

EXPERIMENT – 09

Write a Python Program to Implement Expectation & Maximization Algorithm

CODE :

```
# Simple EM Algorithm using Gaussian Mixture Model
```

```
import numpy as np
from sklearn.mixture import GaussianMixture
```

```
# Sample data
```

```
X = np.array([[1], [2], [3], [8], [9], [10]])
```

```
# Create GMM model (EM algorithm)
```

```
model = GaussianMixture(n_components=2, random_state=0)
```

```
# Train model
```

```
model.fit(X)
```

```
# Predict cluster labels
```

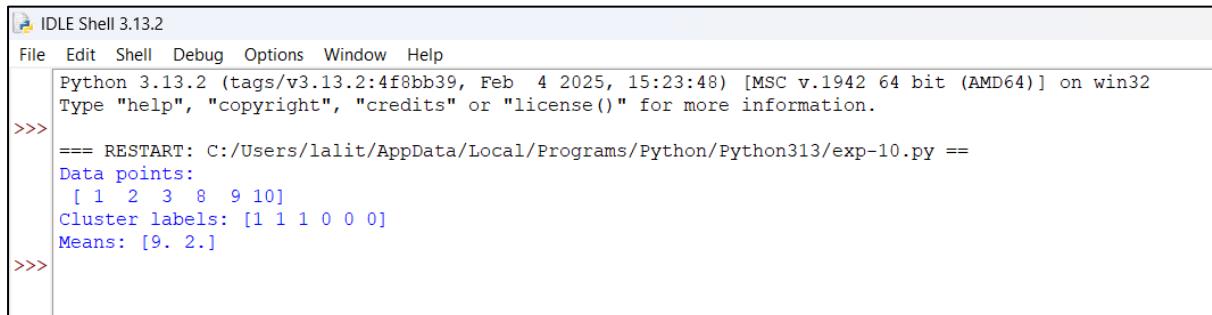
```
labels = model.predict(X)
```

```
print("Data points:\n", X.flatten())
```

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

```
print("Means:", model.means_.flatten())
```

OUTPUT :



```
IDLE Shell 3.13.2
File Edit Shell Debug Options Window Help
Python 3.13.2 (tags/v3.13.2:4f8bb39, Feb  4 2025, 15:23:48) [MSC v.1942 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

>>> === RESTART: C:/Users/lalit/AppData/Local/Programs/Python/Python313/exp-10.py ==
Data points:
[ 1  2  3  8  9 10]
Cluster labels: [1 1 1 0 0 0]
Means: [9. 2.]
```

