In [13]:
```
from scipy.stats import norm
1-norm.cdf(100,90,10)
```

Out[13]:
```
0.15865525393145707
```

In [ ]:
```
Q4.2.For a certain type of computers,
the length of time bewteen charges of the battery is normally distributed with a mean of 50 hours
and a standard deviation of 15 hours.John owns one of these computers and wants to know the
probability that the length of time will be between 50 and 70 hours.
```

In [14]:
```
norm.cdf(70,50,15)-norm.cdf(50,50,15)
```

Out[14]:
```
0.4087887802741321
```

In [ ]:
```
Q4.3.Entry to a certain University is determined by a national test.
The scores on this test are normally distributed with a mean of 500 and a standard deviation of 100.
Tom wants to be admitted to this university and he knows that he must score better than at least 70%
of the students who took the test.Tom takes the test and scores 585. Will he be admitted to this university?
```

In [15]:
```
if 1-norm.cdf(585,500,100)<1*0.3:
 print("He will admitted to this university")
```

```
He will admitted to this university
```