In [2]:
```
import numpy as np
import pandas as pd
import seaborn as sns
from matplotlib import pyplot as plt
```

In [3]:
```
pima_data=pd.read_csv("D:\my_career\data_science\pima-indians-diabetes-database\diabetes.csv")
```

In [4]:
```
pima_data.head()
```

Out[4]:

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

In [5]:
```
pima_data.describe()
```

Out[5]:

	Pregnancies	Glucose	BloodPressure	SkinThickness	Insulin	BMI	Diabetes
count	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	
std	3.369578	31.972618	19.355807	15.952218	115.244002	7.884160	
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	1.000000	99.000000	62.000000	0.000000	0.000000	27.300000	
50%	3.000000	117.000000	72.000000	23.000000	30.500000	32.000000	
75%	6.000000	140.250000	80.000000	32.000000	127.250000	36.600000	
max	17.000000	199.000000	122.000000	99.000000	846.000000	67.100000	

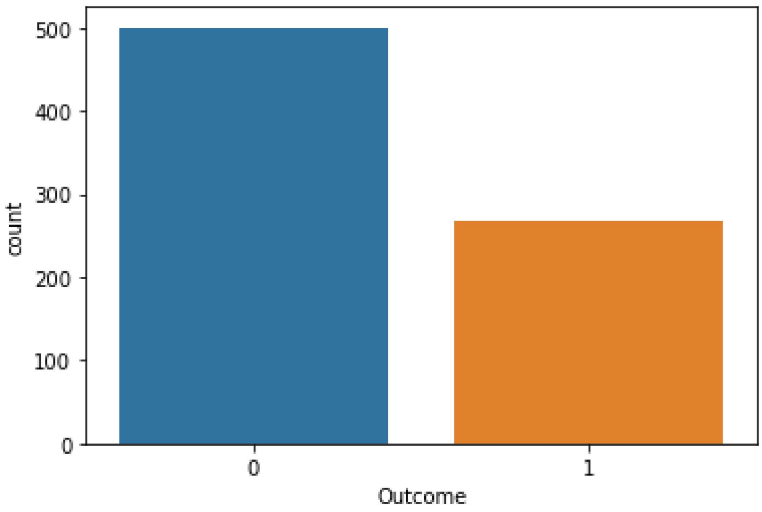
In [6]:
```
df=pima_data
```

In [7]:
```
df.isnull().sum()
```

Out[7]:
```
Pregnancies                 0
Glucose                     0
BloodPressure               0
SkinThickness               0
Insulin                     0
BMI                         0
DiabetesPedigreeFunction    0
Age                         0
Outcome                     0
dtype: int64
```

In [8]:
```
sns.countplot(x="Outcome",data=df)
```

Out[8]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2a1d2f76608>
```



In [9]:
```
x=df.iloc[:,:-1]
```

In [10]:
```
y=df.iloc[:,-1]
```

In [11]:
```
x=np.c_[np.ones((x.shape[0], 1)), x]
```

In [12]:
```
y = y[:, np.newaxis]
```

In [13]:
```
def sigmoid(x, w):
    z= np.dot(x, w)
    #print(z)
    return 1/(1+np.exp(-z))
```

In [47]:
```
def cost_function(w,x, y):
    m = x.shape[0]
    dw=np.zeros((x.shape[1], 1))
    #h = sigmoid(x,w)

    for i in range(m):
        h = sigmoid(x,w)
        j=-(1/m)*np.sum(y*np.log(h) + (1-y)*np.log(1-h))
        dw+=(1/m) * np.dot(x.T, (h-y))
        w=w - (0.0001 * (dw))

    return w,j
```

In [54]:
```
def gradient(w, x, y):
    c=[]
    for i in range(1000):
        w,j=cost_function(w,x,y)
        if i<100:
            c.append(j)
    #print(h)
    return w,c
```

In [55]:
```
theta = np.zeros((x.shape[1], 1))
theta.shape
```

Out[55]: (9, 1)

In [56]:
```
a,c=gradient(theta,x,y)
```

In [57]:
```
a
```

Out[57]:
```
array([[-8.40469637e+00],
       [ 1.23182299e-01],
       [ 3.51637197e-02],
       [-1.32955408e-02],
       [ 6.18975165e-04],
       [-1.19169951e-03],
       [ 8.97009297e-02],
       [ 9.45179740e-01],
       [ 1.48690062e-02]])
```

In [ ]:

In [24]:
```
b=sigmoid(x,a)
```

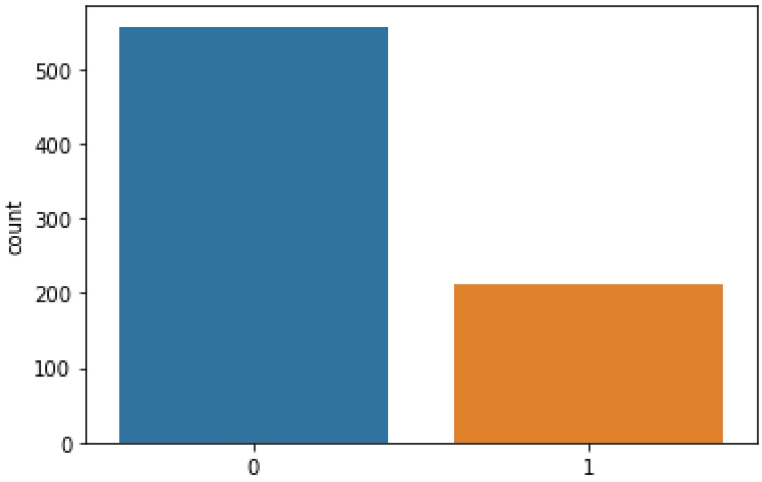
In [25]:
```
z=[]
```

In [26]:
```
for i in b:
    if i>=0.5:
        z.append(1)

    else:
        z.append(0)
```

In [27]:
```
sns.countplot(z)
```

Out[27]: <matplotlib.axes._subplots.AxesSubplot at 0x2a1d3307fc8>



In [28]:
```
z.count(1)
```

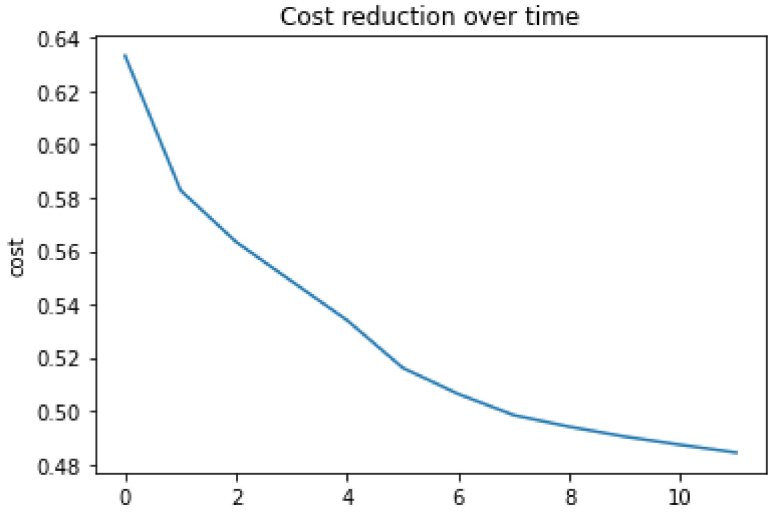
Out[28]: 211

In [29]:
```
accuracy = 0
for i in range(0, len(z)):
    if z[i] == y[i]:
        accuracy += 1
accuracy/len(y)
```

Out[29]: 0.7825520833333334

In [66]:
```
plt.plot(c[:12])
plt.ylabel('cost')

plt.title('Cost reduction over time')
plt.show()
```



In [ ]:
```

```