COMP 3203 Assignment 5

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1. 6 Active Nodes A, B, B, D, E and F
   Slotted ALOHA
   a. P(C succeeds for the first time) = ?
      Transmits p
      doesn't transmit (1-p)
      P(C) = p(C) transmits * p(A doesn't transmit) * p(B doesn't transmit) * p(D doesn't transmit) * p(E doesn't transmit) * p(F doesn't transmit)
      = p(1-p)(1-p)(1-p)(1-p)(1-p)
      = $p(1-p)^5 \rightarrow 1$
      P(succeeding in the slot 4) = P(fail first three)*P(pass on fourth)=$p(1-p)^3 \rightarrow 2$
      Therefore P(C succeeding and ON the 4th slot is) = $1 \times 2 = \ p(1-p)^5 \times p(1-p)^3$

   b. P(some node succeeds in slot 7) =?
      P(A succeeds) =P(B succeeds) =P(C succeeds) =P(D succeeds) =P(E succeeds) =P(F succeeds) = $p(1-p)^6$
      =P(Either succeeds) =P(A)+P(B)+P(C)+P(D)+P(E)+P(F) = 6 $p(1-p)^6$

   c. P(success in slot 1) = ?
      P(some node succeeds) = 6p(1-p)^5
      P(first success in slot 1) = 6p(1-p)^5

   d. Efficiency = p(success for 6 node system in a slot) = $6p(1-p)^5$

2. a.

Action	Switch table status
A sends frame to B	Switch learns interface relating to Mac address of A
B replies with frame to A	Switch learns interface relating to Mac address of B

C send frame to A	Switch learns interface relating to Mac address of C
A responds to C	Switch remains same

b.

Action	Link packet	Justification
A sends frame to B	B,C,D,E	Switch table is empty and it doesn't know the interface corresponding to B
B responds to A	A	Switch knows interface relating to Mac Address A
C sends frame to A	A	Switch knows interface relating to Mac Address A
A responds to C	C	Switch knows interface relating to Mac Address C