7. Write a program to construct a **Bayesian network** considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

import numpy as np

import csv

import pandas as pd

from pgmpy.models import BayesianModel

from pgmpy.estimators import MaximumLikelihoodEstimator

from pgmpy.inference import VariableElimination

#read Cleveland Heart Disease data

heartDisease = pd.read\_csv('heart.csv')

heartDisease = heartDisease.replace('?',np.nan)

#display the data

print('Few examples from the dataset are given below')

print(heartDisease.head())

#Model Bayesian Network

model=BayesianModel([('age','trestbps'),('age','fbs'),('sex','trestbps'),('exang','trestbps'),('trestbps','heartdisease'),('fbs','heartdisease'),('heartdisease','restecg'),('heartdisease','thalach'),('heartdisease','chol')])

#Learning CPDs using Maximum Likelihood Estimators

print('\n Learning CPD using Maximum likelihood estimators')

model.fit(heartDisease,estimator=MaximumLikelihoodEstimator)

# Inferencing with Bayesian Network

print('\n Inferencing with Bayesian Network:')

HeartDisease\_infer = VariableElimination(model)

#computing the Probability of HeartDisease given Age

print('\n 1. Probability of HeartDisease given Age=30')

q1=HeartDisease\_infer.query(variables=['heartdisease'],evidence={'age':28})

print(q1)

#computing the Probability of HeartDisease given cholesterol

print('\n 2. Probability of HeartDisease given cholesterol=100')

q2=HeartDisease\_infer.query(variables=['heartdisease'],evidence={'chol':100})

print(q2)