NATIONAL INSTITUTE OF TECHNOLOGY, WARANGAL
(An Institution of National Importance)
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
III B. Tech (Computer Science & Engineering) I Semester
CS304 : COMPUTER NETWORKS
Minor Test - II

Date: 14 - 11- 2023 Time: 1 hour 15 minutes   Max. Marks: 15

1.   Answer all the subparts at one place and in sequence only

a)   When poll() is also used for I/O multiplexing, why again select() system call is   1.5
preferable in many of the networked applications? List the system calls involved in
your answer.   1024 — 65 5 35

b)   What are the ranges (values) of source port and destination port numbers in the first   1.5
message of a TCP connection establishment in the Internet? How you have arrived at
such ranges?
        DSE Classes
c)   What are the IP addresses which are unused/ unclassified? How you have arrived at   1.5
such numbers/ranges?   DSE

d)   If the IP protocol usage is changed for version 4 (IPv4) to version 6 (IPv6) , then is it   1.5
required to change the ARP protocol?
First answer 'Yes' or 'No.'. After that only briefly explain to support your answer.

2.   Assume that a process S in a server system is providing a connection-oriented service   2
as follows: a client process C, connects to the sever process S, and sends a message
containing: an IP address (IP$_5$), and a file name (f1). That means the client process is
requesting the server process to send contents of the specified file (f1 is in server
computer system) to all the processes which are running in the computer system
whose IP address is IP$_5$. Now the server process makes arrangements and execs
S2.exe without command line arguments. Assume all the processes in the coputer
system of IP$_5$ have already made arrangements to receive from the server.

S2.c code is as below.

```
main()
{ char buf[50];
      while !eof(stdin) {
cin>>buf ;
cout<<buf ; }
}
```

Write pseudo-code segment (not full program) for process S.
(Note : read(), write(), send() recv() system calls should not be used.)

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0 0 0 1 0 0 0 0

3. **Safe Guard Service Provider:** In a computer system, there are service server processes of S1 (threesfds) , S2(two sfds) , S3(three sdfs) which offers different connection oriented services. There is a special Safe Guard Service Provider process SG , is also running on the same system which will be observing and sending warning messages as follows: Whenever a Si notices that there is a connection request for it, then it checks with SG ; whether to accept that connection or not(as SG also observed that connection request). SG checks with the list of blocked IPs and notifies the same to Si about that request (means either to accept or not to accept, depending on the requested client is a blocked IP or safe IP). After receiving such permission grant from SG, a Si accepts or rejects a request. And if SG finds that there is a request from a blocked client (i.e. from a Hacker System, H) , then SG sends a warning message to that H.

But, after receiving such a warning message from SG, a hacker process H, does not keep quite.

It does something as follows: Actually the Hacker Process has already infected the computer system of SG, with a virus V. And that virus program (process V) is already running in the computer system of SG. So, soon after getting a warning message from SG, the H will send a message to V, (because H only knows about V) to disturb the internet connection for the SG computer system by mismatching MAC of that system with IP. Then V injects such damage.

As the SG is attentive all the time, it also observes such kind of mischief and safe guards the Internet connection so that all the Si can provide services to genuine clients.

First write clear steps/flowchart for each Process with proper system calls

4. **NIT-Cricket:** Assume that there is one batsman, one bowler, one umpire and four fielders in the NIT-Cricket ground. The bowler sends afd· (i.e. a file descriptor represents a ball) to the batsman and notifies the umpire. (i.e. has bowled the ball). If the batsman doesn't reply within a specified time, he is declared as out, else, the batsman reads data from the file (fd), which contains two values – (speed, spin). Then he uses a function which takes these two numbers and generates a random number 'r' between 0 and 40. The batsman announces this number 'r'. (i.e. has hit the ball). The fielders are bearing(wearing) numbers as 10, 20, 30, 40. If the number 'r' is a multiple of either 4 or 6, the batsman gets runs as 4(boundary) or 6(sixer). Otherwise, the fielder with the number closest to 'r', informs the umpire that he got 'catch', then, umpire declares that the batsman is out. If the umpire has not been reported by any fielder, he announces the runs, as mentioned above. The fd (i.e. ball) is to be returned to the umpire and then to the bowler for next bowling. Assume that batsman, bowler and umpire are in one same system and fielders are in different systems.

Write essential code for _any two_ processes of bowler, batsman, umpire processes of the above cricket scenario.

(As the batsman is from CSE, NITW, if he hits, it would be either a boundary(4) or a sixer(6), because he is playing single handed on his OWN !!!)