```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from sklearn.metrics import accuracy_score, confusion_matrix
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.tree import DecisionTreeClassifier
from sklearn.svm import SVC
import seaborn as sns
```

```
path="/content/diabetes.csv"
diabetes = pd.read_csv(path, sep=",")
diabetes.shape
```

```
(768, 9)
```

```
diabetes.head()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
0	6	148	72	35	0	33.6	0.627	50	1
1	1	85	66	29	0	26.6	0.351	31	0
2	8	183	64	0	0	23.3	0.672	32	1
3	1	89	66	23	94	28.1	0.167	21	0
4	0	137	40	35	168	43.1	2.288	33	1

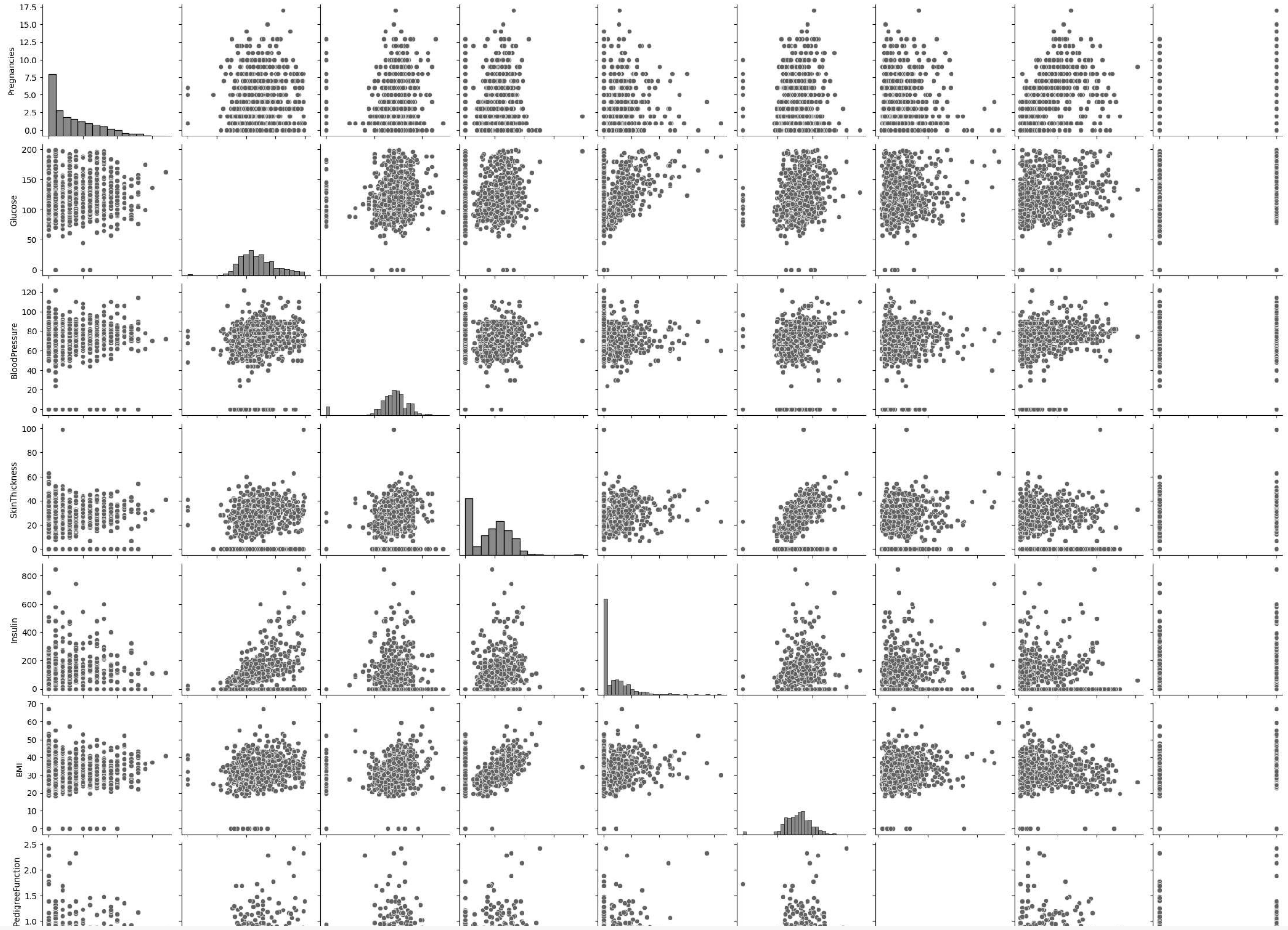
```
diabetes.describe()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age	Outcome
count	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000	768.000000
mean	3.845052	120.894531	69.105469	20.536458	79.799479	31.992578	0.471876	33.240885	0.348958
std	3.369578	31.972618	19.355807	15.952218	115.244002	7.884160	0.331329	11.760232	0.476951
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.078000	21.000000	0.000000
25%	1.000000	99.000000	62.000000	0.000000	0.000000	27.300000	0.243750	24.000000	0.000000
50%	3.000000	117.000000	72.000000	23.000000	30.500000	32.000000	0.372500	29.000000	0.000000
75%	6.000000	140.250000	80.000000	32.000000	127.250000	36.600000	0.626250	41.000000	1.000000
max	17.000000	199.000000	122.000000	99.000000	846.000000	67.100000	2.420000	81.000000	1.000000

```
diabetes.isna().sum()
```

```
Pregnancies                 0
Glucose                     0
BloodPressure               0
SkinThickness               0
Insulin                     0
BMI                         0
DiabetesPedigreeFunction    0
Age                         0
Outcome                     0
dtype: int64
```

```
sns.pairplot(diabetes)
plt.show()
```



```
diabetes.corr()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age
Pregnancies	1.000000	0.129459	0.141282	-0.081672	-0.073535	0.017683	-0.033523	0.544341
Glucose	0.129459	1.000000	0.152590	0.057328	0.331357	0.221071	0.137337	0.263514
BloodPressure	0.141282	0.152590	1.000000	0.207371	0.088933	0.281805	0.041265	0.239528
SkinThickness	-0.081672	0.057328	0.207371	1.000000	0.436783	0.392573	0.183928	-0.113970
Insulin	-0.073535	0.331357	0.088933	0.436783	1.000000	0.197859	0.185071	-0.042163
BMI	0.017683	0.221071	0.281805	0.392573	0.197859	1.000000	0.140647	0.036242
DiabetesPedigreeFunction	-0.033523	0.137337	0.041265	0.183928	0.185071	0.140647	1.000000	0.033561
Age	0.544341	0.263514	0.239528	-0.113970	-0.042163	0.036242	0.033561	1.000000
Outcome	0.221898	0.466581	0.065068	0.074752	0.130548	0.292695	0.173844	0.238356

```
feat=diabetes.columns[:-1]
feat
```

```
Index(['Pregnancies', 'Glucose', 'BloodPressure', 'SkinThickness', 'Insulin',
       'BMI', 'DiabetesPedigreeFunction', 'Age'],
      dtype='object')
```

```
y=diabetes['Outcome']
x=diabetes[feat]
x.head()
```

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	DiabetesPedigreeFunction	Age
0	6	148	72	35	0	33.6	0.627	50
1	1	85	66	29	0	26.6	0.351	31
2	8	183	64	0	0	23.3	0.672	32
3	1	89	66	23	94	28.1	0.167	21
4	0	137	40	35	168	43.1	2.288	33

```
ss=StandardScaler()
x_scaled=ss.fit_transform(x)
```

```
x_train,x_test,y_train,y_test=train_test_split(x_scaled,y,test_size=0.2,random_state=41)
x_train.shape,x_test.shape,y_train.shape,y_test.shape
```

```
((614, 8), (154, 8), (614,), (154,))
```

```
knm=KNeighborsClassifier(n_neighbors=3,algorithm='ball_tree',p=3)
knm.fit(x_train,y_train)
y_train_pred_knm=knm.predict(x_train)
y_test_pred_knm=knm.predict(x_test)
print("Train accuracy", accuracy_score(y_train,y_train_pred_knm))
print("Test accuracy", accuracy_score(y_test,y_test_pred_knm))
```

```
Train accuracy 0.8501628664495114
Test accuracy 0.7727272727272727
```

```
confusion_matrix(y_test,y_test_pred_knm)
```

```
array([[86, 13],
       [22, 33]])
```

```
nb=GaussianNB()
nb.fit(x_train,y_train)
y_train_pred_nb=nb.predict(x_train)
y_test_pred_nb=nb.predict(x_test)
print("train accuracy:",accuracy_score(y_train,y_train_pred_nb))
print("Test accuracy", accuracy_score(y_test,y_test_pred_nb))
```

```
train accuracy: 0.755700325732899
Test accuracy 0.7467532467532467
```

```
dt=DecisionTreeClassifier(max_depth=5,class_weight={0:0.5,1:1})
dt.fit(x_train,y_train)
y_train_pred_dt=dt.predict(x_train)
y_test_pred_dt= dt.predict(x_test)
print("train accuracy:",accuracy_score(y_train,y_train_pred_dt))
print("Test accuracy", accuracy_score(y_test,y_test_pred_dt))
```

```
train accuracy: 0.8306188925081434
Test accuracy 0.7792207792207793
```

```
svm=SVC(kernel='rbf',C=5)
svm.fit(x_train,y_train)
y_train_pred_svm=svm.predict(x_train)
y_test_pred_svm= svm.predict(x_test)
print("train accuracy:",accuracy_score(y_train,y_train_pred_svm))
print("Test accuracy", accuracy_score(y_test,y_test_pred_svm))
```

```
train accuracy: 0.8664495114006515
Test accuracy 0.7922077922077922
```