In [16]:

```
!pip install bayespy

import pandas as pd
import bayespy as bp
import numpy as np
import csv
!pip3 install colorama
!pip3 install colorama
from colorama import init
from colorama import Fore, Back, Style
init()

# Define Parameter Enum values
# Age
ageEnum = {'SuperSeniorCitizen': 0, 'SeniorCitizen': 1,
           'MiddleAged': 2, 'Youth': 3, 'Teen': 4}
# Gender
genderEnum = {'Male': 0, 'Female': 1}
# FamilyHistory
familyHistoryEnum = {'Yes': 0, 'No': 1}
# Diet(Calorie Intake)
dietEnum = {'High': 0, 'Medium': 1, 'Low': 2}
# LifeStyle
lifeStyleEnum = {'Athlete': 0, 'Active': 1, 'Moderate': 2, 'Sedetary': 3}
# Cholesterol
cholesterolEnum = {'High': 0, 'BorderLine': 1, 'Normal': 2}
# HeartDisease
heartDiseaseEnum = {'Yes': 0, 'No': 1}

data = pd.read_csv("image.csv")

data =np.array(data, dtype='int8')
N = len(data)

# Input data column assignment
p_age = bp.nodes.Dirichlet(1.0*np.ones(5))
age = bp.nodes.Categorical(p_age, plates=(N,))
age.observe(data[:, 0])

p_gender = bp.nodes.Dirichlet(1.0*np.ones(2))
gender = bp.nodes.Categorical(p_gender, plates=(N,))
gender.observe(data[:, 1])

p_familyhistory = bp.nodes.Dirichlet(1.0*np.ones(2))
familyhistory = bp.nodes.Categorical(p_familyhistory, plates=(N,))
familyhistory.observe(data[:, 2])

p_diet = bp.nodes.Dirichlet(1.0*np.ones(3))
diet = bp.nodes.Categorical(p_diet, plates=(N,))
diet.observe(data[:, 3])

p_lifestyle = bp.nodes.Dirichlet(1.0*np.ones(4))
lifestyle = bp.nodes.Categorical(p_lifestyle, plates=(N,))
lifestyle.observe(data[:, 4])

p_cholesterol = bp.nodes.Dirichlet(1.0*np.ones(3))
cholesterol = bp.nodes.Categorical(p_cholesterol, plates=(N,))
cholesterol.observe(data[:, 5])

# Prepare nodes and establish edges
# np.ones(2) -> HeartDisease has 2 options Yes/No
# plates(5, 2, 2, 3, 4, 3) -> corresponds to options present for domain values
p_heartdisease = bp.nodes.Dirichlet(np.ones(2), plates=(5, 2, 2, 3, 4, 3))
heartdisease = bp.nodes.MultiMixture(
    [age, gender, familyhistory, diet, lifestyle, cholesterol], bp.nodes.Categorical, p_
heartdisease)
heartdisease.observe(data[:, 6])
```

```
p_heartdisease.update()

#print("Sample Probability")
#print("Probability(HeartDisease|Age=SuperSeniorCitizen, Gender=Female, FamilyHistory=Yes
, DietIntake=Medium, LifeStyle=Sedetary, Cholesterol=High)")
#print(bp.nodes.MultiMixture([ageEnum['SuperSeniorCitizen'], genderEnum['Female'], family
HistoryEnum['Yes'], dietEnum['Medium'], lifeStyleEnum['Sedetary'], cholesterolEnum['High'
]], bp.nodes.Categorical, p_heartdisease).get_moments()[0] [heartDiseaseEnum['Yes']])

# Interactive Test
m = 0
while m == 0:
    print("\n")
    res = bp.nodes.MultiMixture([int(input('Enter Age: ' + str(ageEnum))), int(input('En
ter Gender: ' + str(genderEnum))), int(input('Enter FamilyHistory: ' + str(familyHistoryE
num))), int(input('Enter dietEnum: ' + str(
        dietEnum))), int(input('Enter LifeStyle: ' + str(lifeStyleEnum))), int(input('Ent
er Cholesterol: ' + str(cholesterolEnum)))], bp.nodes.Categorical, p_heartdisease).get_m
oments()[0][heartDiseaseEnum['Yes']]
    print("Probability(HeartDisease) = " + str(res))

# print(Style.RESET_ALL)
    m = int(input("Enter for Continue:0, Exit :1 "))
```

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Requirement already satisfied: bayespy in /usr/local/lib/python3.7/dist-packages (0.5.22)
Requirement already satisfied: numpy>=1.10.0 in /usr/local/lib/python3.7/dist-packages (f
rom bayespy) (1.19.5)
Requirement already satisfied: h5py in /usr/local/lib/python3.7/dist-packages (from bayes
py) (2.10.0)
Requirement already satisfied: scipy>=0.13.0 in /usr/local/lib/python3.7/dist-packages (f
rom bayespy) (1.4.1)
Requirement already satisfied: six in /usr/local/lib/python3.7/dist-packages (from h5py->
bayespy) (1.15.0)
Requirement already satisfied: colorama in /usr/local/lib/python3.7/dist-packages (0.4.4)
Requirement already satisfied: colorama in /usr/local/lib/python3.7/dist-packages (0.4.4)


Enter Age: {'SuperSeniorCitizen': 0, 'SeniorCitizen': 1, 'MiddleAged': 2, 'Youth': 3, 'Te
en': 4}3
Enter Gender: {'Male': 0, 'Female': 1}0
Enter FamilyHistory: {'Yes': 0, 'No': 1}1
Enter dietEnum: {'High': 0, 'Medium': 1, 'Low': 2}1
Enter LifeStyle: {'Athlete': 0, 'Active': 1, 'Moderate': 2, 'Sedetary': 3}3
Enter Cholesterol: {'High': 0, 'BorderLine': 1, 'Normal': 2}1
Probability(HeartDisease) = 0.5
Enter for Continue:0, Exit :1 1
```