FORD TANG
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WORKING WITH THE RAY CHOU

CS 132 - NETWORK HOME WORK 5

1. ## RANDOM ACCESS PROTOCOLS

a) PROBLEM 11:

(a) $[1 - (p(1-p)^3)]^4 \cdot p(1-p)^3$

(b) $p(1-p)^3 \cdot 4$; MULTIPLIED BY 4 SINCE ANY NODE CAN SUCCEED

(c) $\underbrace{[1 - 4p(1-p)^3]^2}_{\text{NODES FAIL TO SEND TWICE}} \cdot \underbrace{4p(1-p)^3}_{\text{ONE NODE SUCCEEDS}}$

(d) $4p(1-p)^3$

b) (i) No, PURE ALOHA TRANSMIT AS SOON AS DATA ARRIVES

(ii) Yes, M_1 AND M_2 ARRIVES AND TRANSMIT IN THE SAME SLOT
CAUSING A COLLISION SO THEY MUST TRY AGAIN NEXT TIME SLOT.
M_3 ARRIVES AND WAITS TILL 12 TO TRANSMIT. AT SLOT
TIME 12, BOTH M_1 AND M_2 ARE UNSUCCESSFUL FOR
RETRANSMISSION $(1 - p(1-p)^{N-1})$. M_3 SENDS SUCCESSFUL.
AT TIME 16, BOTH M_1 AND M_2 ARE UNSUCCESSFUL TO SEND.
AT TIME 20, M_1 SUCCEEDS TO SEND AND M_2 DOES NOT.
AT TIME 24, M_2 IS SUCCESSFUL TO TRANSMIT BUT COLLIDES
WITH M_4. AT TIME 28, BOTH M_2 AND M_4 FAIL
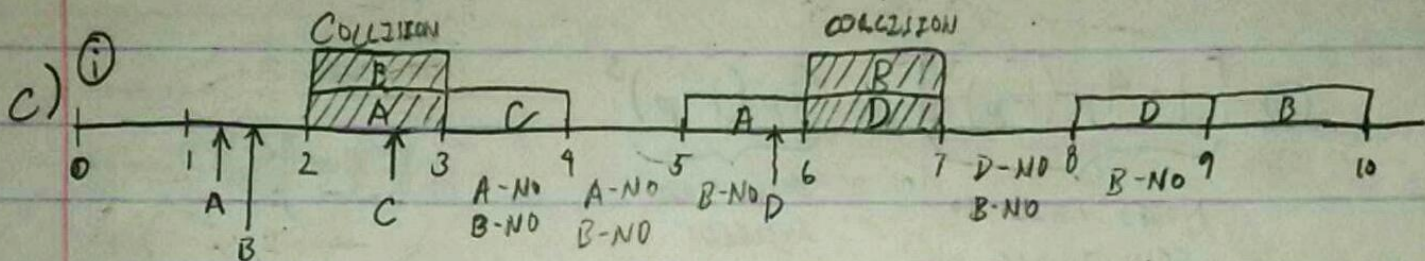TO TRANSMIT. AT TIME 32, M_4 IS SUCCESSFUL BUT M_2
IS NOT. AT TIME 36, M_2 HAD SUCCESS TO RETRANSMIT.

(iii) No, AS SOON AS M_1 ARRIVES IT WOULD DETECT A

CLEAR LINE AND TRANSMIT

(iv) No, SAME AS WITH CSMA, M_1 WOULD HAVE SENT

AS SOON AS IT ARRIVES SINCE THE LINE WAS FREE.

(v) No, WITH M_1 AND M_2 COLLIDING, THEY SHOULD EITHER

TRANSMIT AT TIME 12 OR 16.
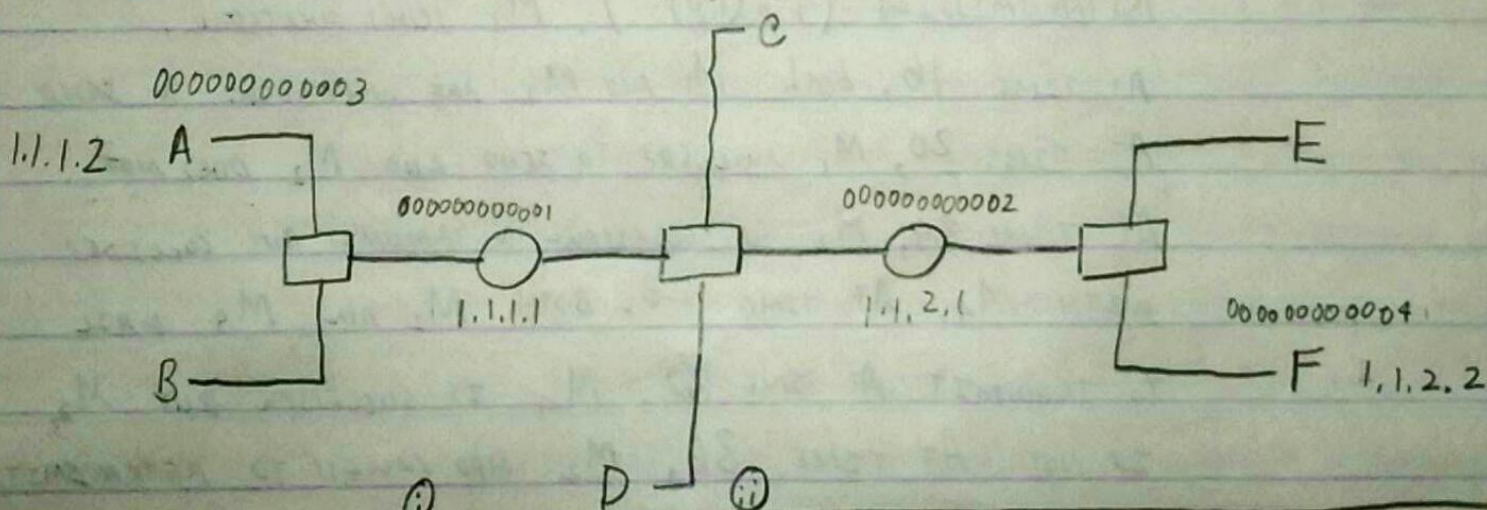
c) (i)

$p \geq 0.5 = $ RETRANSMIT ; YES

$p < 0.5 = $ DON'T RETRANSMIT ; NO

(ii) $1/e = 0.37$; $p \leq 0.37 = $ RETRANSMIT ; $p > 0.37 = $ DON'T RETRANSMIT

FOR MAXIMUM EFFICIENCY ↗

FOR FAIRNESS : $p \geq 0.5 = $ RETRANSMIT ; $p < 0.5 = $ DON'T RETRANSMIT ; FOR EACH STATION

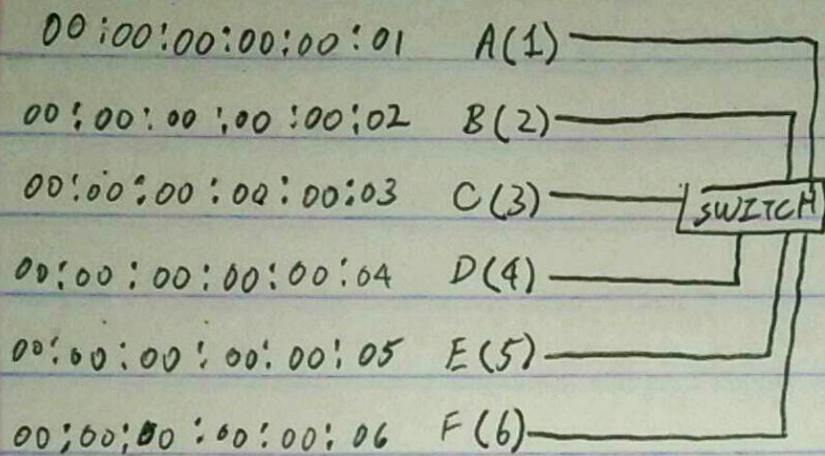## LANs: ADDRESSES AND SWITCHES

a) PROBLEM 21:

	(i)	D	(ii)
SOURCE MAC:	000000000003	000000000001	000000000002
SOURCE IP:	1.1.1.2	1.1.1.1	1.1.2.1
DESTINATION MAC:	000000000004	000000000004	000000000004
DESTINATION IP:	1.1.2.2	1.1.2.2	1.1.2.2

b) PROBLEM 26:

00:00:00:00:00:01   A(1) ─────────┐
00:00:00:00:00:02   B(2) ────────┐│
00:00:00:00:00:03   C(3) ──── [SWITCH]
00:00:00:00:00:04   D(4) ──────┘
00:00:00:00:00:05   E(5) ──────────┘
00:00:00:00:00:06   F(6) ────────────┘

ADDRESS	INTERFACE	TIME
① 00:00:00:00:00:02	2	$1 \to 2 \to 3 \to 4$ (ii)(iii)(iv)
② 00:00:00:00:00:05	5	2 (iv)
③ 00:00:00:00:00:01	1	$3 \to 4$

① TABLE INITIALLY EMPTY. B SENDS, SO TABLE ADDS B's ADDRESS AND
INTERFACE NUMBER AT TIME 1.

② E REPLIES, SO TABLE ADDS E's ADDRESS AND INTERFACE NUMBER AT
TIME 2. B's TIME IS UPDATED

③ A SENDS TO B, SO TABLE ADDS A's ADDRESS. AND INTERFACE
AT TIME 3. B's TIME IS UPDATED TO 3,

④ B replies, SO TABLE UPDATES B's AND A's TIME TO 4,