

In Class Activity 3Temperature

Temperature	Yes	No	Total
Hot	2	2	4
Mild	4	2	6
Cool	3	1	4
Total			14

$$E(Hot) = -\left(\frac{2}{4}\log_2\frac{2}{4}\right) - \left(\frac{2}{4}\log_2\frac{2}{4}\right) = 1. E(Mild) = -\left(\frac{4}{6}\log_2\frac{4}{6}\right) - \left(\frac{2}{6}\log_2\frac{2}{6}\right) = 0.918.$$

$$E(Cool) = -\left(\frac{3}{4}\log_2\frac{3}{4}\right) - \left(\frac{1}{4}\log_2\frac{1}{4}\right) = 0.811. E(PG, T) = \frac{4}{14} * 1 + \frac{6}{14} * 0.918 + \frac{4}{14} * 0.811 = 0.911.$$

$$E(PG) = 0.940. G(PG, T) = 0.940 - 0.911 = \mathbf{0.029}.$$

Humidity

Humidity	Yes	No	Total
High	3	4	7
Normal	6	1	7
Total			14

$$E(High) = -\left(\frac{3}{7}\log_2\frac{3}{7}\right) - \left(\frac{4}{7}\log_2\frac{4}{7}\right) = 0.985. E(Normal) = -\left(\frac{6}{7}\log_2\frac{6}{7}\right) - \left(\frac{1}{7}\log_2\frac{1}{7}\right) = 0.592.$$

$$E(PG, H) = \frac{7}{14} * 0.985 + \frac{7}{14} * 0.592 = 0.789. E(PG) = 0.940. G(PG, H) = 0.940 - 0.789 = \mathbf{0.151}.$$

Windy

Windy	Yes	No	Total
False	6	2	8
True	3	3	6
Total			14

$$E(False) = -\left(\frac{6}{8}\log_2\frac{6}{8}\right) - \left(\frac{2}{8}\log_2\frac{2}{8}\right) = 0.811. E(True) = -\left(\frac{3}{6}\log_2\frac{3}{6}\right) - \left(\frac{3}{6}\log_2\frac{3}{6}\right) = 1.$$

$$E(PG, W) = \frac{8}{14} * 0.811 + \frac{6}{14} * 1 = 0.892. E(PG) = 0.940. G(PG, W) = 0.940 - 0.892 = \mathbf{0.048}.$$