

Minh Nguyen  
2069407

Entropy Extra – Feb 2, 2023

1. Frequency table:

Frequency	
Pass	Fail
30	20

2. E (passing the class):

$$E(\text{passing}) = E(30, 20) = E(0.6, 0.4) = -0.6 * \log_2(0.6) - 0.4 * \log_2(0.4) = \mathbf{0.971}$$

3. E (passing the class/gpa):

		Frequency	
		P	F
GPA	$\leq 1.5$	6	3
	$> 1.5$	24	17

$$\begin{aligned} E(\text{passing class/gpa}) &= P(\leq 1.5) * E(6, 3) + P(> 1.5) * E(24, 17) \\ &= 9/50 * (-6/9 * \log_2(6/9) - 3/9 * \log_2(3/9)) + 41/50 * (-24/41 * \log_2(24/41) - 17/41 * \log_2(17/41)) \\ &= \mathbf{0.968} \end{aligned}$$

4. IG (passing the class/gpa):

$$IG = E(\text{Pass}) - E(\text{Pass/GPA}) = 0.971 - 0.968 = \mathbf{0.003} \text{ (approx.)}$$