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ROLL NO. 65
YR : 4th Yr 7th SEM.
SUB : Distributed Operating System (CS704A)

Q1. Discuss in detail about the different system architecture types in Distributed System.

Ans. The system architecture types in Distributed system are as:-

(1) Mini computer model:- high end processors, large memory and many high end features - better than personal computers. Ratio of mini computer to user is less than 1.

(2) Workstation model :- as per price fall between mini and personal computer have special s/w are hardware feature. No. of workstations :. no. of users is exactly 1.

(3) Processor - pool model - very fast processors. processor to user ratio is more than 1. No. of persons available is always more than the no. of tasks.

Q2. Discuss the in detail about the different issues to be dealt with in case of designing a distributed OS.

Ans. The following are the issues to be dealt with DOS as:-

(1) Absence of global state - global state refers to the combination of global system clock and global

memory. Each computer works according to its local clock hence the sequencing becomes difficult. Each works according to its own local clock.

(2). Naming :- different processes, services, resources etc can be given a name, hence problem of replication may arise ~~causing~~ cause the Naming Service may be present at five different locations, hence all 5 needs to be updated.

(3) Scalability - system grows with time hence the system should be such that growth can be accomodated.

(4). Compatibility - refers to the inter-operability of systems. The following are the 3 levels!-

- Binary level
- Execution level
- Protocol level.

(5) Process Synchronization - The requests are random thus need to assign priority so that access occurs in a desired manner.

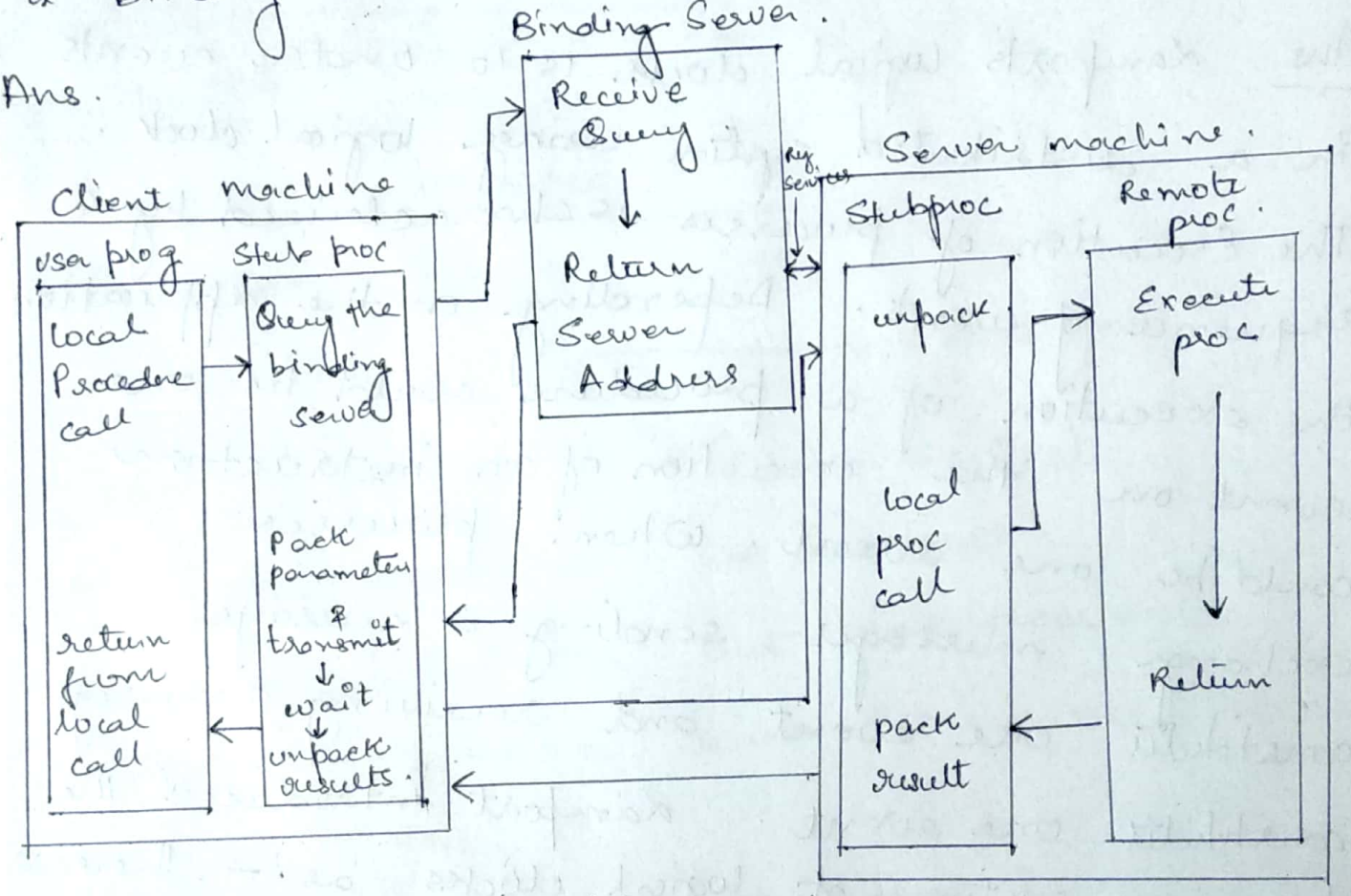
(6) Resource Management - Resource manager is a program that can manage all the various resources of the operating system.

Security – deals with Authentication as well as Authorization.

(8) Structuring – In conventional OS we had only monolithic kernel whereas here we have collective kernel as well as micro kernel.

Q3. Discuss the concept of RPC with the help of a neat diagram and also discuss the need of a Binding Server.

Ans.



Schematic Diagram of RPC.

Binding is the process of connecting the client and server. the server when it starts up, exports its interfaces, identifying itself to a network name server and telling the local runtime its

dispatcher address. The client before issuing any calls, imports the server, which causes the RPC runtime to lookup the server through the name service and contact the requested server to setup a connection.

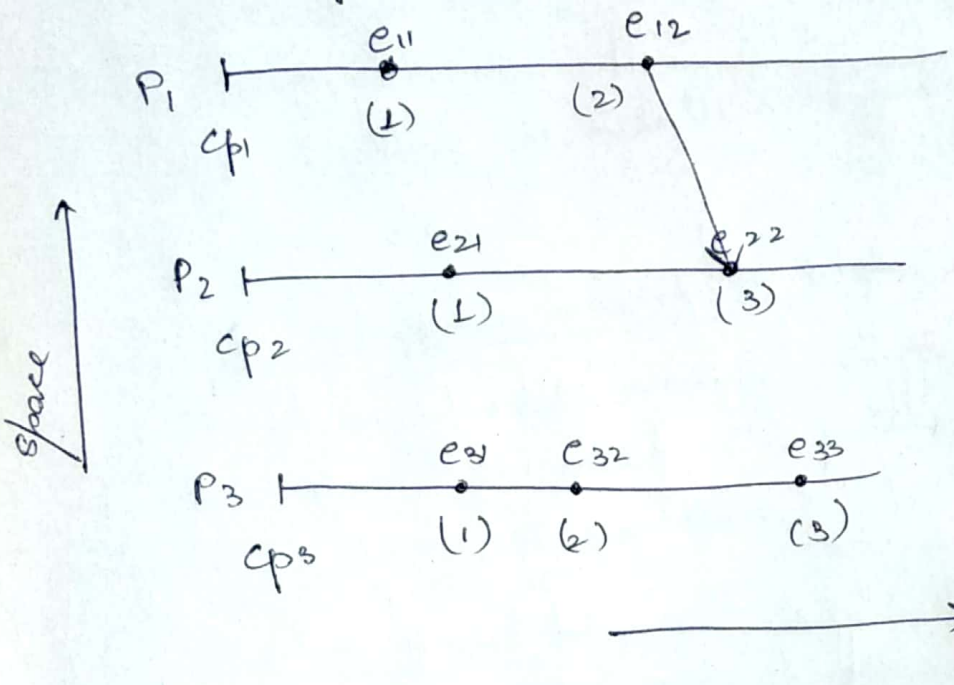
Q4. Discuss the concept of Lamport's logical Clock in detail with the help of valid examples & also discuss about its limitations.

Ans. Lamport's logical clock is to order events in a distributed system using logical clock. The Execution of processes is characterized by a sequence of events. Depending on the application the execution of a procedure could be one event on the execution of an instruction could be one event. When processes exchange messages, sending a message constitutes one event and receiving a message constitutes one event. Lamport introduced the following system of logical clocks as :- there is a clock C_i at each process P_i in the system. C_i acts as a function that assign a number $C_i(a)$ to any event a, called the timestamp of event a, at P_i. The nos assigned by the system

(A)

of clocks have no relation to physical time and hence logical clocks. It takes monotonically increasing values. These clocks are implemented by counters:

Disadvantage —



Here $e_{12} \rightarrow e_{22}$ $\therefore C(e_{12}) < C(e_{22})$

now e_{12} and e_{33}, we see that

$C(e_{12}) < C(e_{33})$ but that does not imply that $e_{12} \rightarrow e_{33}$. Cause there is no arrowhead from e_{12} to e_{33}.

Thus if C(event 1) < C(event 2) then it must have happened before the second event but this may not happen.