* Mini Index :-

RID	age	income	student	credit Rating	buys-computer
1	youth	high	no	fair	no
2	youth	high	no	excellent	no
3	middle_aged	high	no	fair	yes
4	senior	medium	no	fair	yes
5	senior	low	yes	fair	yes
6	senior	low	yes	excellent	no
7	middle_aged	low	yes	excellent	yes
8	youth	medium	no	fair	no
9	youth	low	yes	fair	yes
10	senior	medium	yes	fair	yes
11	youth	medium	yes	excellent	yes
12	middle_aged	medium	no	excellent	yes
13	middle_aged	high	yes	fair	yes
14	senior	medium	no	excellent	no

Buys_computer	count
yes	9
no	5
	14

$$\text{Mini}(D) = 1 - \left(\frac{9}{14}\right)^2 - \left(\frac{5}{14}\right)^2$$

$$= 0.4592$$

⇒ Age Attribute Subset

{ youth , middle } , { senior }
{ youth , senior } , { middle }
{ middle , senior } , { youth }

Distinct value	Yes	no	total
youth	2	3	5
middle	4	0	4
senior	3	2	5
			14

- Gini Age { youth, middle } (D) =

$$\frac{9}{14}\left(1-\left(\frac{6}{9}\right)^2-\left(\frac{3}{9}\right)^2\right)+\frac{5}{14}\left(1-\left(\frac{3}{5}\right)^2-\left(\frac{2}{5}\right)^2\right)$$

$$= 0.4571$$

- Gini Age { youth , senior } (D) =

$$\frac{10}{14}\left(1-\left(\frac{5}{10}\right)^2-\left(\frac{5}{10}\right)^2\right)+\frac{4}{14}\left(1-\left(\frac{4}{4}\right)^2-\left(\frac{0}{4}\right)^2\right)$$

$$= 0.3571$$

- Gini Age { middle , senior } (D) =

$$\frac{9}{14}\left(1-\left(\frac{7}{9}\right)^2-\left(\frac{2}{9}\right)^2\right)+\frac{5}{14}\left(1-\left(\frac{2}{5}\right)^2-\left(\frac{3}{5}\right)^2\right)$$

$$= 0.3937$$

⇒ Income Attribute Subset

{High, Medium}, {low}
{High, low}, {Medium}
{Medium, low}, {High}

Distinct value	yes	no	Total
High	2	2	4
Medium	4	2	6
low	3	1	4
			14

- Gini Income {High, Medium} (D) =

$$\frac{10}{14}\left(1-\left(\frac{6}{10}\right)^2-\left(\frac{4}{10}\right)^2\right)+\frac{4}{10}\left(1-\left(\frac{3}{4}\right)^2-\left(\frac{1}{4}\right)^2\right)$$

$$= 0.4929$$

- Gini Income {High, low} (D) =

$$\frac{8}{14}\left(1-\left(\frac{5}{8}\right)^2-\left(\frac{3}{8}\right)^2\right)+\frac{6}{14}\left(1-\left(\frac{4}{6}\right)^2-\left(\frac{2}{6}\right)^2\right)$$

$$= 0.4583$$

- Gini Income {Medium, low} (D) =

$$\frac{10}{14}\left(1-\left(\frac{7}{10}\right)^2-\left(\frac{3}{10}\right)^2\right)+\frac{4}{10}\left(1-\left(\frac{2}{4}\right)^2-\left(\frac{2}{4}\right)^2\right)$$

$$= 0.4429$$

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⇒ For Student Attribute

	yes	NO	total
yes	6	1	7
no	3	4	$\frac{7}{14}$

- Gini Student (D) = $\frac{7}{14}\left(1-\left(\frac{6}{7}\right)^2-\left(\frac{1}{7}\right)^2\right)$

+

$\frac{7}{14}\left(1-\left(\frac{3}{7}\right)^2-\left(\frac{4}{7}\right)^2\right)$

$= 0.3673$

⇒ For credit rating Attribute

	yes	NO	Total
Fair	6	2	8
Excellent	3	3	$\frac{6}{14}$

- Gini credit rating (D) = $\frac{8}{14}\left(1-\left(\frac{6}{8}\right)^2-\left(\frac{2}{8}\right)^2\right)+\frac{6}{14}\left(1-\left(\frac{3}{6}\right)^2-\left(\frac{3}{6}\right)^2\right)$.

$= 0.4286$

Attribute	mini Index	Δ mini
Age	0.3571	0.4592 - 0.3571 = 0.1021
Income	0.4429	0.4592 - 0.4429 = 0.0163
Student	0.3673	0.4592 - 0.3673 = 0.0919
Credit Rating	0.4286	0.4592 - 0.4286 = 0.306

Age

youth
senior

middle_aged

Income	Student	CR	class
High	NO	Fair	NO
High	NO	EX.	NO
Medium	NO	Fair	NO
Low	yes	Fair	yes
Medium	yes	EX.	yes
Medium	NO	Fair	yes
Low	yes	Fair	yes
Low	yes	EX.	NO
Medium	yes	Fair	yes
Medium	NO	EX.	NO

Income	Student	CR	class
High	NO	Fair	yes
Low	yes	EX.	yes
Medium	NO	EX.	yes
High	yes	Fair	yes