



Operating Systems and Networks

Assignment 6

Assigned on: **27th Mar 2014**

Due by: **4th Apr 2014**

1 CRC

Suppose we want to transmit the message 11001001 ($P(x) = x^7 + X^6 + x^3 + 1$) and protect it from errors using the CRC polynomial $C(x) = x^3 + 1$.

- Use polynomial long division to determine the message that should be transmitted.
- Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred?
- Give an example of the error which can not be detected by CRC. Is there a general pattern for undetectable errors?

2 Spanning Tree Algorithm

- Given the network shown in Figure 1, where the letters A to J represent LANs and the circles B1 to B7 represent a switch node. Indicate which ports are not selected by the spanning tree algorithm.
- Given the network shown in Figure 1, assume that switch B1 suffers catastrophic failure. Indicate which ports are not selected by the spanning tree algorithm after the recovery process and a new tree has been formed.

3 Switches

- Store-and-forward switches have an advantage over cut-through switches with respect to damaged frames. Explain what it is.
- What is the big benefit of using switches to connect hosts?

4 IP Checksum

Here is a IP header from an IP packet received at destination :

4500 003c 1c46 4000 4006 b1e6 ac10 0a63 ac10 0a0c

Please compute the checksum for the header.

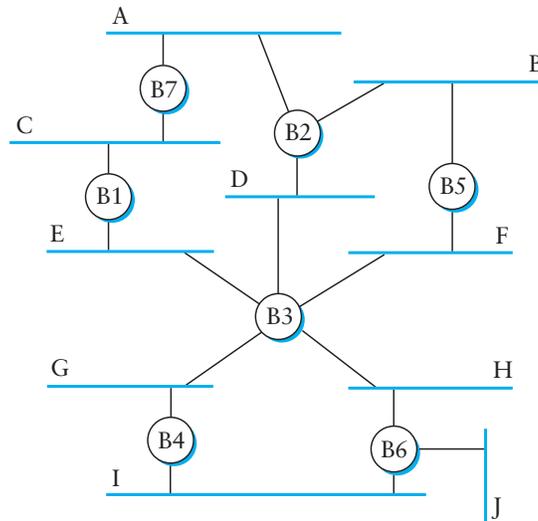


Figure 1: Network for spanning tree algorithm

5 Network Tool

5.1 Traceroute

- a) Run a traceroute to `www.netsec.ethz.ch`. Record the output. Describe what is strange about the observed output, and why traceroute gives you such an output. Refer to the traceroute man page for useful hints.
- b) Explain how traceroute discovers a path to a remote host. The man page might be useful in answering this question.