

## EXPERIMENT – 10

### PROGRAM:

```
import math

print("Enter number of data
points:")
n = int(input())

print("Enter number of clusters:")
k = int(input())

print("Enter data points:")
data = []
for _ in range(n):
    data.append(float(input()))

means = [min(data) + i * (max(data)
- min(data)) / (k + 1) for i in range(1,
k + 1)]

stds = [1.0] * k
weights = [1.0/k] * k

def gaussian(x, mean, std):
    return math.exp(-0.5 * ((x -
mean) / std) ** 2) / (std *
math.sqrt(2 * math.pi))

for _ in range(10):
    responsibilities = []
    for x in data:
```

```
total = sum(weights[i] *  
gaussian(x, means[i], stds[i]) for i in  
range(k))
```

```
probs = [weights[i] *  
gaussian(x, means[i], stds[i]) / total  
for i in range(k)]
```

```
responsibilities.append(probs)
```

```
for i in range(k):
```

```
    sum_resp = sum(r[i] for r in  
responsibilities)
```

```
    means[i] = sum(data[j] *  
responsibilities[j][i] for j in range(n))  
/ sum_resp
```

```
    variance =  
sum(responsibilities[j][i] * (data[j] -  
means[i]) ** 2 for j in range(n)) /  
sum_resp
```

```
    stds[i] = math.sqrt(variance)
```

```
    weights[i] = sum_resp / n
```

```
print("Cluster means:", means)
```