In [1]:
```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.decomposition import PCA
from sklearn.pipeline import Pipeline
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score
```

In [2]:
```
df=pd.read_csv(r"C:\Users\USER\Downloads\archive\breast-cancer.csv")
df.head()
```

Out[2]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_mean	compactness_mean	concavity_mean	pc
0	842302	M	17.99	10.38	122.80	1001.0	0.11840	0.27760	0.3001	
1	842517	M	20.57	17.77	132.90	1326.0	0.08474	0.07864	0.0869	
2	84300903	M	19.69	21.25	130.00	1203.0	0.10960	0.15990	0.1974	
3	84348301	M	11.42	20.38	77.58	386.1	0.14250	0.28390	0.2414	
4	84358402	M	20.29	14.34	135.10	1297.0	0.10030	0.13280	0.1980	

5 rows × 32 columns

In [3]:
```
# Preprocess the data
# Encode the diagnosis column (M = 1, B = 0)
df['diagnosis'] = df['diagnosis'].map({'M': 1, 'B': 0})
```

In [4]:
```
X=df.drop(columns=['diagnosis','id'])
y=df['diagnosis']
```

In [5]:
```
X   #Just confirming
```

Out[5]:

	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_mean	compactness_mean	concavity_mean	concave points_mean	symmet
0	17.99	10.38	122.80	1001.0	0.11840	0.27760	0.30010	0.14710	
1	20.57	17.77	132.90	1326.0	0.08474	0.07864	0.08690	0.07017	
2	19.69	21.25	130.00	1203.0	0.10960	0.15990	0.19740	0.12790	
3	11.42	20.38	77.58	386.1	0.14250	0.28390	0.24140	0.10520	
4	20.29	14.34	135.10	1297.0	0.10030	0.13280	0.19800	0.10430	
...	...	...	...	...	...	...	...	...	
564	21.56	22.39	142.00	1479.0	0.11100	0.11590	0.24390	0.13890	
565	20.13	28.25	131.20	1261.0	0.09780	0.10340	0.14400	0.09791	
566	16.60	28.08	108.30	858.1	0.08455	0.10230	0.09251	0.05302	
567	20.60	29.33	140.10	1265.0	0.11780	0.27700	0.35140	0.15200	
568	7.76	24.54	47.92	181.0	0.05263	0.04362	0.00000	0.00000	

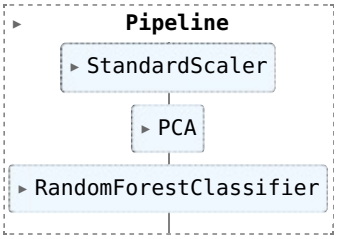
569 rows × 30 columns

In [6]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

In [7]:
```
# Create a pipeline with a scaler, PCA, and a classifier
pipeline = Pipeline([
    ('scaler', StandardScaler()),      # Step 1: Standardize the data
    ('pca', PCA(n_components=2)),      # Step 2: Apply PCA with 2 components
    ('classifier', RandomForestClassifier(random_state=42))  # Step 3: Fit a classifier (Random Forest)
])
```

In [8]:
```
# Fit the pipeline on the training data
pipeline.fit(X_train, y_train)
```

Out[8]:



In [9]:
```
# Use the pipeline to predict on the test data
y_pred = pipeline.predict(X_test)
```

In [10]:
```
# Evaluate the model
accuracy = accuracy_score(y_test, y_pred)
print(f'Accuracy: {accuracy}')
```

```
Accuracy: 0.9824561403508771
```