article	D	E	F	C
	variable			class variable
10	t	t	t	t
1	t	t	t	f
27	t	t	f	t
8	t	t	f	f
13	t	f	t	t
1	t	f	t	f
9	t	f	f	t
33	t	f	f	f
1	f	t	t	t
3	f	t	f	t
14	f	t	f	f
5	f	f	t	t
6	f	f	t	f
1	f	f	f	t
68	f	f	f	f

200 ← Total

N.B model Says

$$P(D,E,F,C) = P(C)\cdot P(D|C) \cdot P(E|C)\cdot P(F|C)$$

C	P(C)
t	$\frac{10+27+13+9+1+3+5+1}{200} = 69/200 = 0.3$
f	$\frac{1+8+1+33+14+6+68}{200} = \frac{131}{200} = 0.655$

table - 1

(1) Conditional Probability tables (CPT's)

D	C	P(D|C)
t	t	
t	f	
N	Y	
N	N	

Conditional probability tables (CPT's)

a)

table-2

D	C	P(D|C)
t	t	$\frac{10+27+13+9}{10+27+13+9+1+3+5+1} \simeq \frac{59}{69} \simeq 0.8550$
t	f	$\frac{1+8+1+33}{1+8+1+33+14+6+68} = 43/131 \simeq 0.328$
f	t	$\frac{1+3+5+1}{10+27+13+9+1+3+5+1} = 10/69 \simeq 0.145$
f	f	$\frac{14+6+8}{1+8+1+33+14+6+68} = 88/131 \simeq 0.672$

table-3

E	C	P(E|C)
t	t	$\frac{10+27+1+3}{10+27+13+9+1+3+5+1} = 41/69 \simeq 0.594$
t	f	$\frac{1+8+14}{1+8+1+33+14+6+68} = 23/131 \simeq 0.1756$
f	t	$\frac{13+9+5+1}{10+27+13+9+1+3+5+1} = 28/69 \simeq 0.406$
f	f	$\frac{1+33+6+68}{1+8+1+33+14+6+68} = 108/131 \simeq 0.8244$

table-4

F	C	P(F|C)
t	t	$\frac{10+13+1+5}{10+27+13+9+1+3+5} = 29/69 \simeq 0.420$
t	f	$\frac{1+1+6}{1+8+1+33+14+6+68} = 8/131 \simeq 0.061$
f	t	$\frac{27+9+3+1}{10+27+13+9+1+3+5+1} = 40/69 \simeq 0.58$
f	f	$\frac{8+33+14+68}{1+8+1+33+14+6+68} = 123/131 \simeq 0.94$

b) $P(C=t \mid D=f, E=t, F=t)$

$$= \frac{P(C=t, D=f, E=t, F=t)}{P(D=f, E=t, F=t)} \begin{matrix} \longrightarrow (i) \\ \longrightarrow (ii) \end{matrix}$$

(i) $\longrightarrow$ Calculating Numerator

$P(C=t, D=f, E=t, F=t)$

$= P(C=t) \times P(D=f \mid C=t) \times P(E=t \mid C=t) \times P(F=t \mid C=t)$

from table 1   from table 2   from table 3   from table 7

$0.345 \times 0.145 \times 0.594 \times 0.420$

$\simeq 0.0125$

(ii) $\longrightarrow$ Calculating denominator

$P(D=f, E=t, F=t)$

$= P(C=t, D=f, E=t, F=t)$

$+$

$P(C=f, D=f, E=t, F=t)$

by definition is equal to summation of all probability of C where C=t and C=f in this case

$= 0.0125 + P(C=f, D=f, E=t, F=t)$

$P(C=f) \times P(D=f \mid C=f) \times P(E=t \mid C=f) \times P(F=t \mid C=f)$

$0.655 \times 0.672 \times 0.1756 \times 0.061$
$\simeq 0.0047$

$\Rightarrow 0.0125 + 0.0047$
$= 0.0172$

this conditabal probability represent conditioning computational task in probabilistic modeling.

$$\boxed{\begin{array}{l} P(C=t \mid D=f, E=t, F=t) \simeq \dfrac{0.0125}{0.0172} \begin{array}{l} \text{(i)} \\ \text{(ii)} \end{array} \\ \text{conditioning} \simeq 0.728 \end{array}}$$

c) from above calculations we can see that for partial configuration $P(D=f, E=t, F=t)$ gives higher value ~~for~~ when class variable $C=t$ which is 0.0125. So, most likely value is $C=$ true for partial configuration $P(D=f, E=t, F=t)$

d) $P(C=t \mid D=f, E=t, F=t)$ — for joint distribution model

what is the probability that article is finacial given $D=f, E=t, F=t$;

so from table we can see is equal

f 0 1

ie 100%

another way to calculate is we can find

$$\frac{\text{marginal probability of } P(C=t, D=f, E=t, F=t)}{\text{marginal prob } P(D=f, E=t, F=t)} = \frac{1}{1} = 1$$

e) $P(C=t \mid D=f, E=t, F=t)$ – for fully independent model:

$$= P(C=t \mid D=f) \cdot P(C=t \mid E=t) \cdot P(C=t \mid F=t)$$

table2 ↓ ↓ table 3 ↓ table4

$$= 0.145 \times \cancel{0.406}\ 0.594 \times 0.420$$

$= \cancel{0.0297}$

$$\boxed{\simeq 0.0362}$$