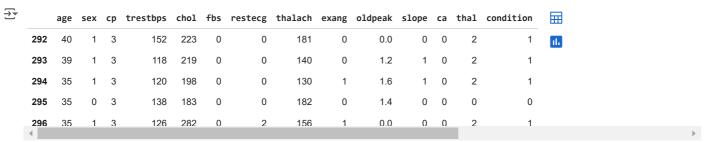
```
!pip install pgmpy
      Downloading pgmpy-0.1.26-py3-none-any.whl.metadata (9.1 kB)
     Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from pgmpy) (3.4.2)
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     Requirement already satisfied: scikit-learn in /usr/local/lib/python3.10/dist-packages (from pgmpy) (1.5.2)
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     Requirement already satisfied: statsmodels in /usr/local/lib/python3.10/dist-packages (from pgmpy) (0.14.4)
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     Requirement already satisfied: proto-plus<2.0.0dev,>=1.22.3 in /usr/local/lib/python3.10/dist-packages (from google-ai-generative
     Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.10/dist-packages (from pandas->pgmpy) (2.8.2)
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     Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn->pgmpy) (3.5.0)
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     Requirement already satisfied: nvidia-nccl-cu12 in /usr/local/lib/python3.10/dist-packages (from xgboost->pgmpy) (2.23.4)
     Requirement already satisfied: googleapis-common-protos<2.0.dev0,>=1.56.2 in /usr/local/lib/python3.10/dist-packages (from google
     Requirement already satisfied: requests<3.0.0.dev0,>=2.18.0 in /usr/local/lib/python3.10/dist-packages (from google-api-core->goo
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     Requirement already satisfied: pyasn1-modules>=0.2.1 in /usr/local/lib/python3.10/dist-packages (from google-auth>=2.15.0->google
     Requirement already satisfied: rsa<5,>=3.1.4 in /usr/local/lib/python3.10/dist-packages (from google-auth>=2.15.0->google-generat
     Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from patsy>=0.5.6->statsmodels->pgmpy) (1.16.0)
     Requirement already satisfied: httplib2<1.dev0,>=0.19.0 in /usr/local/lib/python3.10/dist-packages (from google-api-python-client
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     Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests<3.0.0.dev0,>=2.
     Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests<3.0.0.dev0,>=2.18.0->google
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     Downloading pgmpy-0.1.26-py3-none-any.whl (2.0 MB)
                                                - 2.0/2.0 MB 16.9 MB/s eta 0:00:00
     Installing collected packages: pgmpy
     Successfully installed pgmpy-0.1.26
import numpy as np
import pandas as pd
from pgmpy.models import BayesianNetwork
from pgmpy.estimators import ParameterEstimator, BayesianEstimator, MaximumLikelihoodEstimator
from pgmpy.inference import VariableElimination
data = pd.read_csv('heart_cleveland_upload.csv')
data.head()
```

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```

Next steps: Generate code with data View recommended plots New interactive sheet data.tail()



data.info()

<class 'pandas.core.frame.DataFrame'> RangeIndex: 297 entries, 0 to 296 Data columns (total 14 columns): Non-Null Count Dtype # Column --------0 age 297 non-null int64 1 sex 297 non-null int64 297 non-null int64 ср trestbps 297 non-null chol 297 non-null int64 297 non-null int64 5 fbs restecg int64 6 297 non-null thalach 297 non-null int64 int64 8 297 non-null exang 297 non-null float64 9 oldpeak 10 slope 297 non-null int64 11 ca 297 non-null int64

dtypes: float64(1), int64(13)

condition 297 non-null

297 non-null

int64

int64

memory usage: 32.6 KB

data.describe()

13

12 thal

₹		age	sex	ср	trestbps	chol	fbs	restecg	thalach	exang	oldpeak	slope
	count	297.000000	297.000000	297.000000	297.000000	297.000000	297.000000	297.000000	297.000000	297.000000	297.000000	297.000000
	mean	54.542088	0.676768	2.158249	131.693603	247.350168	0.144781	0.996633	149.599327	0.326599	1.055556	0.602694
	std	9.049736	0.468500	0.964859	17.762806	51.997583	0.352474	0.994914	22.941562	0.469761	1.166123	0.618187
	min	29.000000	0.000000	0.000000	94.000000	126.000000	0.000000	0.000000	71.000000	0.000000	0.000000	0.000000
	25%	48.000000	0.000000	2.000000	120.000000	211.000000	0.000000	0.000000	133.000000	0.000000	0.000000	0.000000
	50%	56.000000	1.000000	2.000000	130.000000	243.000000	0.000000	1.000000	153.000000	0.000000	0.800000	1.000000
	75%	61.000000	1.000000	3.000000	140.000000	276.000000	0.000000	2.000000	166.000000	1.000000	1.600000	1.000000
	max	77.000000	1.000000	3.000000	200.000000	564.000000	1.000000	2.000000	202.000000	1.000000	6.200000	2.000000

model = BayesianNetwork([('age','condition'),('sex','condition'),('cp','condition'),('trestbps','condition'),('chol','condition')])

model.fit(data, estimator=MaximumLikelihoodEstimator)

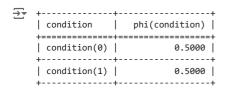
→ WARNING:pgmpy:Replacing existing CPD for age ${\tt WARNING:pgmpy:Replacing\ existing\ CPD\ for\ condition}$ $\hbox{\tt WARNING:pgmpy:Replacing existing CPD for sex}\\$ $\hbox{\tt WARNING:pgmpy:Replacing existing CPD for cp}\\$ $\hbox{\tt WARNING:pgmpy:Replacing existing CPD for trestbps}$ WARNING:pgmpy:Replacing existing CPD for chol

heart = VariableElimination(model)

q1 = heart.query(variables=['condition'], evidence={'cp':3}) print(q1)

\rightarrow	+				
نگ	condition	phi(condition)			
	condition(0)	0.4997			
	condition(1)	0.5003			

q2 = heart.query(variables=['condition'],evidence={'trestbps':140}) print(q2)



q3 = heart.query(variables=['condition'],evidence={'age':50})
print(q3)

→	+	 phi(condition)
	condition(0)	0.4999
	condition(1)	0.5001

q4 = heart.query(variables=['condition'],evidence={'chol':220})
print(g4)

<u></u>	+	
ت	condition	phi(condition)
	+=======+	=======+
	condition(0)	0.5003
	++	+
	condition(1)	0.4997
	++	+

Start coding or generate with AI.