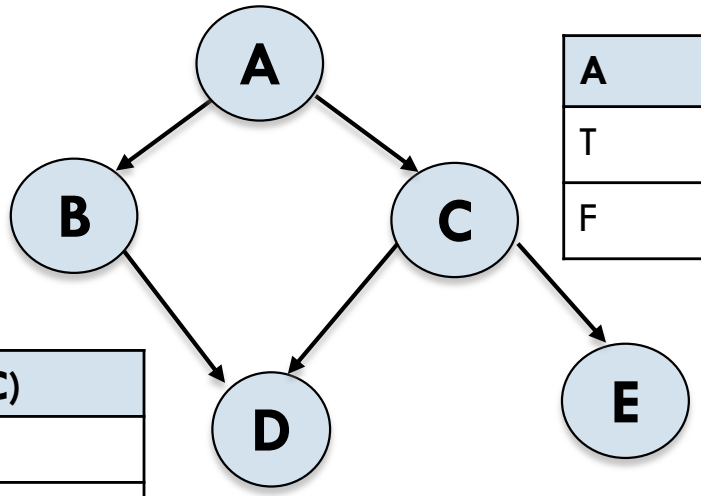
EXERCISES (BAYESIAN NETWORKS)

Ex 1

Bayesian network

- Given the BN below, compute P (a, b, –c, d, –e), that is P(A = true, B = true, C = false, D = true, E = false)



P(A)
0.6

A	P(B | A)
T	0.4
F	0.5

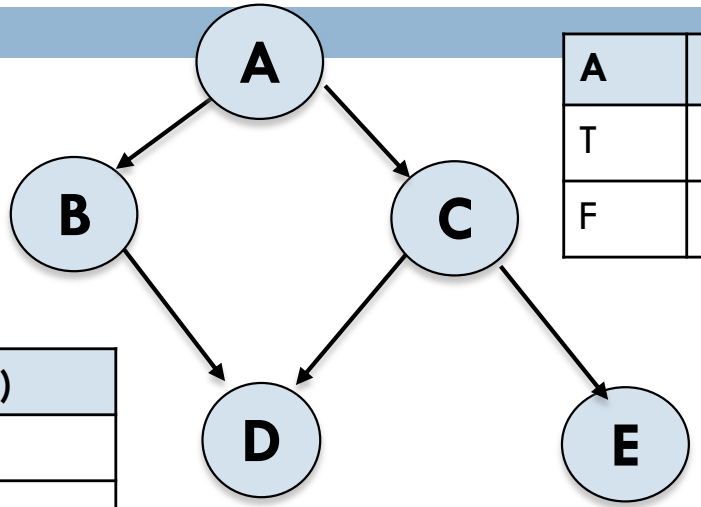
A	P(C | A)
T	0.7
F	0.9

B	C	P(D | B , C)
T	T	0.3
T	F	0.4
F	T	0.5
F	F	0.6

C	P(E | C)
T	0.1
F	0.2

Bayesian network

P(A)
0.6



A	P(B | A)
T	0.4
F	0.5

A	P(C | A)
T	0.7
F	0.9

B	C	P(D | B , C)
T	T	0.3
T	F	0.4
F	T	0.5
F	F	0.6

C	P(E | C)
T	0.1
F	0.2

$P(a, b, \neg c, d, \neg e) =$ 0.6*0.4*(1-0.7)*0.4*(1-0.2)

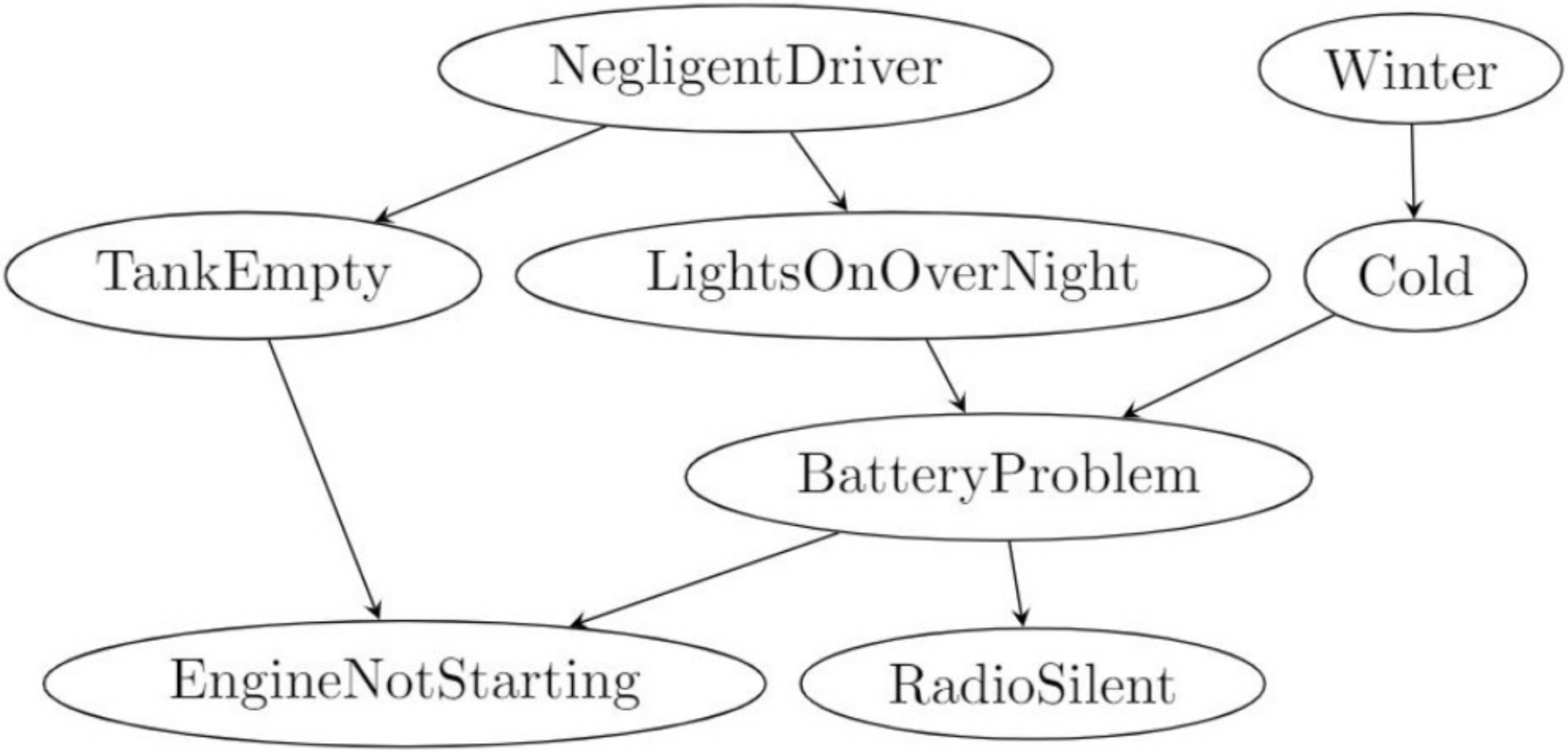
$= P(a)\, P(b|a)\, P(\text{-}c|a)\, P(d|b,\text{-}c)\, P(\text{-}e|\text{-}c)$

$= 0.6 \times 0.4 \times 0.3 \times 0.4 \times 0.8$

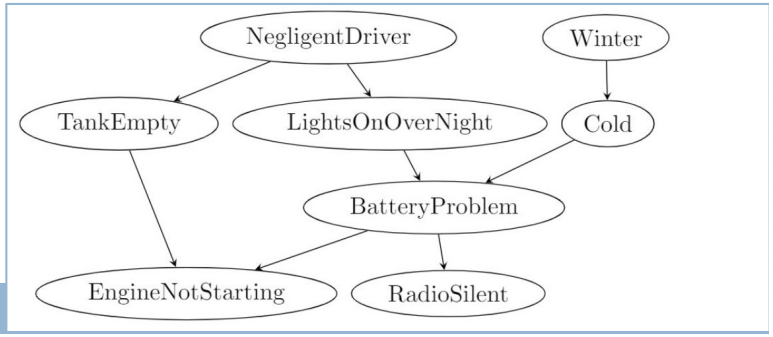
$= 0.02304$

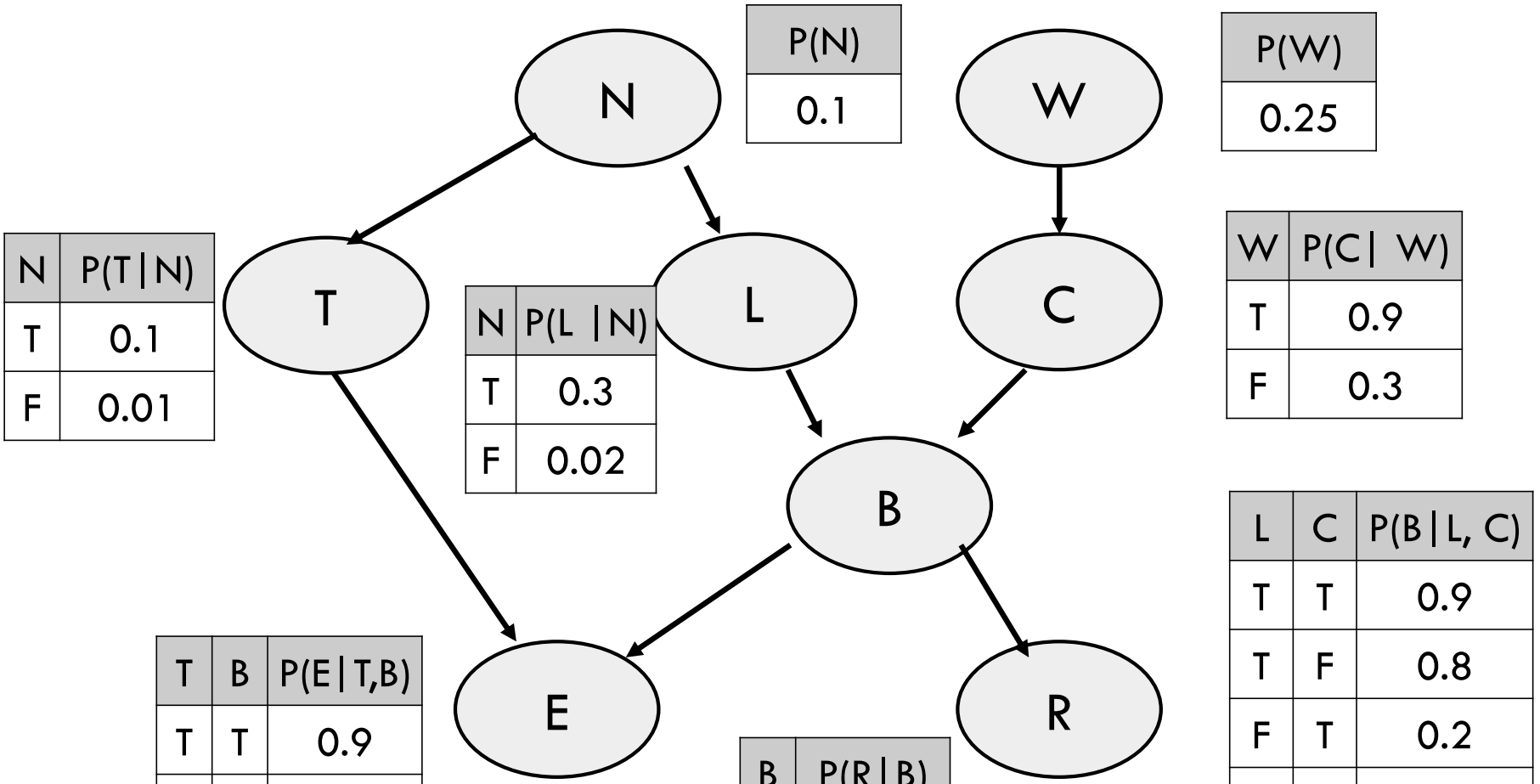
Ex 2

Bayesian network



Bayesian network





P(N)
0.1

P(W)
0.25

N	P(T | N)
T	0.1
F	0.01

N	P(L | N)
T	0.3
F	0.02

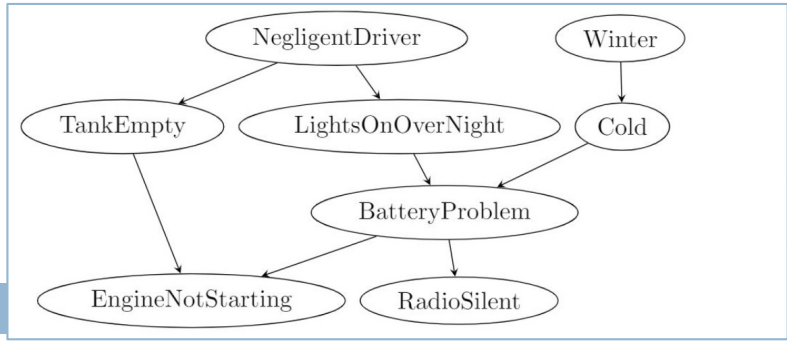
W	P(C | W)
T	0.9
F	0.3

L	C	P(B | L, C)
T	T	0.9
T	F	0.8
F	T	0.2
F	F	0.01

T	B	P(E | T,B)
T	T	0.9
T	F	0.8
F	T	0.7
F	F	0.05

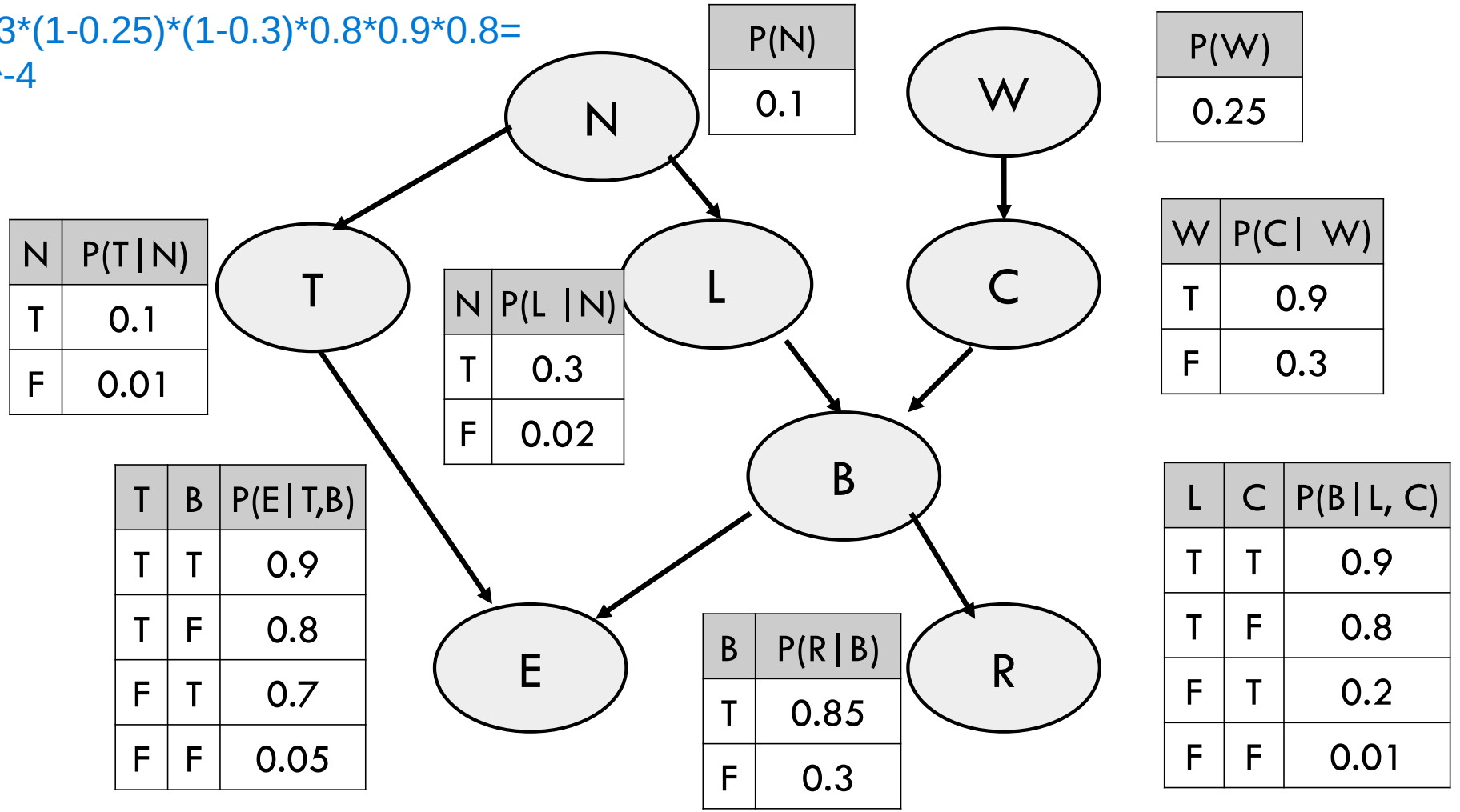
B	P(R | B)
T	0.85
F	0.3

Bayesian network



- Given the BN below, compute P (n, t, l, -w, -c, b, e, r)

0.1*0.1*0.3*(1-0.25)*(1-0.3)*0.8*0.9*0.8=
9.072x10^-4



P(N)
0.1

P(W)
0.25

N	P(T|N)
T	0.1
F	0.01

N	P(L |N)
T	0.3
F	0.02

W	P(C| W)
T	0.9
F	0.3

T	B	P(E|T,B)
T	T	0.9
T	F	0.8
F	T	0.7
F	F	0.05

B	P(R|B)
T	0.85
F	0.3

L	C	P(B|L, C)
T	T	0.9
T	F	0.8
F	T	0.2
F	F	0.01