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EECS 148 Homework 5

**1. Random Access Protocols**

1. **Analysis of Slotted Aloha**. **Problem 11.**
2. **Comparing Protocols**
   1. No because the frames are not being transmitted immediately after arrival.
   2. Yes because the nodes do not transmit until the beginning of a time slot. When there is a collision, the nodes retransmit at a random subsequent slot which suggests that the retransmissions happen if the coin toss is successful at the slot; otherwise it tries again at the next slot.
   3. Yes if the CSMA protocol is p-persistent since the nodes do not transmit if the slot is busy, and if the slot is idle, the nodes tries to transmit if the coin toss is successful . If the coin toss fails, the nodes waits until the next time slot to try to transmit again.
   4. No because the nodes transmit their frames completely despite a collision occurring.
   5. No because the M2 frame is retransmitted for the second time after the same amount of time of the first retransmission.
3. **Slotted Aloha in Action** 
   1. Since A and B receive packets at time 1.5 and 1.7 respectively, they both transmit from time 2 to 3, causing a collision. C receives a packet at time 2.6, so it will transmit from time 3 to 4 without collision since A and B both fail their coin toss at that time slot (assuming number < 0.5 is tails and number ≥ 0.5 is heads). A’s coin toss is successful at time 5, so A transmits from time 5 to 6 without collision since B’s coin toss fails. D receives a packet at time 5.7, so D transmits from time 6 to 7, but B’s coin toss is successful at that time slot, so B also transmits from time 6 to 7, causing a collision. D’s coin toss is successful at time 8, so D transmits from time 8 to 9 without collision since B’s coin toss fails at that time slot. B’s coin toss is successful at time 9, so B finally transmits from time 9 to 10.
   2. To maximize efficiency and fairness, the probabilities for each of the four stations should each be 0.25.

**2. LANs: Addresses and Switches**

1. **MAC and IP addresses: Problem 21**

|  |  |  |
| --- | --- | --- |
|  | MAC address | IP address |
| Source | 00:00:00:00:00:0A | 111.111.111.111 |
| Destination | 00:00:00:00:00:01 | 333.333.333.333 |

|  |  |  |
| --- | --- | --- |
|  | MAC address | IP address |
| Source | 00:00:00:00:00:02 | 111.111.111.111 |
| Destination | 00:00:00:00:00:04 | 333.333.333.333 |

|  |  |  |
| --- | --- | --- |
|  | MAC address | IP address |
| Source | 00:00:00:00:00:07 | 111.111.111.111 |
| Destination | 00:00:00:00:00:0F | 333.333.333.333 |

1. **Learning Switches: Problem 26**
   1. The switch table is initially empty then the switch learns the interface that corresponds to the MAC address of B. Transmitted frame is forwarded to A, B, D, E, and F because switch table is initially empty and does not know the interface that corresponds to the MAC address of E.
   2. The switch learns the interface that corresponds to the MAC address of E. Transmitted frame is forwarded to B because the switch knows the interface that corresponds to the MAC address of B.
   3. The switch learns the interface that corresponds to the MAC address of A. Transmitted frame is forwarded to B because the switch knows the interface that corresponds to the MAC address of B.
   4. The switch table does not change. Transmitted frame is forwarded to A because the switch knows the interface that corresponds to the MAC address of A.