In [8]:
```
# importing libraries
import numpy as nm
import matplotlib.pyplot as mtp
import pandas as pd

#importing datasets
data_set= pd.read_csv('hierarchical data.csv')

#Extracting Independent and dependent Variable
x= data_set.iloc[:, [2,3]].values
y= data_set.iloc[:, 4].values

# Splitting the dataset into training and test set.
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test= train_test_split(x, y, test_size= 0.25, random_state=0

#feature Scaling
from sklearn.preprocessing import StandardScaler
st_x= StandardScaler()
x_train= st_x.fit_transform(x_train)
x_test= st_x.transform(x_test)
```

In [9]:
```
#Fitting K-NN classifier to the training set
from sklearn.neighbors import KNeighborsClassifier
classifier= KNeighborsClassifier(n_neighbors=5, metric='minkowski', p=2 )
classifier.fit(x_train, y_train)
```

Out[9]:
```
▼ KNeighborsClassifier

KNeighborsClassifier()
```

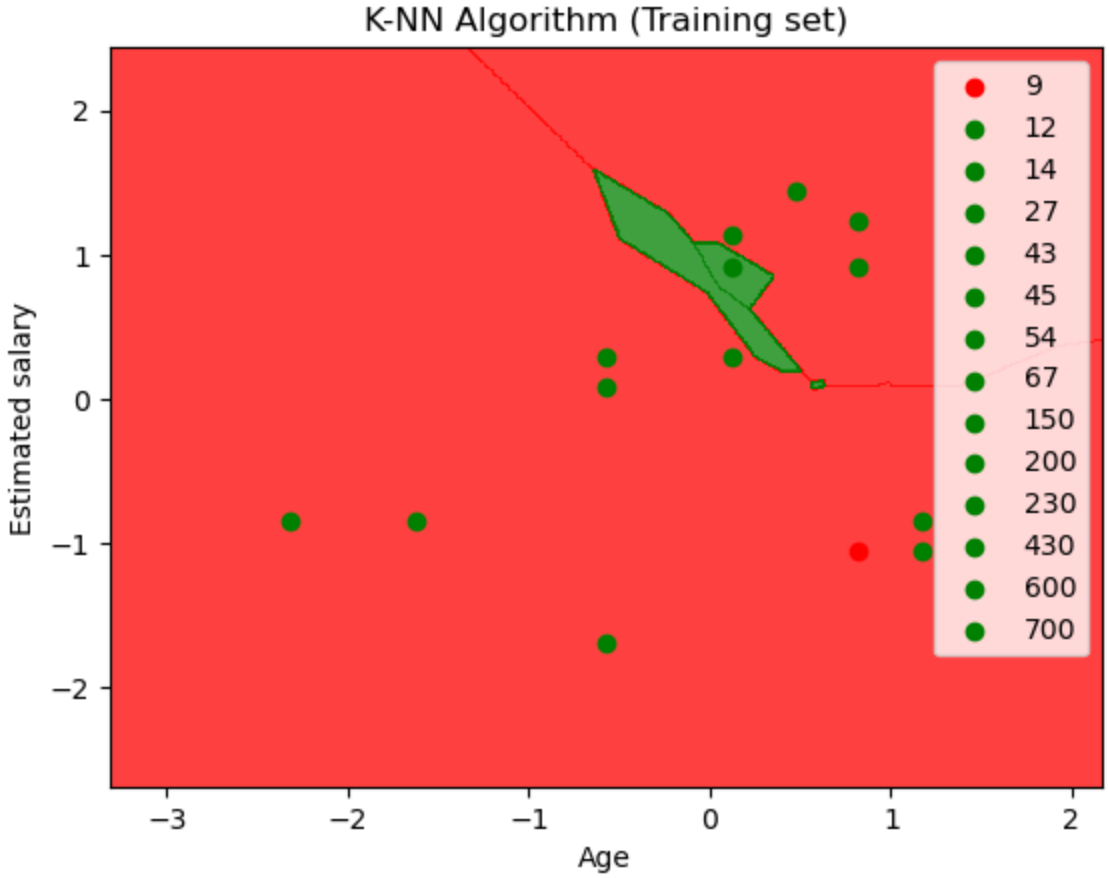
In [10]:
```
#Predicting the test set result
y_pred= classifier.predict(x_test)
```

In [11]:
```
#Creating the Confusion matrix
from sklearn.metrics import confusion_matrix
cm= confusion_matrix(y_test, y_pred)
```

In [12]:
```
#Visulaizing the trianing set result
from matplotlib.colors import ListedColormap
x_set, y_set = x_train, y_train
x1, x2 = nm.meshgrid(nm.arange(start = x_set[:, 0].min() - 1, stop = x_set[:, 0].max() +
nm.arange(start = x_set[:, 1].min() - 1, stop = x_set[:, 1].max() + 1, step = 0.01))
mtp.contourf(x1, x2, classifier.predict(nm.array([x1.ravel(), x2.ravel()]).T).reshape(x1
alpha = 0.75, cmap = ListedColormap(('red','green' )))
mtp.xlim(x1.min(), x1.max())
mtp.ylim(x2.min(), x2.max())
for i, j in enumerate(nm.unique(y_set)):
    mtp.scatter(x_set[y_set == j, 0], x_set[y_set == j, 1],
        c = ListedColormap(('red', 'green'))(i), label = j)
mtp.title('K-NN Algorithm (Training set)')
mtp.xlabel('Age')
mtp.ylabel('Estimated salary')
mtp.legend()
mtp.show()
```

Loading [MathJax]/extensions/Safe.js

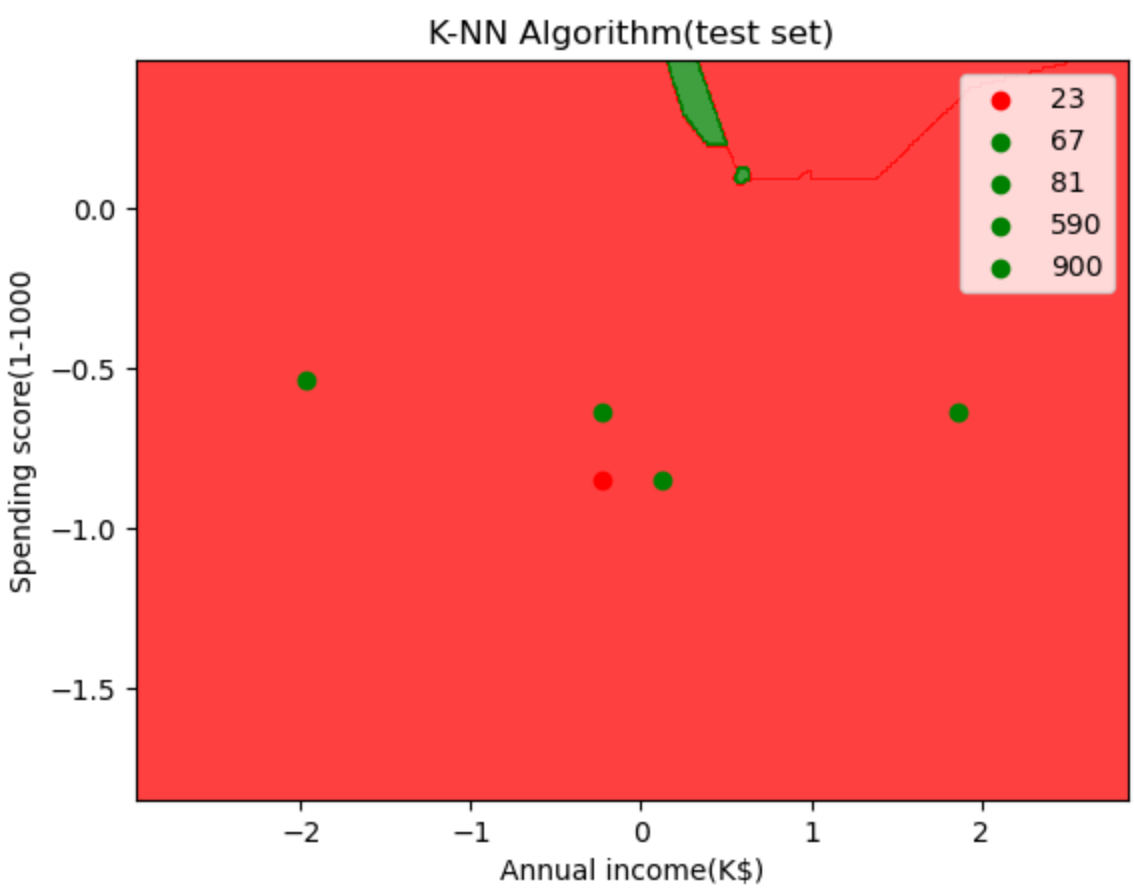
```
C:\Users\R.MUNIRANJANI\AppData\Local\Temp\ipykernel_25008\22317786.py:11: UserWarning: *
c* argument looks like a single numeric RGB or RGBA sequence, which should be avoided as
value-mapping will have precedence in case its length matches with *x* & *y*.  Please us
e the *color* keyword-argument or provide a 2D array with a single row if you intend to
specify the same RGB or RGBA value for all points.
  mtp.scatter(x_set[y_set == j, 0], x_set[y_set == j, 1],
```



In [14]:
```
from matplotlib.colors import ListedColormap
x_set,y_set=x_test,y_test
x1,x2=nm.meshgrid(nm.arange(start=x_set[:,0].min()-1,stop=x_set[:,0].max()+1,step=0.01),
                  nm.arange(start=x_set[:,1].min()-1,stop=x_set[:,1].max()+1,step=0.01))
mtp.contourf(x1,x2,classifier.predict(nm.array([x1.ravel(),x2.ravel()]).T).reshape(x1.sh
                                      alpha=0.75,cmap=ListedColormap(('red','green')))
mtp.xlim(x1.min(),x1.max())
mtp.ylim(x2.min(),x2.max())
for i,j in enumerate(nm.unique(y_set)):
    mtp.scatter(x_set[y_set==j,0],x_set[y_set==j,1],c=ListedColormap(('red','green'))(i)
mtp.title('K-NN Algorithm(test set)')
mtp.xlabel('Annual income(K$)')
mtp.ylabel('Spending score(1-1000')
mtp.legend()
mtp.show()
```

```
C:\Users\R.MUNIRANJANI\AppData\Local\Temp\ipykernel_25008\903933048.py:10: UserWarning:
*c* argument looks like a single numeric RGB or RGBA sequence, which should be avoided a
s value-mapping will have precedence in case its length matches with *x* & *y*.  Please
use the *color* keyword-argument or provide a 2D array with a single row if you intend t
o specify the same RGB or RGBA value for all points.
  mtp.scatter(x_set[y_set==j,0],x_set[y_set==j,1],c=ListedColormap(('red','green'))(i),l
abel=j)
```

Loading [MathJax]/extensions/Safe.js



In [ ]:

Loading [MathJax]/extensions/Safe.js