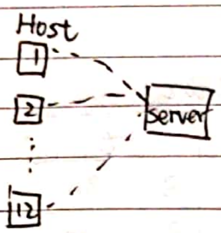
LUO ZIJIAN A0224725H

Section 1

1. 155.52 Mbps

2.



For switch,

the throughput is 1200 Mbps.

3. $AL_5 - AL_4 - AL_3 - AL_2 - AL_1 - RL_1 - RL_2 - RL_3 - RL_2 - RL_1 - BL_1 - BL_2 - BL_3 - BL_4 - BL_5$

4. The configuration message is <Y, 7, 5>

5. 1 ms When the link ~~is~~ bandwidth is double, the total ~~throughput~~ throughput is no changed, so the time became $\frac{1}{2} \times 2ms = 1ms$

Section 2

6. (a) For the list of the outstanding frames
{14, 15, 0, 1, 2, 3} ~~15~~ 10 − 4 = 6
so the 6 sequence of frames has been send.

(b) When receiving RR2, means {14, 15, 0, 1, 2} has been received,
so sender window updated {4, 5, 6, 7, 8, 9, 10, 11, 12}

7.
```
      100010110 1
101 / 1010100110000
      101
      ----
        00100
          101
        -----
           111
           101
          ----
            100
            101
          -----
             100
             101
          ------
               1
```

E[x] = 1, means there is an error

Therefore, the receiver can detect an error.

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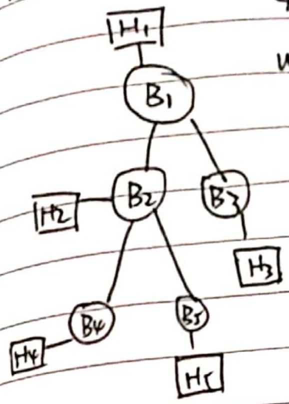
8. (a) When H_1 sends to H_4, every bridge forwards the packet through all the interfaces as none of the bridges knows where H_4 is; all bridges learn where H_1 is.



(b) When H_5 sends to H_1, the packet use the path $H_5 - B_5 - B_2 - B_1 - H_1$ as every bridge knows where H_1 is; B_5, B_2, B_1 learn where H_5 is, Bridge B_3, B_4 does not learn where H_5 is.

The ~~follow~~ forwarding tables are built as follows:

Bridge B_1

Host	port
H_1	$B_1 \to H_1$
H_5	$B_1 \to B_2$

B_2

Host	Port
H_1	$B_2 \to B_1$
H_5	$B_2 \to B_5$

B_5

Host	Port
H_1	$B_5 \to B_2$
H_5	$B_5 \to H_5$

B_3

Host	port
H_1	$B_3 \to B_1$

B_4

Host	Port
H_1	$B_4 \to B_1$

9. I don't think, each host has 0.5 probability of winning the race?

No.

Reasons: For both A and B, this collision is the second collision. means. A's slot is $[0,3)$ B's slot is $[0,3)$

For A, if A win the race, when $A=0$, $B=1,2,3$
When $A=1$, $B=2,3$
When $A=2$, $B=3$
When $A=3$, $B=\phi$

Therefore, $P(A \text{ win the race}) = \frac{3+2+1}{4 \times 4} = \frac{3}{8}$

Using the similar analyse, we also can get $P(B \text{ win the race}) = \frac{3}{8}$

In a word, EACH host has $\frac{3}{8}$ probability of winning the race.

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10. $T_f = \frac{10^{12}}{3 \times 60 \times 60} = 10^8$ ~~[illegible]~~ bps

$T_{p_1} = \frac{2000 \times 10^3}{3 \times 10^8} \approx 6.66\ ms$

$T_{p_2} = 5 \times 2000 = 10000\ us = 10\ ms$