

Name:

Quiz #1

09/02/15

[1] Calls are classified either as voice (V) or data (D). They are also classified as brief (B) or long (L). It is known that: (a) 40% of calls are V, (b) 70% of calls are L, and (c) 80% of calls are either V or L. Find the probability of finding a voice call among long calls. Are brief and data calls independent? (Show your work)

	D	V
L	0.4	0.3
B	0.2	0.1
	0.6	0.4

$$(a) P[V|L] = \frac{P[V \cap L]}{P[L]} = \frac{0.3}{0.7} = \frac{3}{7}$$

$$(b) P[B \cap D] \stackrel{?}{=} P[B] P[D] \text{ check}$$

$$P[B \cap D] = 0.2 \quad \leftarrow \text{not equal!}$$

$$P[B] P[D] = 0.3 \times 0.6 = 0.18$$

\therefore B & D are not independent.

[2] In a group of students, 60% major in CS while the remaining 40% major in Math. Among CS students, 20% are part-time students. Similarly, among Math students, 10% are part-time students. If a randomly selected student from the gathering is a part-time student, find the probability that he/she majors in Math.

$$P[CS] = 0.6, \quad P[M] = 0.4$$

PT - Part time
FT - Full time

$$P[PT/CS] = 0.2, \quad P[FT/CS] = 0.8$$

$$P[PT/M] = 0.1, \quad P[FT/M] = 0.9$$

$$P[PT] = P[PT/CS] P[CS] + P[PT/M] P[M]$$

$$= 0.2 \times 0.6 + 0.1 \times 0.4$$

$$= 0.12 + 0.04 = 0.16$$

$$P[M/PT] = ?$$

$$P[M/PT] = \frac{P[PT/M] P[M]}{P[PT]}$$

$$= \frac{0.1 \times 0.4}{0.16} //$$