In [1]:
```
from sklearn import tree
from pandas import read_csv
from sklearn.tree import DecisionTreeClassifier
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
df=read_csv("Travel.csv")
```

In [2]:
```
df
```

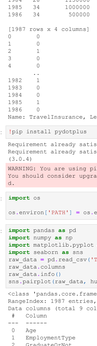
Out[2]:

	Age	EmploymentType	GraduateOrNot	AnnualIncome	FamilyMembers	ChronicDiseases	FrequentFlyer	EverTravelledAbroad	TravelInsurance
0	31	Government Sector	Yes	400000	6	1	No	No	
1	31	Private Sector/Self Employed	Yes	1250000	7	0	No	No	
2	34	Private Sector/Self Employed	Yes	500000	4	1	No	No	
3	28	Private Sector/Self Employed	Yes	700000	3	1	No	No	
4	28	Private Sector/Self Employed	Yes	700000	8	1	Yes	No	
...	...	...	...	...	...	...	...	...	
1982	33	Private Sector/Self Employed	Yes	1500000	4	0	Yes	Yes	
1983	28	Private Sector/Self Employed	Yes	1750000	5	1	No	Yes	
1984	28	Private Sector/Self Employed	Yes	1150000	6	1	No	No	
1985	34	Private Sector/Self Employed	Yes	1000000	6	0	Yes	Yes	
1986	34	Private Sector/Self Employed	Yes	500000	4	0	No	No	

1987 rows × 9 columns

In [3]:
```
df.hist()
plt.show
```

Out[3]:
```
<function matplotlib.pyplot.show(close=None, block=None)>
```



In [4]:
```
features=['Age', 'AnnualIncome', 'FamilyMembers','ChronicDiseases']
X=df[features]
y=df['TravelInsurance']
print(X)
print(y)
```

```
      Age  AnnualIncome  FamilyMembers  ChronicDiseases
0      31        400000              6                1
1      31       1250000              7                0
2      34        500000              4                1
3      28        700000              3                1
4      28        700000              8                1
...   ...           ...            ...              ...
1982   33       1500000              4                0
1983   28       1750000              5                1
1984   28       1150000              6                1
1985   34       1000000              6                0
1986   34        500000              4                0

[1987 rows x 4 columns]
0       0
1       0
2       1
3       0
4       0
       ..
1982    1
1983    0
1984    0
1985    1
1986    0
Name: TravelInsurance, Length: 1987, dtype: int64
```

In [5]:
```
!pip install pydotplus
```

```
Requirement already satisfied: pydotplus in c:\programdata\anaconda3\lib\site-packages (2.0.2)
Requirement already satisfied: pyparsing>=2.0.1 in c:\programdata\anaconda3\lib\site-packages (from pydotplus) (3.0.4)
WARNING: You are using pip version 21.2.4; however, version 22.0.4 is available.
You should consider upgrading via the 'C:\ProgramData\Anaconda3\python.exe -m pip install --upgrade pip' command.
```

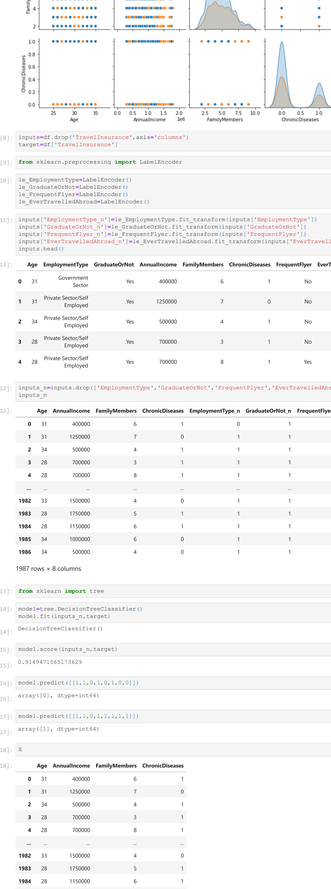
In [6]:
```
import os

os.environ['PATH'] = os.environ['PATH']+';'+os.environ['CONDA_PREFIX']+r'\Library\bin\graphviz'
```

In [7]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
raw_data = pd.read_csv("Travel.csv")
raw_data.columns
raw_data.info()
sns.pairplot(raw_data, hue = 'TravelInsurance')
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1987 entries, 0 to 1986
Data columns (total 9 columns):
 #   Column               Non-Null Count  Dtype 
---  ------               --------------  ----- 
 0   Age                  1987 non-null   int64 
 1   EmploymentType       1987 non-null   object
 2   GraduateOrNot        1987 non-null   object
 3   AnnualIncome         1987 non-null   int64 
 4   FamilyMembers        1987 non-null   int64 
 5   ChronicDiseases      1987 non-null   int64 
 6   FrequentFlyer        1987 non-null   object
 7   EverTravelledAbroad  1987 non-null   object
 8   TravelInsurance      1987 non-null   int64 
dtypes: int64(5), object(4)
memory usage: 139.8+ KB
```

Out[7]:
```
<seaborn.axisgrid.PairGrid at 0x20a39b4a0d0>
```



In [8]:
```
inputs=df.drop('TravelInsurance',axis='columns')
target=df['TravelInsurance']
```

In [9]:
```
from sklearn.preprocessing import LabelEncoder
```

In [10]:
```
le_EmploymentType=LabelEncoder()
le_GraduateOrNot=LabelEncoder()
le_FrequentFlyer=LabelEncoder()
le_EverTravelledAbroad=LabelEncoder()
```

In [11]:
```
inputs['EmploymentType_n']=le_EmploymentType.fit_transform(inputs['EmploymentType'])
inputs['GraduateOrNot_n']=le_GraduateOrNot.fit_transform(inputs['GraduateOrNot'])
inputs['FrequentFlyer_n']=le_FrequentFlyer.fit_transform(inputs['FrequentFlyer'])
inputs['EverTravelledAbroad_n']=le_EverTravelledAbroad.fit_transform(inputs['EverTravelledAbroad'])
inputs.head()
```

Out[11]:

	Age	EmploymentType	GraduateOrNot	AnnualIncome	FamilyMembers	ChronicDiseases	FrequentFlyer	EverTravelledAbroad	EmploymentTy
0	31	Government Sector	Yes	400000	6	1	No	No	
1	31	Private Sector/Self Employed	Yes	1250000	7	0	No	No	
2	34	Private Sector/Self Employed	Yes	500000	4	1	No	No	
3	28	Private Sector/Self Employed	Yes	700000	3	1	No	No	
4	28	Private Sector/Self Employed	Yes	700000	8	1	Yes	No	

In [12]:
```
inputs_n=inputs.drop(['EmploymentType','GraduateOrNot','FrequentFlyer','EverTravelledAbroad'],axis='columns')
inputs_n
```

Out[12]:

	Age	AnnualIncome	FamilyMembers	ChronicDiseases	EmploymentType_n	GraduateOrNot_n	FrequentFlyer_n	EverTravelledAbroad_n
0	31	400000	6	1	0	1	0	0
1	31	1250000	7	0	1	1	0	0
2	34	500000	4	1	1	1	0	0
3	28	700000	3	1	1	1	0	0
4	28	700000	8	1	1	1	1	0
...	...	...	...	...	...	...	...	...
1982	33	1500000	4	0	1	1	1	1
1983	28	1750000	5	1	1	1	0	1
1984	28	1150000	6	1	1	1	0	0
1985	34	1000000	6	0	1	1	1	1
1986	34	500000	4	0	1	1	0	0

1987 rows × 8 columns

In [13]:
```
from sklearn import tree
```

In [14]:
```
model=tree.DecisionTreeClassifier()
model.fit(inputs_n,target)
```

Out[14]:
```
DecisionTreeClassifier()
```

In [15]:
```
model.score(inputs_n,target)
```

Out[15]:
```
0.9149471565173629
```

In [16]:
```
model.predict([[1,1,0,1,0,1,0,0]])
```

Out[16]:
```
array([0], dtype=int64)
```

In [17]:
```
model.predict([[1,1,0,1,1,1,1,1]])
```

Out[17]:
```
array([1], dtype=int64)
```

In [18]:
```
X
```

Out[18]:

	Age	AnnualIncome	FamilyMembers	ChronicDiseases
0	31	400000	6	1
1	31	1250000	7	0
2	34	500000	4	1
3	28	700000	3	1
4	28	700000	8	1
...	...	...	...	...
1982	33	1500000	4	0
1983	28	1750000	5	1
1984	28	1150000	6	1
1985	34	1000000	6	0
1986	34	500000	4	0

1987 rows × 4 columns

In [19]:
```
y
```

Out[19]:
```
0       0
1       0
2       1
3       0
4       0
       ..
1982    1
1983    0
1984    0
1985    1
1986    0
Name: TravelInsurance, Length: 1987, dtype: int64
```

In [20]:
```
import sklearn.model_selection
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.3,random_state=1)
```

In [21]:
```
X.shape
```

Out[21]:
```
(1987, 4)
```

In [22]:
```
X_train.shape
```

Out[22]:
```
(1390, 4)
```

In [23]:
```
X_test.shape
```

Out[23]:
```
(597, 4)
```

In [24]:
```
clf=DecisionTreeClassifier()
clf=clf.fit(X_train,y_train)
y_pred=clf.predict(X_test)
```

In [25]:
```
from sklearn import metrics
print("Accuracy",metrics.accuracy_score(y_test,y_pred))
```

```
Accuracy: 0.7855946398659966
```

In [26]:
```
from sklearn.metrics import classification_report
print(classification_report(y_test,y_pred))
```

```
              precision    recall  f1-score   support

           0       0.79      0.91      0.84       383
           1       0.77      0.57      0.65       214

    accuracy                           0.79       597
   macro avg       0.78      0.74      0.75       597
weighted avg       0.78      0.79      0.78       597
```