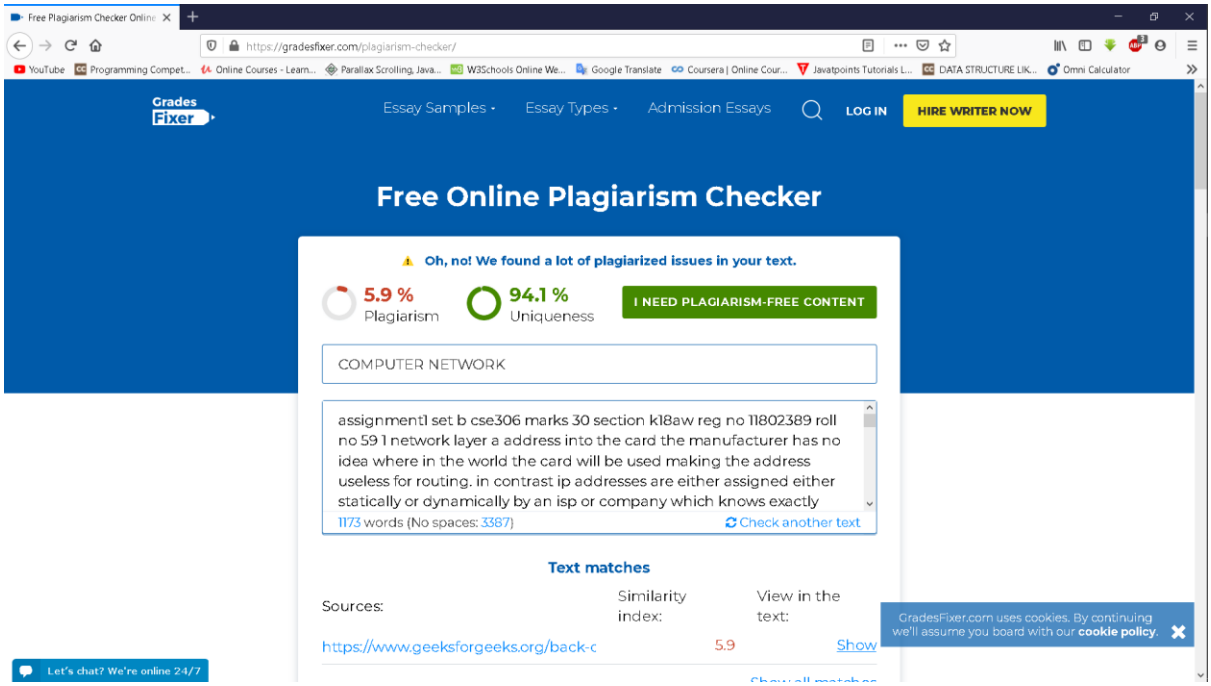
ASSIGNMENT1 (SET-B)

CSE306 MARKS -30

SECTION-K18AW

REG NO-11802389

ROLL NO-59



1)- NETWORK LAYER

A)-

Each Ethernet adapter sold in stores comes hardwired with an Ethernet (MAC) address in it. When burning the address into the card, the manufacturer has no idea where in the world the card will be used, making the address useless for routing. In contrast, IP addresses are either assigned either statically or dynamically by an ISP or company, which knows exactly how to get to the host getting the IP address.

B)-

The mask is 20 bits long, so the network part is 20 bits. Th e remaining 12 bits are for the host, so 4096 host address es exist.

Subnet mask of 255.255.240.0

Convert the subnet mask to binary: 11111111.11111111. 11110000.00000000
The zeroes tell you which bytes indicate the host; in this c ase, 12 zeroes allow for 2^12 = 4096 different IP address es within the subnet. Of these, two are unusable for a hos t, so you have a maximum of 4094 hosts.

C)-

With a 2-
bit prefix, there would have been 18 bits left over to indica

te the network. Consequently, the number of networks wo uld have been 218 or 262,144. However, all 0s and all 1s are special, so only 262,142 are available.

Class B networks range from 128-
191 (or 64 possible values) over their first 8 bits. Therefor e, the number of networks had class B used 20 bits to rep resent the network part of the address would have been

$64 * 2^{12} = 262,144$.

D)-

Subnet mask is a mask used to determine what subnet a n IP address belongs to. An IP address has two compone nts, the network address and the host address. For exam ple, consider the IP address **150.215.017.009**. Assuming this is part of a Class B network, the first two numbers (**15 0.215**) represent the Class B network address, and the se cond two numbers (**017.009**) identify a particular host on t his network.

2)- DATA LINK LAYER

A)-

Number the acquisition attempts starting at 1. Attempt i is distributed among 2^(i −1) slots.

Thus, the probability of a collision on attempt i is

2^(−(i −1)). The probability that the first k − 1 attempts will fail, followed by a success on round k is

$$P_k = (1 - 2^{-(k-1)}) \prod_{i=1}^{k-1} 2^{-(i-1)}$$

which can be simplified to

$$P_k = (1 - 2^{-(k-1)})\, 2^{-(k-1)(k-2)/2}$$

The expected number of rounds is then just ΣkPk.

Ƀ)-

Store-and-
forward switches store entire frames before forwarding th em. After a frame comes in, the checksum can be verified . If the frame is damaged, it is discarded immediately. Wit h cut-
through, damaged frames cannot be discarded by the swi tch because by the time the error is detected, the frame is already gone. Trying to deal with the problem is like locki ng the barn door after the horse has escaped.

ℂ)-

An IP address is a label which is used to identify one or m ore devices on a computer network, such as the internet. It is comparable to a postal address. An IP address is a lo ng number written in binary. ... These routers or gateways are often configured to assign "local” IP addresses to the devices that are connected.

And An Internet Protocol is a numeric label assigned to e ach device (e.g., computer, smartphone, hotspot) particip ating in a computer network that uses the Internet Protoc ol for communication. The address serves two principal fu nctions: host or network interface identification and locati on addressing.

D)-

Back-
off algorithm is a **collision resolution** mechanism which is used in random access MAC protocols (CSMA/CD). Th is algorithm is generally used in Ethernet to schedule re-transmissions after collisions.

If a collision takes place between 2 stations, they may res tart transmission as soon as they can after the collision. T his will always lead to another collision and form an infinit e loop of collisions leading to a deadlock. To prevent such scenario back-off algorithm is used.

<>TRANSPORT LAYER<>

A)-

- To use TCP or UDP, your RPC addresses must end i n the medium names whereas UDP is a datagram pr otocol. The RPC system uses one or the other as ins tructed. UDP may be faster but is not available on so me machines. TCP is stream-
  oriented and so, when data flow is mainly in one dire ction.

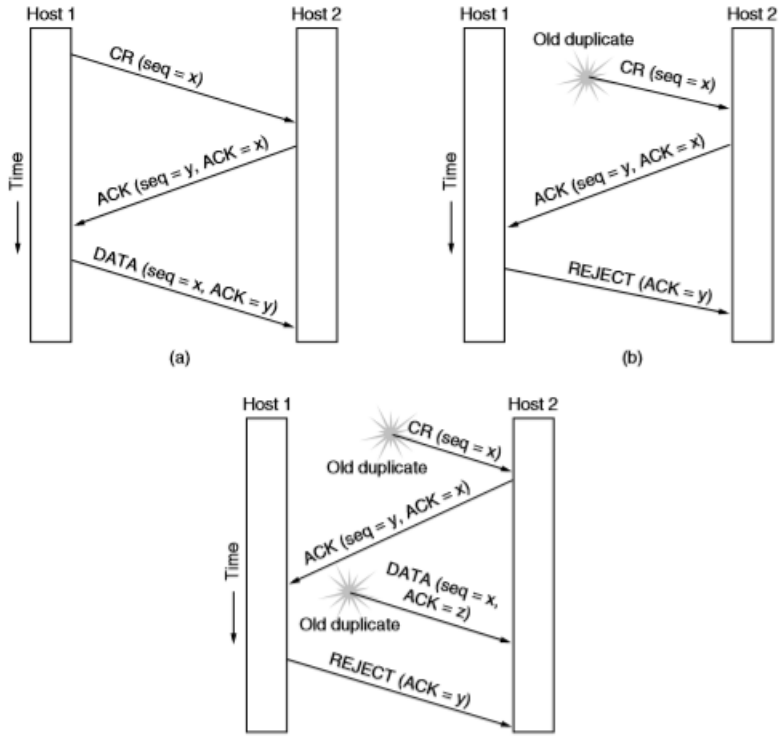
- In terms of transport layer protocols, UDP is a good b ase on which to implement RPC. Both requests and r eplies may be sent as a single UDP packet in the sim plest case and the operation can be fast.
- However, not all operations are idempotent, for exa mple, because they have important side-effects such as incrementing a counter. RPC for thes e operations requires stronger semantics so that wh en the programmer calls a procedure it is not execut ed multiple times. In this case, it may be necessary t o set up a TCP connection and send the request ove r it rather than using UDP.

B)-

The TCP protocol manages communication faults.
The RPC client and servers are notified of connection fail ures when they use the TCP
keepalive option. They can take appropriate decision whe n they encounter this kind of
events.
Unconfirmed services are used for special events as alar ms. This kind of information needs
urgent data transfers. TCP provides this facility

C)->

Three way handshake



Look at the second duplicate packet in Fig(b).

When that packet arrives, it would be a disaster if acknow ledgements to y were still floating around.

D)-

Real communication takes place between two processes (application programs). We need process-to-process delivery. The transport layer is responsible for pr ocess-to-process delivery-
the delivery of a packet, part of a message, from one proc ess to another.

E)-

DNS is a host name to IP address translation service. DN S is a distributed database implemented in a hierarchy of

name servers. It is an application layer protocol for messa ge exchange between clients and servers.

The Domain Name System (DNS) is the phonebook of th e Internet. Humans access information online through do main names, like nytimes.com or espn.com. Web browse rs interact through Internet Protocol (IP) addresses. DNS translates domain names to IP addresses so browsers ca n load Internet resources.