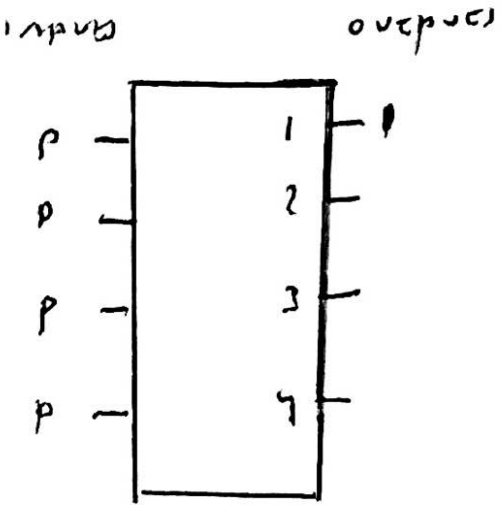
Name:_____

Hwk 2 ESE 346 Robertazzi

Concatenator

Consider a switching element serving as a "concatenator." There are four inputs and four outputs. Time is slotted. The independent probability of there being a packet at each input in a time slot is p. The independent probability of there being no packet at an input in a time slot is $1 - p$.

Referring to Fig. 2.10, if one input packet arrives across all inputs in a time slot, it is sent to the top output. If two packets arrive across all the inputs in a time slot, the packets are sent to the top two outputs. If three packets arrive across all the inputs in a time slot, the packets are sent to the top three outputs. If four packets arrive at the inputs in a time slot, each output gets a packet.



(a) Write an expression for the probability of a packet at output 3.

(b) Write an expression for the probability of no packet at output 1.

[c] Write an expression for the thruput (hint: it is simple).