In [1]:

```
import numpy as np
import pandas as pd
import math
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
df = pd.read_csv('diabetes.csv')
df.head()
```

Out[2]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	Pedigree	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

In [3]:

```
df.drop(['Pregnancies', 'BloodPressure', 'SkinThickness'], axis=1, inplace=True)
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 768 entries, 0 to 767
Data columns (total 6 columns):
 #   Column     Non-Null Count  Dtype  
---  ------     --------------  -----  
 0   Glucose    768 non-null    int64  
 1   Insulin    768 non-null    int64  
 2   BMI        768 non-null    float64
 3   Pedigree   768 non-null    float64
 4   Age        768 non-null    int64  
 5   Outcome    768 non-null    int64  
dtypes: float64(2), int64(4)
memory usage: 36.1 KB
```

In [4]:

```
df.describe().T
```

Out[4]:

	count	mean	std	min	25%	50%	75%	max
Glucose	768.0	120.894531	31.972618	0.000	99.00000	117.0000	140.25000	199.00
Insulin	768.0	79.799479	115.244002	0.000	0.00000	30.5000	127.25000	846.00
BMI	768.0	31.992578	7.884160	0.000	27.30000	32.0000	36.60000	67.10
Pedigree	768.0	0.471876	0.331329	0.078	0.24375	0.3725	0.62625	2.42
Age	768.0	33.240885	11.760232	21.000	24.00000	29.0000	41.00000	81.00
Outcome	768.0	0.348958	0.476951	0.000	0.00000	0.0000	1.00000	1.00

In [5]:

```
#aiming to impute nan values for the columns in accordance
#with their distribution
df[['Glucose','Insulin','BMI']].replace(0,np.NaN)
```

Out[5]:

	Glucose	Insulin	BMI
0	148.0	NaN	33.6
1	85.0	NaN	26.6
2	183.0	NaN	23.3
3	89.0	94.0	28.1
4	137.0	168.0	43.1
...	...	...	...
763	101.0	180.0	32.9
764	122.0	NaN	36.8
765	121.0	112.0	26.2
766	126.0	NaN	30.1
767	93.0	NaN	30.4

768 rows × 3 columns

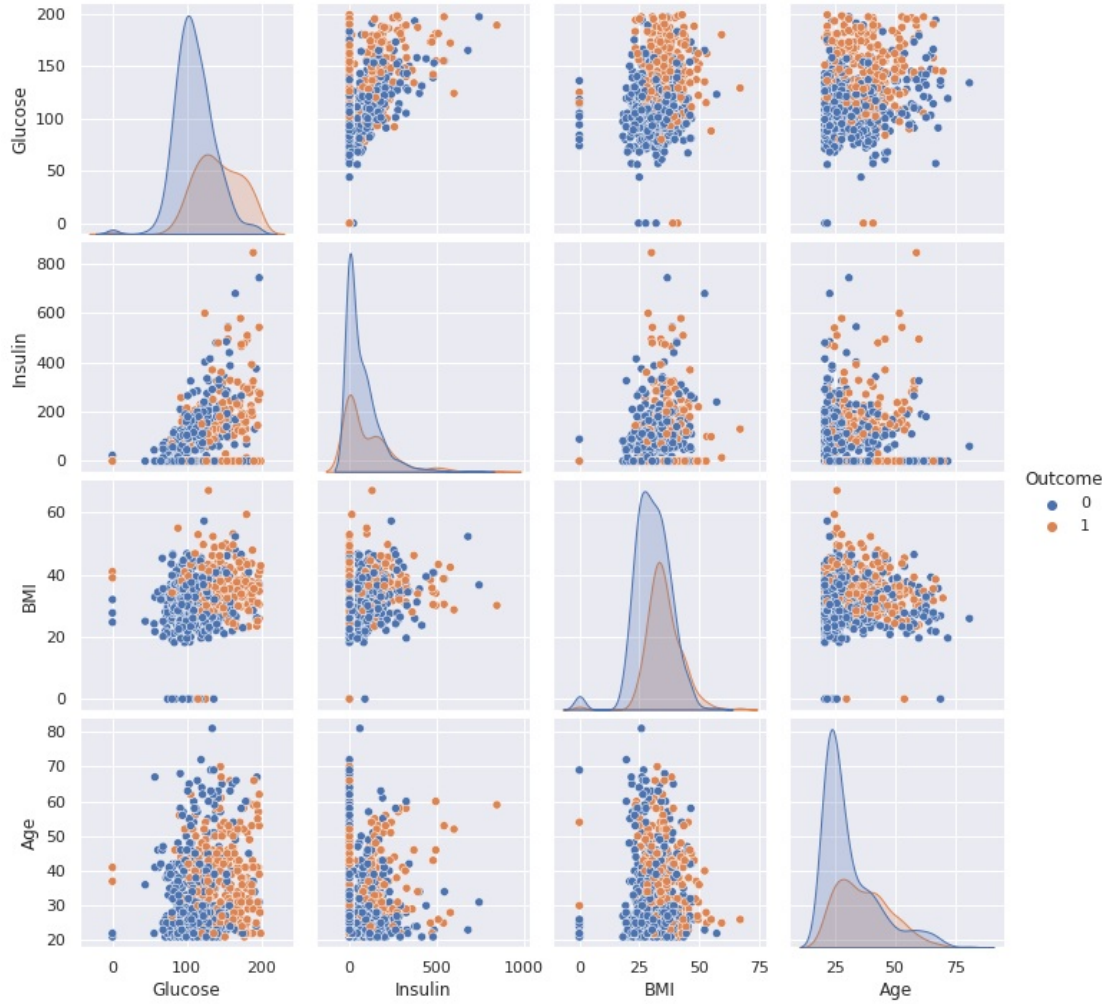
In [6]:

```
columns = ['Glucose','Insulin','BMI']
for col in columns:
    val = df[col].mean()
    df[col].replace(0, val)
```

In [7]:

```
#plot graph
graph = ['Glucose','Insulin','BMI','Age','Outcome']
sns.set()
print(sns.pairplot(df[graph],hue='Outcome', diag_kind='kde'))
```

```
<seaborn.axisgrid.PairGrid object at 0x7ff895ce6390>
```



In [8]:

```
#separate outcome or target col
X = df.drop(['Outcome'], axis=1)
y = df['Outcome']
```

In [9]:

```
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy score
```

In [10]:

```
X train,X test,y train,y test = train test split(X,y,test size=0.2,random state=0)
```

In [11]:

```
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import confusion_matrix
from sklearn.metrics import f1_score
from sklearn.metrics import accuracy score
```

In [12]:

```
# feature scaling

scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X test = scaler.transform(X test)
```

In [13]:

```
classifier = KNeighborsClassifier(n_neighbors=11,p=2,metric='euclidean')

classifier.fit(X_train,y_train)
```

```
y_pred = classifier.predict(X_test)
```

In [16]:

```
# evaluating model

conf_matrix = confusion_matrix(y_test,y_pred)
print(conf_matrix)
```

```
[[93 14]
 [18 29]]
```

In [17]:

```
print(f1 score(y test,y pred))
```

```
0.6444444444444444
```

In [15]:

```
# accuracy
print(accuracy score(y test,y pred))
```

```
0.7922077922077922
```

In [18]:

```
# roc curve
from sklearn.metrics import roc_curve
plt.figure(dpi=100)
fpr, tpr, thresholds = roc_curve(y_test, y_pred)
from sklearn.metrics import roc_auc_score

temp=roc_auc_score(y_test,y_pred)

plt.plot(fpr,tpr,label = "%.2f" %temp)
plt.legend(loc = 'lower right')
plt.grid(True)
```