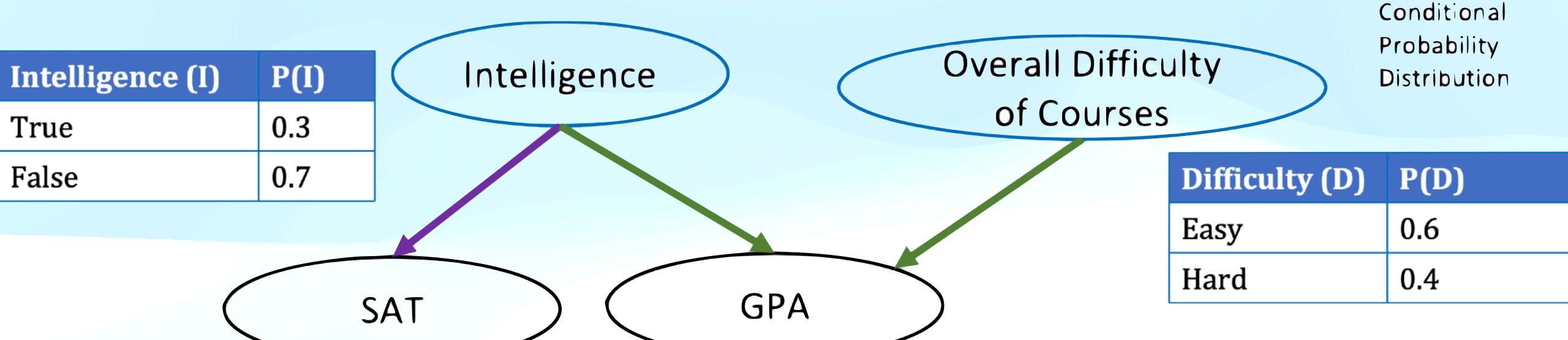# Bayesian Networks

- Basic components:

  - A Directed Acyclic Graph (DAG)

  - Local probability model $\Pr(x_i | \text{Parent}(x_i))$

- $\Pr(x_1, \cdots, x_n) = \prod \Pr(x_i | \text{Parent}(x_i))$

Student Example – A Full Bayesian Network

Component: (1) Graph Structure (DAG)   (2) Local probability model (CPDs)

Conditional Probability Distribution

Intelligence (I)	P(I)
True	0.3
False	0.7

Difficulty (D)	P(D)
Easy	0.6
Hard	0.4

I	SAT	P(SAT|I)
True	High	0.7
True	Low	0.3
False	High	0.4
False	Low	0.6

I	D	GPA	P(GPA|I,D)
True	Easy	High	0.8
True	Easy	Low	0.2
True	Hard	High	0.6
...	...	...	...