CS 5811
October 30, 2020
Friday ①

Reminder

IAAI presentations ~~next week~~ the week following next week
Nov. 9, 11, 13
M W F

Previous class

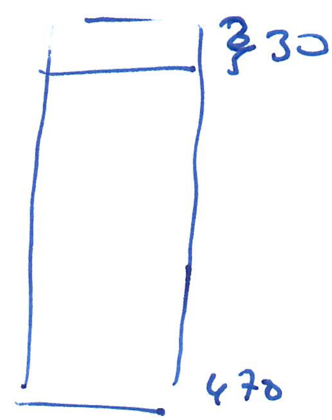
BBN exact inference by enumeration
can use variable elimination
} potentially exponential time

Approximate inference by stochastic simulation

idea: given BBN reconstruct the data (samples)
↑ data point

30 samples out of 478

S = r   I = g   H = y



Simulate the network N times

to obtain a sample:

: sample the root variables

sample for C using the 50-50 distribution

entire sample with 4 variables ⤳ C = t   S =   R =   W =

ask for 0-1

[0 ... 50 ... 100]
t   f

20-80

[... 20 ...]

C = t S = f R = t W = t (2)

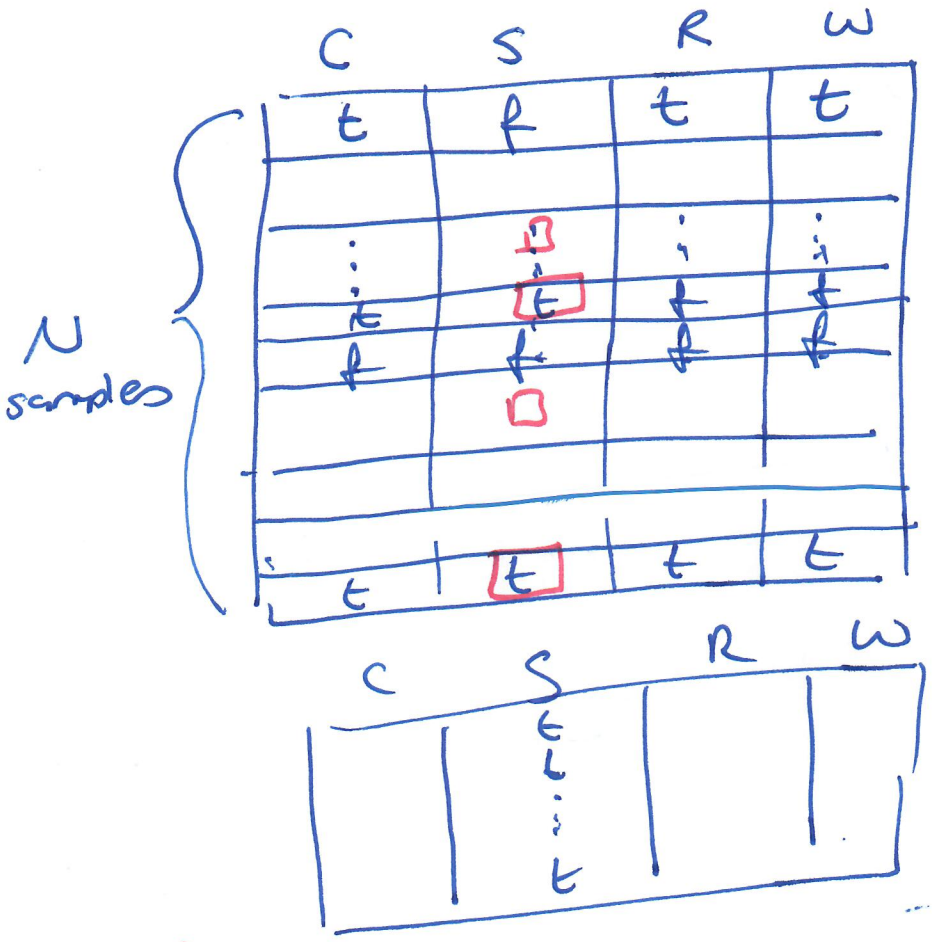
sample from ⟨0.1, 0.9⟩ distribution

sample from ⟨0.8, 0.2⟩

sample from ⟨0.9, 0.1⟩

repeat N times.

$\mathbb{P}(R \mid S = true)$ how to compute this probability distribution



Take rows which have S = true (discard the others)

x: number of samples R = t

y: number of samples R = f

$\alpha \langle x, y \rangle$

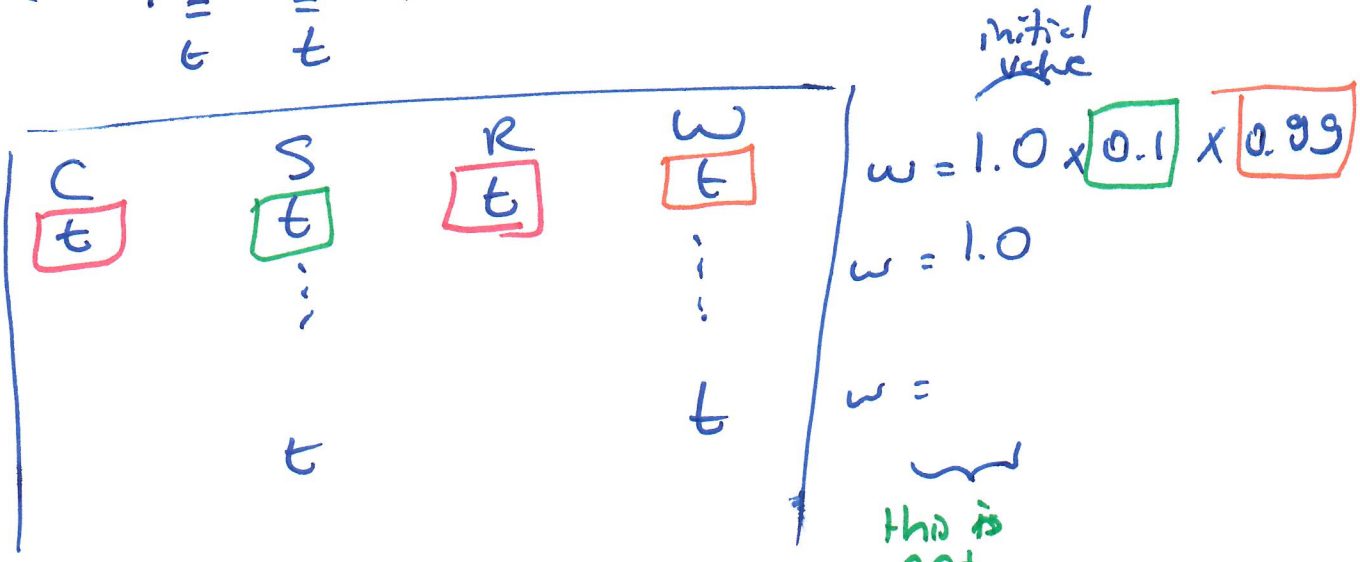
↑ Rejection sampling

↓ samples that do not agree with the evidence are discarded

100 variables × 1000000

Likelihood weighting

$P(\ \mid S=t, W=t)$



$P(C \mid S, W)$

$\alpha \langle \sum \text{weights}, \sum \text{weights} \rangle$

$\uparrow$ num $C=t$ $C=f$

number of samples with