age	income	student	credit_rating	buys_computer
<=30	high	no	fair	no
<=30	high	no	excellent	no
31…40	high	no	fair	yes
>40	medium	no	fair	yes
>40	low	yes	fair	yes ∨
>40	low	yes	excellent	no
31…40	low	yes	excellent	yes ✓
<=30	medium	no	fair	no
<=30	low	yes	fair	yes ✓
>40	medium	yes	fair	yes
<=30	medium	yes	excellent	yes
31…40	medium	no	excellent	yes
31…40	high	yes	fair	yes
>40	medium	no	excellent	no

Known Information : age > 40 , income = low .

Asked : $P(\text{Buy ?} \mid \text{age} > 40, \text{income} = \text{high})$

Sol^n :

1) $P(C_i) \Rightarrow P(\text{buy computer} = \text{"yes"}) = \frac{9}{14}$

   $P(\text{buy computer} = \text{"no"}) = \frac{5}{14}$

2) $P(X \mid C_i)$

   $P(\text{age} > 40 \mid \text{buy} = \text{yes}) = \frac{3}{9}$

   $P(\text{age} > 40 \mid \text{buy} = \text{no}) = \frac{2}{5}$

   $P(\text{low} \mid \text{buy} = \text{yes}) = \frac{3}{9}$

   $P(\text{low} \mid \text{buy} = \text{no}) = \frac{1}{5}$

$P(X \mid \text{buy} = \text{yes}) = \frac{3}{9} \cdot \frac{3}{9} = \frac{9}{81} = \frac{1}{9}$

$P(X \mid \text{buy} = \text{no}) = \frac{2}{5} \cdot \frac{1}{5} = \frac{2}{25}$

$P(X \mid C_i) * P(C_i) = P(X \mid \text{buy} = \text{yes}) \cdot P(\text{buy} = \text{yes})$

$= \frac{1}{9} \cdot \frac{9}{14} = \frac{1}{14}$

$P(X \mid C_i) * P(C_i) = P(X \mid \text{buy} = \text{no}) \cdot P(\text{buy} = \text{no})$

$= \frac{2}{25} \cdot \frac{5}{14} = \frac{2}{70} = \frac{1}{35}$

Since $P(X \mid \text{buy} = \text{yes}) P(\text{buy} = \text{yes}) > P(X \mid \text{buy} = \text{no}) P(\text{buy} = \text{no})$. Then the customer is buying the computer.