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Assignment No: 5

Title Name: Implement K-Nearest Neighbors algorithm

Name: Aniket Rajani

Class : BE **Div**: 1 **Batch**: A

Roll No: 405A008

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In [1]:

```
import numpy as np
import pandas as pd
import math
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.neighbors import KNeighborsClassifier
from sklearn import metrics
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import KFold
%matplotlib inline


location = 'diabetes.csv'
f = pd.read_csv(location)
data = pd.DataFrame(f)
data.head()
```

Out[1]:

	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 [2]:

```
cols_clean  =  ['Glucose','BloodPressure','SkinThickness','Insulin','BMI','Pedigree']

# with this function , i dealt with missing values and NaN values
for i in cols_clean:
    data[i] = data[i].replace(0,np.NaN)
    cols_mean = int(data[i].mean(skipna=True))
    data[i] = data[i].replace(np.NaN, cols_mean)
data1 = data
data1.head().style.highlight_max(color="lightblue").highlight_min(color="red")
```

Out[2]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	Pedigree	Age	O
0	6	148.000000	72.000000	35.000000	155.000000	33.600000	0.627000	50	
1	1	85.000000	66.000000	29.000000	155.000000	26.600000	0.351000	31	
2	8	183.000000	64.000000	29.000000	155.000000	23.300000	0.672000	32	
3	1	89.000000	66.000000	23.000000	94.000000	28.100000	0.167000	21	

4	0	137.000000	40.000000	35.000000	168.000000	43.100000	2.288000	33

In [3]:

```
print(data1.describe())
```

```
       Pregnancies     Glucose  BloodPressure  SkinThickness     Insulin  \
count   768.000000  768.000000     768.000000     768.000000  768.00000
mean      3.845052  121.682292      72.386719      29.108073  155.28125
std       3.369578   30.435999      12.096642       8.791221   85.02155
min       0.000000   44.000000      24.000000       7.000000   14.00000
25%       1.000000   99.750000      64.000000      25.000000  121.50000
50%       3.000000  117.000000      72.000000      29.000000  155.00000
```

```
75%       6.000000  140.250000      80.000000      32.000000  155.00000
max      17.000000  199.000000     122.000000      99.000000  846.00000

              BMI    Pedigree         Age     Outcome
count  768.000000  768.000000  768.000000  768.000000
mean    32.450911    0.471876   33.240885    0.348958
std      6.875366    0.331329   11.760232    0.476951
min     18.200000    0.078000   21.000000    0.000000
25%     27.500000    0.243750   24.000000    0.000000
50%     32.000000    0.372500   29.000000    0.000000
75%     36.600000    0.626250   41.000000    1.000000
max     67.100000    2.420000   81.000000    1.000000
```

In [4]:

```
# for the purpose of simplicity and analysing the most relevent  data , we will sele
# Glucose , Insulin and BMI
q_cols = ['Glucose','Insulin','BMI','Outcome']

# defining variables and features for the dataset for splitting
df = data1[q_cols]
print(df.head(2))
```

```
   Glucose  Insulin   BMI  Outcome
0    148.0    155.0  33.6        1
1     85.0    155.0  26.6        0
```

In [5]:

```
# let's split the data into training and testing datasets
split = 0.75 # 75% train and 25% test dataset
total_len = len(df)
split_df = int(total_len*split)
train, test = df.iloc[:split_df,0:4],df.iloc[split_df:,0:4]
train_x = train[['Glucose','Insulin','BMI']]
train_y = train['Outcome']
test_x = test[['Glucose','Insulin','BMI']]
test_y = test['Outcome']
```

In [6]:

```
a = len(train_x)
b = len(test_x)
print(' Training data =',a,'\n','Testing data =',b,'\n','Total data length = ',a+b)
```

```
Training data = 576
Testing data = 192
Total data length =  768
```

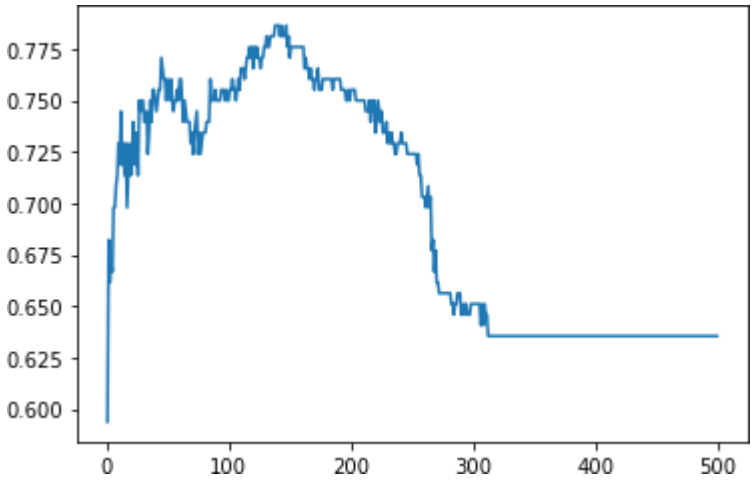
In [7]:

```
def knn(x_train, y_train, x_test, y_test,n):
    n_range = range(1, n)
    results = []
    for n in n_range:
        knn = KNeighborsClassifier(n_neighbors=n)
        knn.fit(x_train, y_train)
        #Predict the response for test dataset
        predict_y = knn.predict(x_test)
        accuracy = metrics.accuracy_score(y_test, predict_y)
        #matrix = confusion_matrix(y_test,predict_y)
        #seaborn_matrix = sns.heatmap(matrix, annot = True, cmap="Blues",cbar=True)
        results.append(accuracy)
    return results
```

In [8]:

```
n= 500
output = knn(train_x,train_y,test_x,test_y,n)
n_range = range(1, n)
plt.plot(n_range, output)
```

Out[8]: [<matplotlib.lines.Line2D at 0x1f812813580>]



In [ ]: