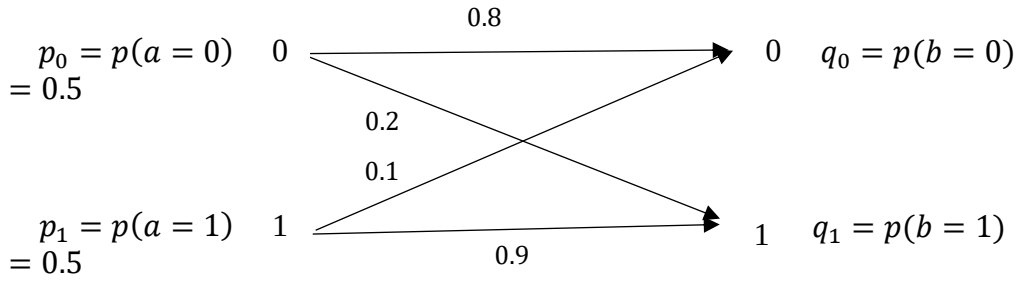
Homework 6: (Chapter 4 Information Channel)

Additional questions

1. (10%) For the binary channel shown below, find
(a) the channel matrix,
(b) $q_0 = P(b = 0)$ and $q_1 = P(b = 1)$ when $p_0 = p_1 = 0.5$, and
(c) the joint probabilities R_{01} = P(a=0, b=1) and R_{10} = P(a=1, b=0) when $p_0 = p_1 = 0.5$.



2. (4%) Given a BEC with $p = 0.5$ and $P = 0.8$, find the probabilities associated with the channel outputs. (I.e., $q_0 = P(b = 0), q_1 = P(b = 1), and\ q_? = P(b = ?)$)

3. (12%) Given a BSC with $p = 0.8$ and $P = 0.7$
(1) Compute the output probability distribution: q_0 and q_1.
Note $q_0 = \Pr(b = 0)$ and $q_1 = \Pr(b = 1)$.

(2) Compute the backward probabilities: Q_{01}, Q_{11}.
Note $Q_{ij} = P(a = i \mid b = j)$