In [12]:
```
! pip install pgmpy
import pandas as pd
import numpy as np
import sys
#!{sys.executable} -m pip install pgmpy
import pgmpy
from pgmpy.models import BayesianModel
from pgmpy.estimators import MLE, base
from pgmpy.estimators import BayesianEstimator
```

```
Requirement already satisfied: pgmpy in c:\users\chida\anaconda3\lib\site-packa
ges (0.1.13)
Requirement already satisfied: scikit-learn in c:\users\chida\anaconda3\lib\sit
e-packages (from pgmpy) (0.22.1)
Requirement already satisfied: pyparsing in c:\users\chida\anaconda3\lib\site-p
ackages (from pgmpy) (2.4.6)
Requirement already satisfied: joblib in c:\users\chida\anaconda3\lib\site-pack
ages (from pgmpy) (0.14.1)
Requirement already satisfied: pandas in c:\users\chida\anaconda3\lib\site-pack
ages (from pgmpy) (1.0.1)
Requirement already satisfied: tqdm in c:\users\chida\anaconda3\lib\site-packag
es (from pgmpy) (4.42.1)
Requirement already satisfied: numpy in c:\users\chida\anaconda3\lib\site-packa
ges (from pgmpy) (1.18.2)
Requirement already satisfied: networkx in c:\users\chida\anaconda3\lib\site-pa
ckages (from pgmpy) (2.4)
Requirement already satisfied: scipy in c:\users\chida\anaconda3\lib\site-packa
ges (from pgmpy) (1.4.1)
Requirement already satisfied: torch in c:\users\chida\anaconda3\lib\site-packa
ges (from pgmpy) (1.7.1)
Requirement already satisfied: statsmodels in c:\users\chida\anaconda3\lib\site
-packages (from pgmpy) (0.11.0)
Requirement already satisfied: pytz>=2017.2 in c:\users\chida\anaconda3\lib\sit
e-packages (from pandas->pgmpy) (2018.9)
Requirement already satisfied: python-dateutil>=2.6.1 in c:\users\chida\anacond
a3\lib\site-packages (from pandas->pgmpy) (2.8.1)
Requirement already satisfied: decorator>=4.3.0 in c:\users\chida\anaconda3\lib
\site-packages (from networkx->pgmpy) (4.4.1)
Requirement already satisfied: typing-extensions in c:\users\chida\anaconda3\li
b\site-packages (from torch->pgmpy) (3.7.4.3)
Requirement already satisfied: patsy>=0.5 in c:\users\chida\anaconda3\lib\site-
packages (from statsmodels->pgmpy) (0.5.1)
Requirement already satisfied: six>=1.5 in c:\users\chida\anaconda3\lib\site-pa
ckages (from python-dateutil>=2.6.1->pandas->pgmpy) (1.14.0)

WARNING: You are using pip version 20.1; however, version 20.3.3 is available.
You should consider upgrading via the 'c:\users\chida\anaconda3\python.exe -m p
ip install --upgrade pip' command.
```

In [13]:
```
import pandas as pd
data=pd.read_csv("prog7heart disease.csv")
heart_disease=pd.DataFrame(data)
print(heart_disease)
```

```
    age  Gender  Family  diet  Lifestyle  cholestrol  heartdisease
0     0       0       1     1          3           0             1
1     0       1       1     1          3           0             1
2     1       0       0     0          2           1             1
3     4       0       1     1          3           2             0
4     3       1       1     0          0           2             0
5     2       0       1     1          1           0             1
6     4       0       1     0          2           0             1
7     0       0       1     1          3           0             1
8     3       1       1     0          0           2             0
9     1       1       0     0          0           2             1
10    4       1       0     1          2           0             1
11    4       0       1     1          3           2             0
12    2       1       0     0          0           0             0
13    2       0       1     1          1           0             1
14    3       1       1     0          0           1             0
15    0       0       1     0          0           2             1
16    1       1       0     1          2           1             1
17    3       1       1     1          0           1             0
18    4       0       1     1          3           2             0
```

In [14]:
```
from pgmpy.models import BayesianModel
model=BayesianModel([
('age','Lifestyle'),
('Gender','Lifestyle'),
('Family','heartdisease'),
('diet','cholestrol'),
('Lifestyle','diet'),
('cholestrol','heartdisease')
])
print(model)
```

In [15]:
```
from pgmpy.estimators import MaximumLikelihoodEstimator
model.fit(heart_disease, estimator=MaximumLikelihoodEstimator)
```

In [16]:
```
from pgmpy.inference import VariableElimination
HeartDisease_infer = VariableElimination(model)
```

In [17]:
```
print('For age enter SuperSeniorCitizen:0, SeniorCitizen:1, MiddleAged:2, Youth:3
print('For Gender Enter Male:0, Female:1')
print('For Family History Enter yes:1, No:0')
print('For diet Enter High:0, Medium:1')
print('for lifeStyle Enter Athlete:0, Active:1, Moderate:2, Sedentary:3')
print('for cholesterol Enter High:0, BorderLine:1, Normal:2')
```

```
For age enter SuperSeniorCitizen:0, SeniorCitizen:1, MiddleAged:2, Youth:3, Tee
n:4
For Gender Enter Male:0, Female:1
For Family History Enter yes:1, No:0
For diet Enter High:0, Medium:1
for lifeStyle Enter Athlete:0, Active:1, Moderate:2, Sedentary:3
for cholesterol Enter High:0, BorderLine:1, Normal:2
```

In [18]:
```
q = HeartDisease_infer.query(variables=['heartdisease'], evidence={
 'age':int(input('enter age')),
 'Gender':int(input('enter Gender')),
 'Family':int(input('enter Family history')),
 'diet':int(input('enter diet')),
 'Lifestyle':int(input('enter Lifestyle')),
 'cholestrol':int(input('enter cholestrol'))
 })
print(q)
```

```
enter age1
enter Gender1
enter Family history1
enter diet1
enter Lifestyle1
enter cholestrol1

Finding Elimination Order: : : 0it [00:00, ?it/s]
0it [00:00, ?it/s]

+-----------------+---------------------+
| heartdisease    |   phi(heartdisease) |
+=================+=====================+
| heartdisease(0) |              1.0000 |
+-----------------+---------------------+
| heartdisease(1) |              0.0000 |
+-----------------+---------------------+
```

In [ ]: