```
import io, numpy as np, pandas as pd, matplotlib.pyplot as plt
from google.colab import files
from sklearn.cluster import KMeans
from sklearn.decomposition import PCA
from sklearn.preprocessing import LabelEncoder, StandardScaler
```

```
print("📁 Upload cust_segmentation.csv")
uploaded = files.upload()
df = pd.read_csv(io.BytesIO(uploaded[list(uploaded.keys())[0]]))
```

```
📁 Upload cust_segmentation.csv
Choose Files Cust_Segmentation.csv
Cust_Segmentation.csv(text/csv) - 34276 bytes, last modified: 11/8/2025 - 100% done
Saving Cust_Segmentation.csv to Cust_Segmentation.csv
```

```
for c in df.select_dtypes(include='object'):
    df[c] = LabelEncoder().fit_transform(df[c].astype(str))
df = df.fillna(df.mean())       # ✅ fills NaN
X = StandardScaler().fit_transform(df.select_dtypes(include=[np.number]))
```

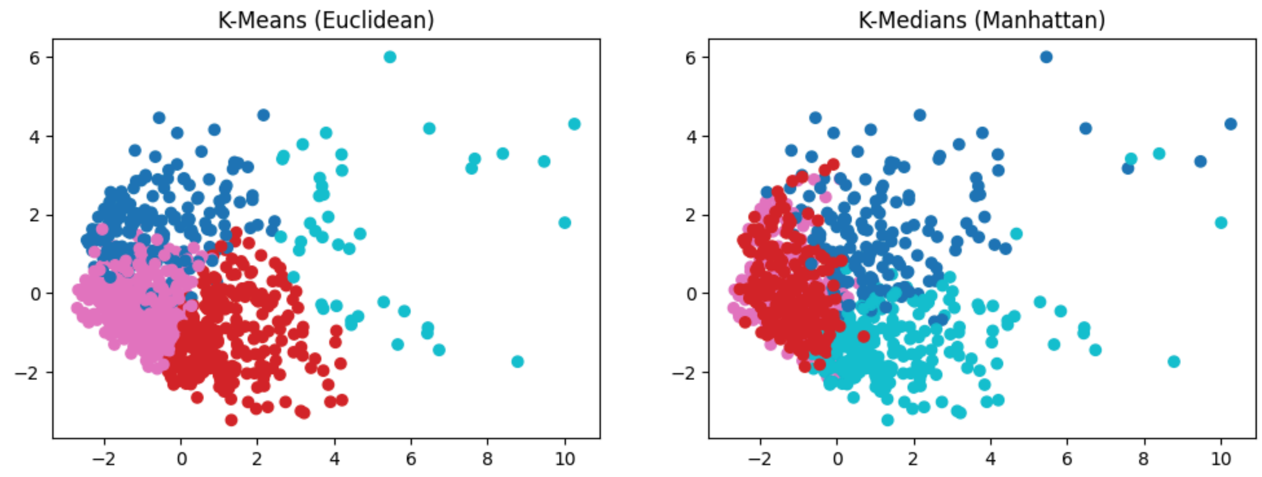
```
k = 4
km = KMeans(n_clusters=k, random_state=0, n_init=10).fit(X)
print("✅ KMeans Inertia (Euclidean):", round(km.inertia_, 2))
```

```
✅ KMeans Inertia (Euclidean): 5299.65
```

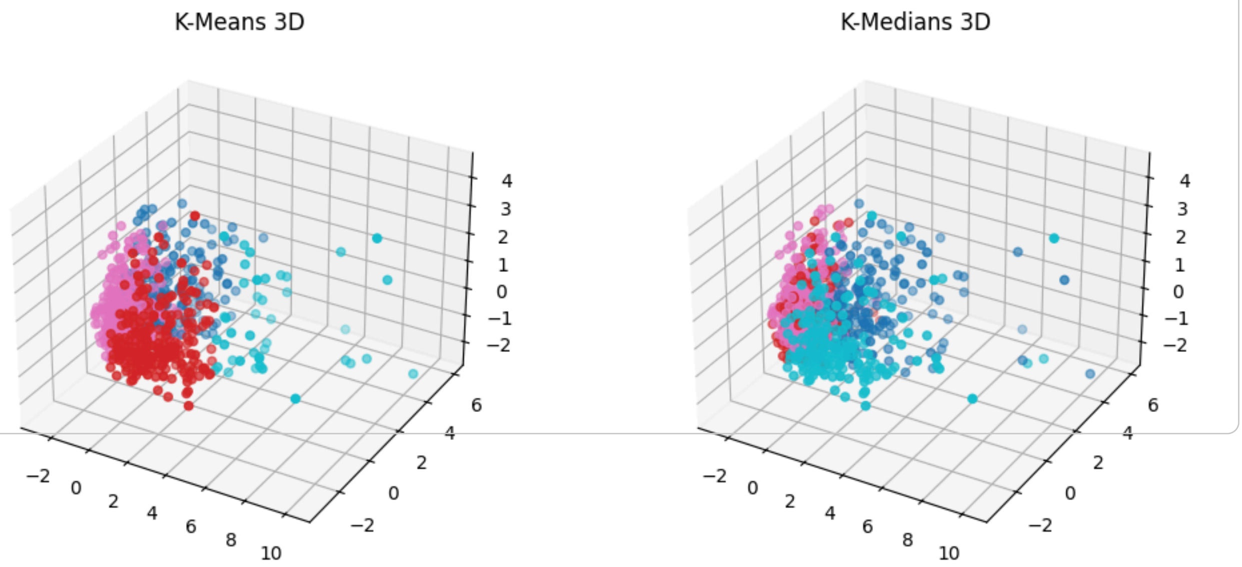
```
def k_medians(X,k,iters=100):
  cent = X[np.random.choice(len(X),k,replace=False)]
  for _ in range(iters):
    dist = np.abs(X[:,None]-cent).sum(2)
    lbl = dist.argmin(1)
    new = np.array([np.median(X[lbl==i],0) for i in range(k)])
    if np.allclose(cent,new): break
    cent=new
  return lbl,cent
lbl_m,cent_m = k_medians(X,k)
```

```
p2 = PCA(2).fit_transform(X); p3 = PCA(3).fit_transform(X)
```

```
plt.figure(figsize=(12,4))
plt.subplot(121); plt.scatter(p2[:,0],p2[:,1],c=km.labels_,cmap='tab10'); plt.title("K-Means (Euclidean)")
plt.subplot(122); plt.scatter(p2[:,0],p2[:,1],c=lbl_m,cmap='tab10'); plt.title("K-Medians (Manhattan)")
plt.show()
```



```
from mpl_toolkits.mplot3d import Axes3D
fig=plt.figure(figsize=(12,5))
ax=fig.add_subplot(121,projection='3d'); ax.scatter(p3[:,0],p3[:,1],p3[:,2],c=km.labels_,cmap='tab10'); ax.set_title("K-Mean
ax=fig.add_subplot(122,projection='3d'); ax.scatter(p3[:,0],p3[:,1],p3[:,2],c=lbl_m,cmap='tab10'); ax.set_title("K-Medians 3
plt.show()
```



K-Means 3D

K-Medians 3D