Deber 02 Redes

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CMP-4005 -- Homework 1

1.

1. a) Collision

$h + $ S1.2 $\angle$ B's

choise ① probability $= \frac{1}{2}$ | chose ② probability $= \frac{1}{2}$

we can chose between $(0,1),(0,2),(0,3),(1,2),(1,3)$

so the probability is

$$\left[\left(\frac{1}{2}\right)\left(\frac{3}{4}\right) + \left(\frac{1}{2}\right)\left(\frac{2}{4}\right)\right] \Rightarrow \frac{3}{8} + \frac{1}{4} = \frac{3+2}{8} = \boxed{\frac{5}{8}} \text{ //}$$

b) probability of each $= \frac{1}{2}$ we can choose between

$(0 \rightarrow 3)$ so $= \frac{1}{8}$ $\Rightarrow \left[\left(\frac{1}{2}\right)\left(\frac{7}{8}\right) + \left(\frac{1}{2}\right)\left(\frac{6}{8}\right)\right] \Rightarrow \boxed{\frac{13}{16}}$ //

c) If A wins $\angle$ race then the probably is $\frac{5}{8}$,
of each is $\frac{1}{2}$ so $\frac{A}{\text{B's}} > \frac{1}{2}$ so we have a successic

$$\left(1 - \frac{1}{8}\right)\left(1 - \frac{1}{16}\right)\cdots\cdots \text{ the bound and condition to f}$$

wins every race

d) B₁ will failure and try next frame B₁ $\approx$ B

2). 3).

2:

a) probability that on 1024-host network, will the same birthday problem says

$$\left(1 - \frac{1}{1 \text{ year}}\right)\left(1 - \frac{2}{1 \text{ year}}\right) \quad \text{so we have that}$$

$$\left(1 - \frac{1}{2^{48}}\right)\left(1 - \frac{2}{2^{48}}\right)\left(1 - \frac{3}{2^{48}}\right)\left(1 - \frac{4}{2^{48}}\right) \cdots \left(1 - \frac{1023}{2^{48}}\right)$$

making this in a computer we have that the probability is $\left| 1.7 \times 10^{-9} \right|$ "

b) $\left(1 - \frac{1}{2^{20}}\right) \cdots \left(1 - \frac{1023}{2^{20}}\right) = \Rightarrow \overline{\left| 1.77 \times 10^{-3} \right|}$ "

c) $\left(2^{48} - \frac{1}{2^{30}}\right) \cdots \left(2^{48} - \frac{1023}{2^{30}}\right) \Rightarrow$ extra large answer

3.- Because it could manage more traffic, because if we have multiple devices we can transmit data simultaneosly.

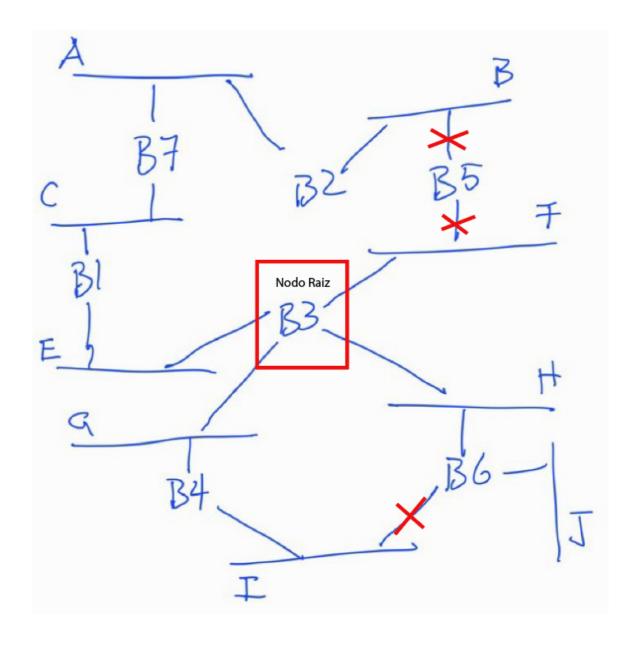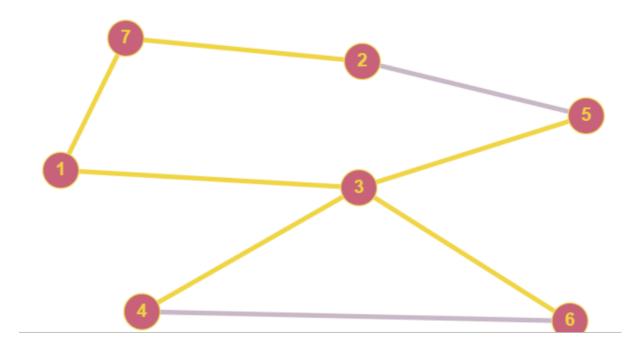Also if there's a problem in any device this problem doesn't break the comunication

4). 5).

4: IP fragmented into 10

a) 90 1 independent

   10% losing

   So $(10\%)(0.1) \Rightarrow (0.1)(0.1) = \overline{0.01}$ //

b) fragmented and the probability above

   $(0.01)(0.01) = \overline{0.0001}$ //

c) We can use a same value for ident field.

5:

Nodo A:

Destino	hop	Cost
B	C→i	6
C	C	3
D	C→E	6
E	C	4
F	C	9

Nodo B:

Destino	hop	Cost
A	E→C	12
C	E	3
D	E	4
E	E	2
F	E→C	9

Nodo C:

Destino	hop	Cost
A	A	3
B	E	3
D	E	3
E	E	1
F	F	6

Nodo D:

Dest	hop	Cost
A	E	6
B	E	4
C	E	3
E	E	2
F	E	9

Nodo E

Destino	hop	Cost
A	C	4
B	B	2
C	C	1
D	D	2
F	C	7

Nodo F

Destino	hop	Cost
A	C	9
B	C	9
C	C	6
D	C	9
E	C	7

6. Spanning Tree done made with computational algorithm

We use Graph Online to make the LAN as a graph and use the algorithm STP an we got this result

7. **Traceroute**

```
Tracing route to usfq.edu.ec [192.188.53.110]
over a maximum of 30 hops:

  1      2 ms     <1 ms     <1 ms   192.168.100.1
  2      9 ms      7 ms      4 ms   100.97.113.1
  3      4 ms      5 ms      5 ms   10.224.11.150
  4      3 ms      3 ms      3 ms   10.201.222.36
  5      3 ms      2 ms      2 ms   10.201.222.20
  6     13 ms      8 ms      4 ms   10.201.222.29
  7      3 ms      2 ms      2 ms   100.71.0.7
  8      2 ms      3 ms      7 ms   100.71.0.6
  9      4 ms      3 ms      3 ms   186.101.24.50
 10     10 ms     11 ms     10 ms   186.3.125.42
 11      9 ms     10 ms     11 ms   143.255.248.252
 12      *          *          *     Request timed out.
 13      *          *          *     Request timed out.
 14      *          *          *     Request timed out.
 15      *          *          *     Request timed out.
```

we have a "request timed out" in hop 12 so we say that leave our local site in 11 hops

```
:\Users\nicor>tracert google.com

racing route to google.com [2800:3f0:4005:408::200e]
ver a maximum of 30 hops:

  1     1 ms     1 ms    <1 ms  2800:bf0:1fff:f520:82e1:bfff:fea8:92e3
  2     9 ms     6 ms     5 ms  2800:bf0:1fff:f520::1
  3     3 ms     3 ms     3 ms  fd00:0:0:8ad::1
  4     3 ms     2 ms     2 ms  ::ffff:10.201.222.36
  5     4 ms     2 ms     2 ms  ::ffff:10.101.21.186
  6    15 ms    15 ms    16 ms  2800:3f0:804c::1
  7    16 ms    15 ms    15 ms  2800:3f0:4005:408::200e

race complete.
```

Need 7 hops to leave the local site

```
Tracing route to amazon.com [54.239.28.85]
over a maximum of 30 hops:

  1     7 ms    13 ms    14 ms  192.168.100.1
  2     8 ms     4 ms     4 ms  100.97.113.1
  3     2 ms     3 ms     2 ms  10.224.11.150
  4     3 ms     9 ms     2 ms  10.201.222.36
  5     3 ms     2 ms     2 ms  10.201.222.20
  6     3 ms     2 ms     2 ms  100.71.0.6
  7     3 ms     3 ms     3 ms  186.101.24.50
  8    10 ms     7 ms    14 ms  204-199-148-221.dia.static.centurylink.com.ec [204.199.148.221]
  9     *         *         *    Request timed out.
 10    70 ms    69 ms    69 ms  99.82.179.8
```

Step 8 we have a change of IP so we need 8 hops to leave our local site

This command line send a couple of ICMP(Internet Control Message Protocol) packets also takes the time to send and arrive the package

Packets have TTL(Time to live) values this means that a package has a life time