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Homework 2

$$Info(D) = I(9,5) = -\frac{9}{14}\log_2\left(\frac{9}{14}\right) - \frac{5}{14}\log_2\left(\frac{5}{14}\right) = 0.940$$

(yes, No)

$$Info_{age}(D) = \frac{5}{14}I(2,3) + \frac{4}{14}I(4,0) + \frac{5}{14}I(3,2$$

$$= 0.694$$

$$Info_{Income}(D) = \frac{4}{14}I(2,2) + \frac{6}{14}I(4,2) + \frac{4}{14}I(3,1)$$

(high, medium, low)

$$= 0.911$$

$$Info_{student}(D) = \frac{7}{14}I(6,1) + \frac{7}{14}I(3,4)$$

(yes, No)

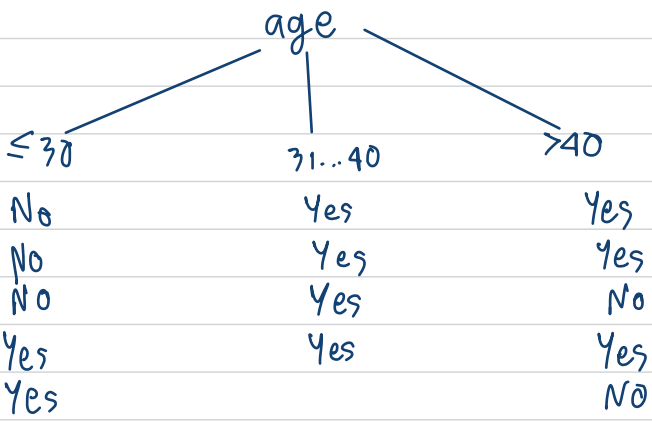
$$= 0.788$$

$$Info_{credit\text{-}rat}(D) = \frac{6}{14}I(3,3) + \frac{8}{14}I(6,2)$$

(excellent, fair)

$$= 0.892$$

Gain
- Age = 0.940 − 0.694 = 0.246 *
- Income = 0.940 − 0.911 = 0.029
- Student = 0.940 − 0.788 = 0.152
- Credit-rating = 0.940 − 0.892 = 0.048



Age ≤ 30

$Info_{age}(D) = I(2,3)$

$= 0.971$

$Info_{Income}(D) = \frac{2}{5} I(0,2) + \frac{2}{5} I(1,1) + \frac{1}{5} I(1,0)$ (high, medium, low)

$= 0.4$

$Info_{student}(D) = \frac{2}{5} I(2,0) + \frac{3}{5} I(0,3)$ (yes, no)

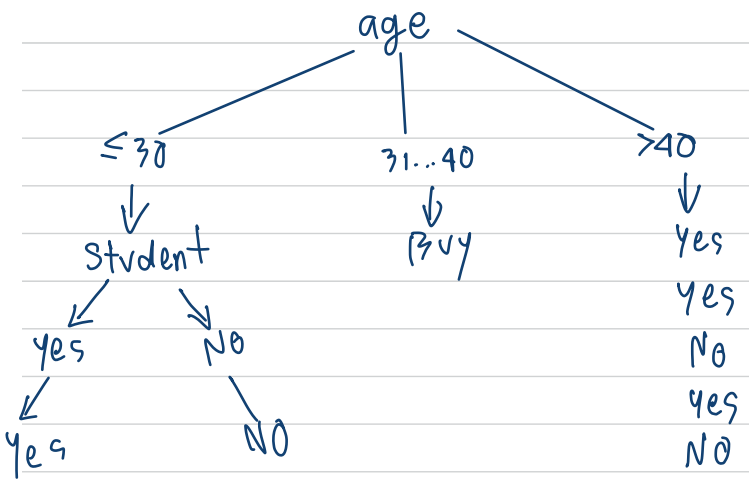
$= 0$

$Info_{credit\text{-}rat}(D) = \frac{2}{5} I(1,1) + \frac{3}{5} I(1,2)$ (excellent, fair)

$= 0.951$

Gain

Income	=	0.940 - 0.4	= 0.571
Student	=	0.940 - 0	= 0.971 *
Credit-rating	=	0.940 - 0.951	= 0.020



$Info_{age}(D) = I(3,2)$

$= 0.971$

$Info_{Income}(D) = \frac{3}{5} I(2,1) + \frac{2}{5} I(1,1)$ (high, low)

$= 0.951$

$Info_{student}(D) = \frac{3}{5} I(2,1) + \frac{2}{5} I(1,1)$ (yes, No)

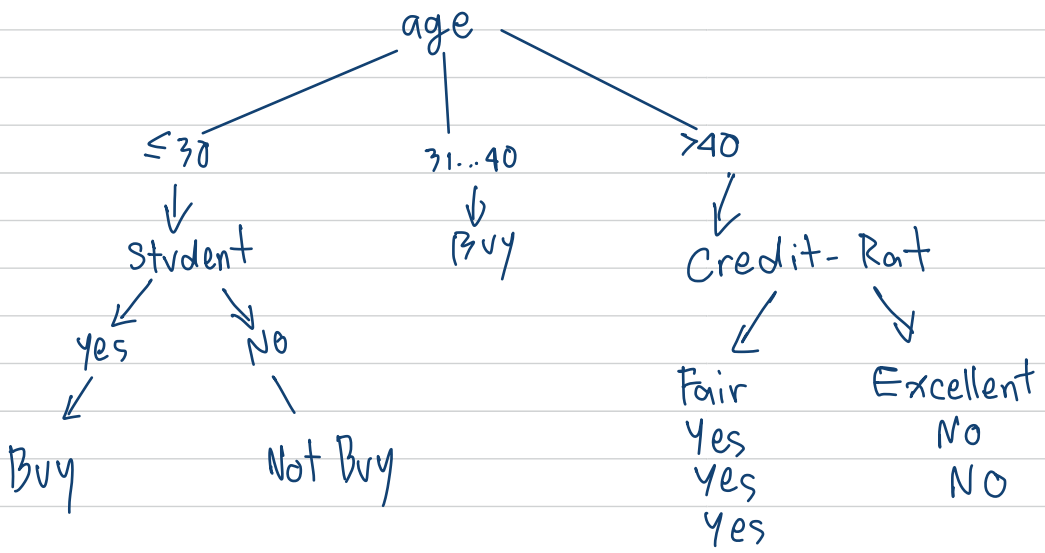
$= 0.951$

$Info_{credit\text{-}rat}(D) = \frac{2}{5} I(0,2) + \frac{3}{5} I(3,0)$ (excellent, fair)

$= 0$

Gain

Income	=	0.940 - 0.951	= 0.020
Student	=	0.940 - 0.951	= 0.020
Credit-rating	=	0.940 - 0	= 0.971 *



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