Computer Netwrok Notes

Network Models:

1. OSI

Seven Layers-

1. TCP/IP

ARQ Techniques:

1. Stop-and-Wait ARQ: In this simple ARQ technique, the sender sends a data packet to the receiver and waits for an acknowledgment (ACK) before sending the next packet. If the sender does not receive an ACK within a specified timeout period, it assumes the packet was lost or corrupted and retransmits it. This technique ensures reliable delivery but may lead to inefficient use of bandwidth due to the waiting time.
2. Go-Back-N ARQ: This ARQ technique allows the sender to transmit multiple packets without waiting for individual acknowledgments. The receiver buffers the received packets and sends cumulative acknowledgments for all successfully received packets. If the sender does not receive an ACK within a timeout period, it assumes that one or more packets were lost and retransmits all packets starting from the last acknowledged one. This technique improves bandwidth utilization but may result in unnecessary retransmissions if only a few packets were lost.
3. Selective Reject ARQ: Similar to Go-Back-N ARQ, Selective Repeat ARQ allows the sender to transmit multiple packets. However, the receiver individually acknowledges each successfully received packet, allowing the sender to retransmit only the lost or corrupted packets. For every sent packet a individual timer is set, if an Ack signal is not received for that packet in the set time, then only that packet is resent. The receiver buffers out-of-order packets and delivers them to the upper layer in the correct order. This technique reduces unnecessary retransmissions and improves efficiency but requires more complex buffering and processing at both ends.

CRC (Cyclic Redundancy Check):

Used tocheck errors, A checksum is calculated for the data and sent along with it, the receiver also performs the same set of operations to calculate a check sum and compare it with the checksum received.

What is sliding window protocol?

ChatGPT

Sliding window protocol is a flow control mechanism used in computer networking to manage the transmission of data between a sender and a receiver over a communication channel. It allows multiple packets to be transmitted and acknowledged simultaneously, improving the efficiency of data transfer.

Here's how the sliding window protocol works:

1. Window Size: The sliding window consists of a fixed number of packets that can be sent without requiring an acknowledgment. This number is known as the window size. The window size determines the maximum number of unacknowledged packets that the sender can transmit at a given time.

There are two main variations of ALOHA:

1. Pure ALOHA: In Pure ALOHA, devices can transmit data packets at any time without checking for channel availability or collisions with other devices. If two or more devices transmit simultaneously and their packets collide, a collision occurs.
   * Collision Detection: After transmitting a packet, a device listens to the network to detect collisions. If a collision is detected, the device waits for a random period of time and retransmits the packet.
   * Efficiency: Pure ALOHA is inefficient because collisions are likely to occur, leading to retransmissions and wasted bandwidth. It is suitable for low-traffic networks.
2. Slotted ALOHA: Slotted ALOHA improves the efficiency of the protocol by dividing time into discrete slots, synchronized across all devices. Each slot corresponds to the time required to transmit a single packet.
   * Transmission Timing: Devices are allowed to transmit only at the beginning of a time slot. If a device has data to transmit, it waits until the next slot starts.
   * Collision Detection: After transmitting a packet, a device listens to the network for acknowledgments or collisions. If a collision is detected, the device waits for a random time and retransmits the packet in the next time slot.
   * Efficiency: Slotted ALOHA improves efficiency compared to Pure ALOHA because collisions are reduced. The maximum achievable throughput of Slotted ALOHA is approximately 36.8% of the total channel capacity.

ALOHA is a simple protocol that provides a basic framework for random access communication. While it has limitations in terms of efficiency and collision handling, its concepts and principles have influenced the development of more advanced protocols, such as Carrier Sense Multiple Access (CSMA), which form the basis of modern Ethernet and wireless networking standards.

import java.util.\*;

class main{

int isDivisible(StringBuffer s){

//complete the function here

int cnt=0;

s.reverse();

for(int i=0;i<s.length();i++)

{

if(s.charAt(i)=='1')

cnt+=(i%2==0 ? 1 : 2);

}

return cnt%3==0?1:0;

}

public void main (String[] args) {

/\* code \*/

int t;

Scanner sc=new Scanner(System.in);

t=sc.nextInt();

String k;

while(t!=0){

StringBuffer s=new StringBuffer();

k=sc.nextLine();

s.append(k);

System.out.println(isDivisible(s));

t--;

}

}

}

class Solution{

public:

int isDivisible(string s){

//complete the function here

int cnt=0;

reverse(s.begin(),s.end());

for(int i=0;i<s.size();i++)

{

if(s[i]=='1')

cnt+=(i%2==0 ? 1 : 2);

}

return cnt%3==0;

}

};