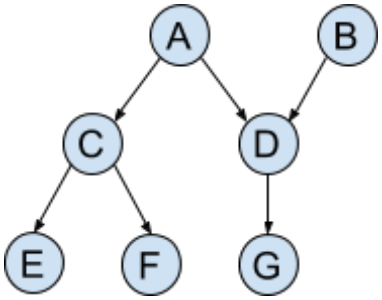
CENG 461 Artificial Intelligence
Homework 2

Due date: 10.01.2021

You are expected to write a Python program which calculates and prints **the probability of an event given evidence** using a **set of observations** and the underlying **Bayesian Network** structure.

A set of observations is given in data.npy. An NPY file is a NumPy array file created by the Python software package with the NumPy library installed. It contains an array saved in the NumPy (NPY) file format. You can load an array in an NPY file by using `np.load('filename.npy')`.

The Bayesian network structure is as the following:



The program should ask the user for the query and evidence variables as given in the example below in which the user asks the program to calculate P(+D, -G | +A, +C). (The prefix n indicates the value being False.) Then, the program calculates the given probability firstly by using inference on the given Bayesian Network. The network parameters should be computed using the data. Secondly, the program calculates the same probability only using the data. Finally, it prints both outputs.

```
Please give query variables: D nG
Please give evidence variables: A C
The probability calculated by inference is 0.0337.
The probability calculated from data is 0.0335.
```

Submission Rules:

1. You should submit your assignments through MS TEAMS until the due date.
2. You have to submit one python file named as **CENG461_HW2_studentID.py**.