

FileEditSelectionViewGoRunTerminalHelp

lab 9

EXPLORErkmeans_step_by_step.py

LAB 9

kmeans_step_by_step.py

88for c, plist in clusters.items():

89 print(c, ":", plist)

90

91 print

92 for c

93

94

95 # --

96 # Sta

97 # --

98 x =

99 y =

100

101 plt.

102 plt.

103

104 # la

105 for

OUTPUT

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7 r0 obaagie

New Centroid

C1: mean of

C2: mean of

C3: mean of

PROBLEMS

Filter (e.g. text, **/*.ts, !*/node_modules...

No problems have been detected in the workspace.

> OUTLINE

> TIMELINE

Figure 1

K-Means Clustering (K=3, After 2 Iterations)

Cluster	Centroid (C)	Points (P)
C1	(2.0, 2.8)	P1, P2, P7
C2	(3.66, 8.0)	P3, P5, P9
C3	(9.0, 5.33)	P4, P6, P8

FINAL CLUSTER

C1 : ['P1', 'P2', 'P7']

C2 : ['P3', 'P5', 'P9']

C3 : ['P4', 'P6', 'P8']

FINAL CENTROIDS:

C1 : (2.0, 2.8)

C2 : (3.6666666666666665, 8.0)

C3 : (9.0, 5.333333333333333)

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6' '-- 'c:\Users\zumer\OneD

Build with Agent

AI responses may be inaccurate.

Generate Agent Instructions to onboard AI onto your codebase.

+ kmeans_step_by_step.py

Describe what to build next

Agent Auto

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```
OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  Python Debug Console + v [ ] [ ] ... | [ ] X

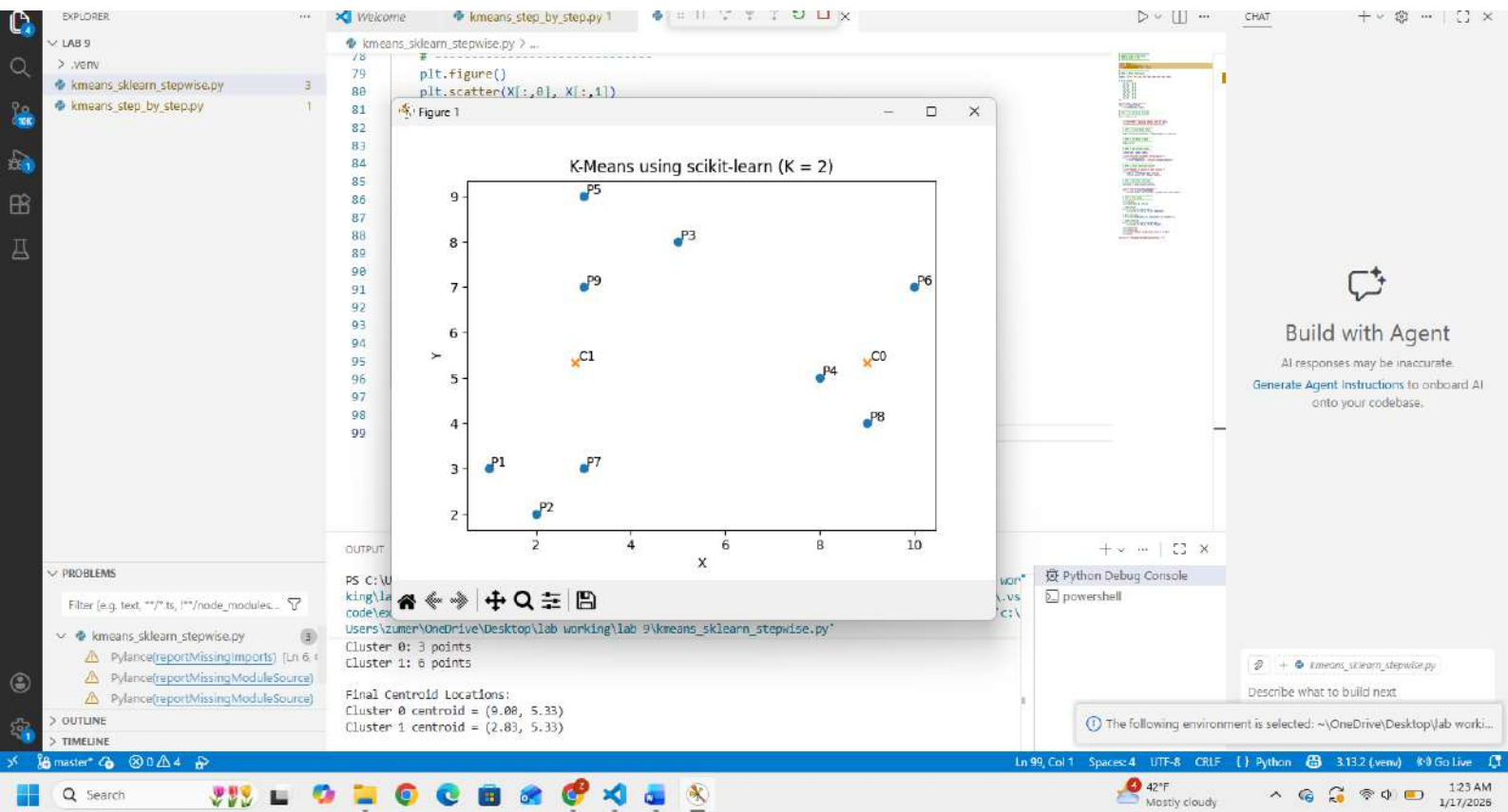
PS C:\Users\zumer\OneDrive\Desktop\lab working\lab 9> & 'c:\Users\zumer\AppData\Local\Programs\Python\Python313\python.exe' 'c:\Users\zumer\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '54506' '--' 'c:\Users\zumer\OneDrive\Desktop\lab working\lab 9\kmeans_step_by_step.py'

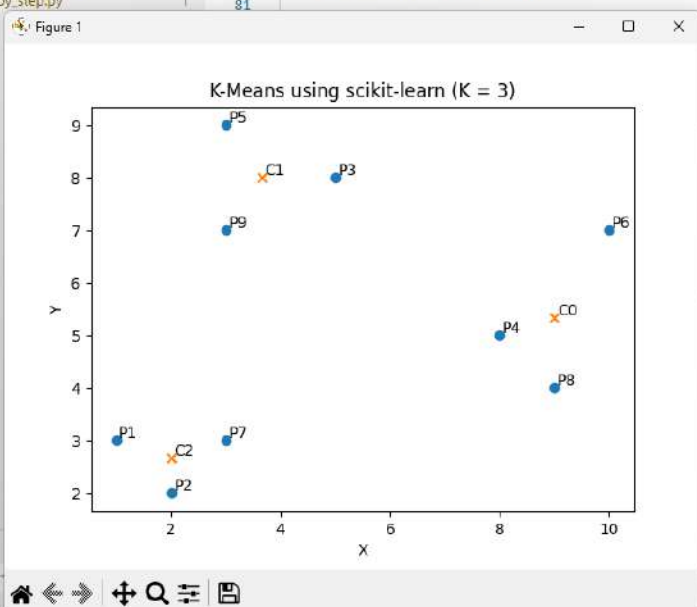
→ P4 assigned to C3
P5 distances -> C1:6.41, C2:1.20, C3:7.03
→ P5 assigned to C2
P6 distances -> C1:9.10, C2:6.41, C3:1.94
→ P6 assigned to C3
P7 distances -> C1:1.05, C2:5.04, C3:6.44
→ P7 assigned to C1
P8 distances -> C1:7.13, C2:6.67, C3:1.33
→ P8 assigned to C3
P9 distances -> C1:4.45, C2:1.20, C3:6.23
→ P9 assigned to C2

New Centroid Calculation:
C1: mean of ['P1', 'P2', 'P7'] = (2.00, 2.67)
C2: mean of ['P3', 'P5', 'P9'] = (3.67, 8.00)
C3: mean of ['P4', 'P6', 'P8'] = (9.00, 5.33)

=====
FINAL CLUSTERS AFTER 2 ITERATIONS
=====
C1 : ['P1', 'P2', 'P7']
C2 : ['P3', 'P5', 'P9']
C3 : ['P4', 'P6', 'P8']

FINAL CENTROIDS:
C1 : (2.0, 2.6666666666666665)
C2 : (3.6666666666666665, 8.0)
C3 : (9.0, 5.333333333333333)
PS C:\Users\zumer\OneDrive\Desktop\lab working\lab 9>
```



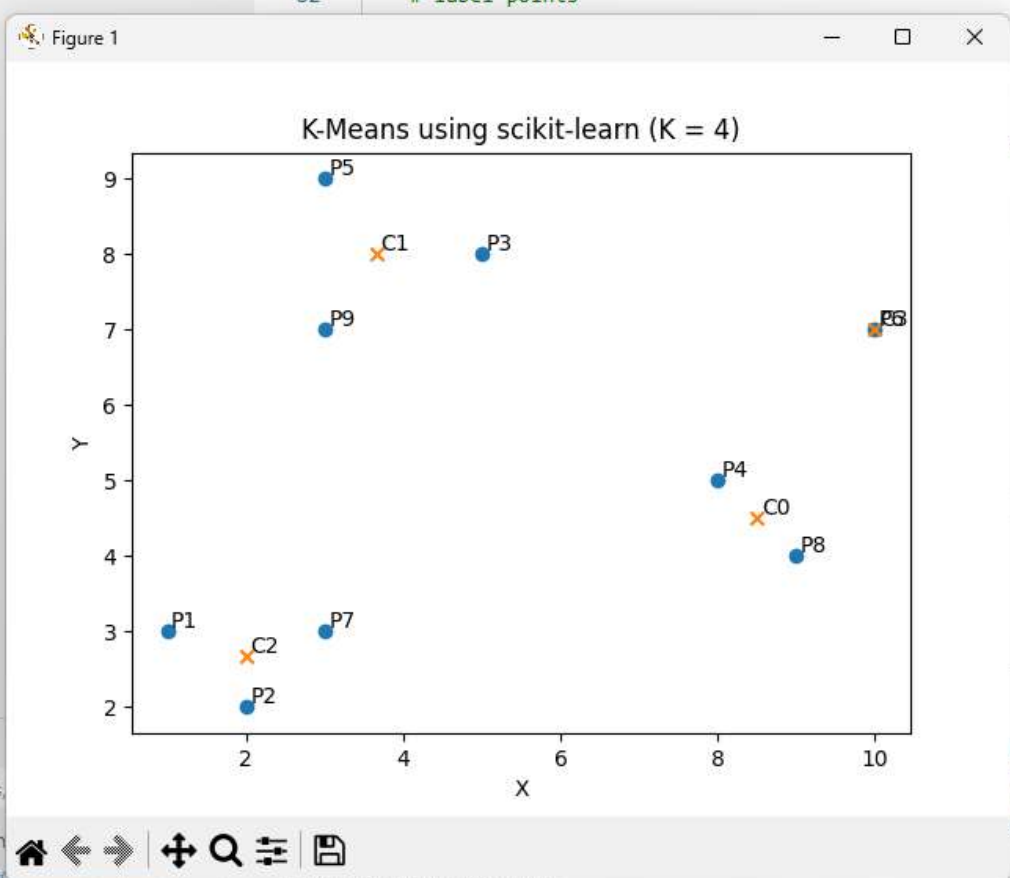


Cluster 2: 3 points

Final Centroid Locations:

Cluster 0 centroid = (9.00, 5.33)
Cluster 1 centroid = (3.67, 8.00)
Cluster 2 centroid = (2.00, 2.67)

```
step.py 1
80 plt.scatter(X[:,0], X[:,1])
81
82 # label points
```



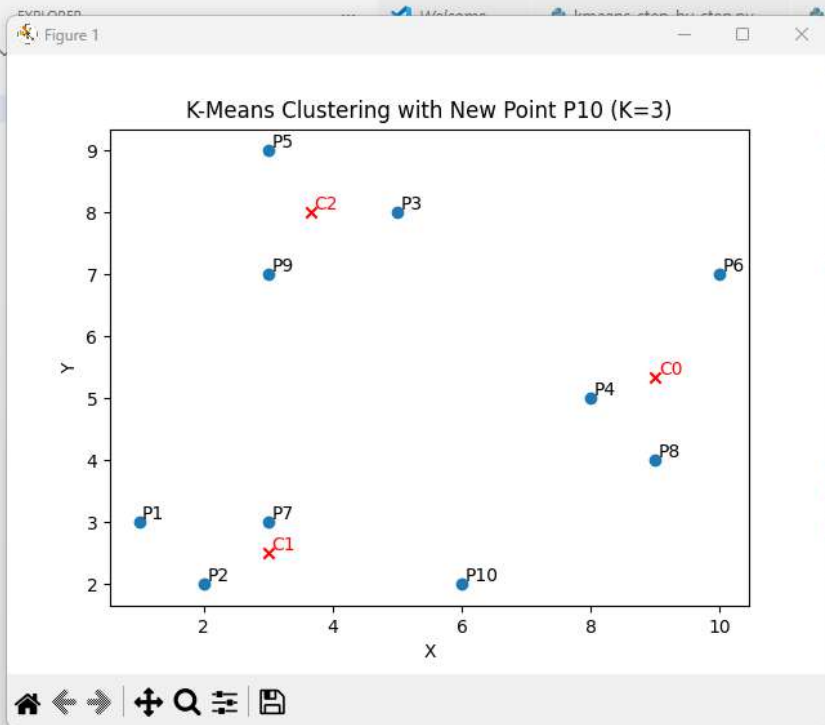
Final centroid locations:
Cluster 0 centroid = (8.50, 4.50)
Cluster 1 centroid = (3.67, 8.00)
Cluster 2 centroid = (2.00, 2.67)
Cluster 3 centroid = (10.00, 7.00)

= 'x')

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n313\python.exe' 'c:\Users\zumer\.vs
\debugpy\launcher' '52358' '--' 'c:\
wise.py'

Python D
powershe

TH



kmeans_add_point.py

```
oids_new[:,1], marker= 'x', color= 'red' )
```

```
new):  
i}", color='red')
```

```
w Point P10 (K=3)"))
```

cluster assignments slightly.
nt depending on which cluster it joins.
{}, which causes its centroid to move closer to P10.
ns similar, but centroids adjust to accommodate the new data.

OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
ktop\lab working\lab 9\.venv\Scripts\python.exe' 'c:\Users\zumer\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundle  
uncher' '51531' '--' 'c:\Users\zumer\OneDrive\Desktop\lab working\lab 9\kmeans_add_point.py'
```

```
P10 -> Cluster 1
```

```
New Centroids after adding P10:
```

```
C0: (9.00, 5.33)
```

```
C1: (3.00, 2.50)
```

```
C2: (3.67, 8.00)
```

```
P10 joins Cluster 1
```

> PROBLEMS

> OUTLINE

> TIMELINE

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OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
ktop\lab working\lab 9\.venv\Scripts\python.exe' 'c:\Users\zumer\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundle
uncher' '51531' '--' 'c:\Users\zumer\OneDrive\Desktop\lab working\lab 9\kmeans_add_point.py'
```

P3 -> Cluster 1

P4 -> Cluster 0

P5 -> Cluster 1

P6 -> Cluster 0

P7 -> Cluster 2

P8 -> Cluster 0

P9 -> Cluster 1

Centroids: [[9. 5.33333333]

[3.66666667 8.]

[2. 2.66666667]]

STEP 3: Added new point P10 [6,2]

STEP 4: New K-Means Clustering with P10

P1 -> Cluster 1

P2 -> Cluster 1

P3 -> Cluster 2

P4 -> Cluster 0

P5 -> Cluster 2

P6 -> Cluster 0

P7 -> Cluster 1

P8 -> Cluster 0

P9 -> Cluster 2

P10 -> Cluster 1

New Centroids after adding P10:

C0: (9.00, 5.33)

C1: (3.00, 2.50)

C2: (3.67, 8.00)

P10 joins Cluster 1

STEP 7: Explanation:

- Adding a new data point can change cluster assignments slightly.
- Centroids shift towards the new point depending on which cluster it joins.
- In this example, P10 joins Cluster 1, which causes its centroid to move closer to P10.
- The overall cluster structure remains similar, but centroids adjust to accommodate the new data.

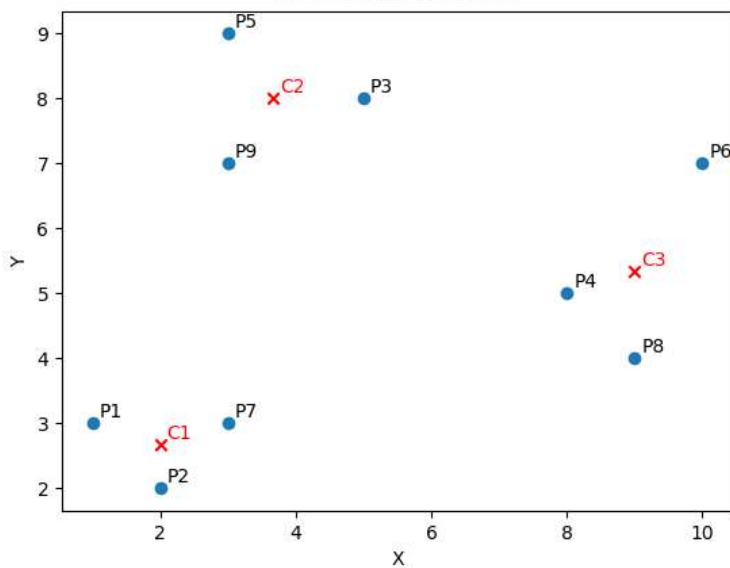
LAB 9

kmeans_first_iteration.py > ...

plt.figure()

Figure 1

K-Means First Iteration



P7	0.00	4.00	6.08	C1
P8	6.08	6.71	0.00	C3
P9	4.00	0.00	6.71	C2

New Centroids After First Iteration:

C1: (2.00, 2.67)

C2: (3.67, 8.00)

C3: (9.00, 5.33)

> PROBLEMS

> OUTLINE

> TIMELINE

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Search


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...
PS C:\Users\zumer\OneDrive\Desktop\lab working\lab 9>
PS C:\Users\zumer\OneDrive\Desktop\lab working\lab 9> ^C
PS C:\Users\zumer\OneDrive\Desktop\lab working\lab 9> c:; cd 'c:\Users\zumer\OneDrive\Desktop\lab working\lab 9'; & 'c:\Users\zumer\OneDrive\Desktop\lab working\lab 9\.venv\Scripts\python.exe' 'c:\Users\zumer\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '57657' '--' 'c:\Users\zumer\OneDrive\Desktop\lab working\lab 9\kmeans_first_iteration.py'
```

Distance Table (First Iteration):

Point	Dist to C1	Dist to C2	Dist to C3	Assigned Cluster
P1	2.00	4.47	8.06	C1
P2	1.41	5.10	7.28	C1
P3	5.39	2.24	5.66	C2
P4	5.39	5.39	1.41	C3
P5	6.00	2.00	7.81	C2
P6	8.06	7.00	3.16	C3
P7	0.00	4.00	6.08	C1
P8	6.08	6.71	0.00	C3
P9	4.00	0.00	6.71	C2

New Centroids After First Iteration:

C1: (2.00, 2.67)

C2: (3.67, 8.00)

C3: (9.00, 5.33)

```
PS C:\Users\zumer\OneDrive\Desktop\lab working\lab 9> 
```