

Reason for Co-operating Process:

- Info sharing
- Memory Speed
- Modularity
- Convenience

Example

Producer - Consumer
Plan

* Communication Syn must be in co-op process.

Inf pro \rightarrow buffer \rightarrow inf consumer

Buffer:

- * Unbounded buffer problem
- * Bounded buffer problem.

Communication b/w two process - IPC

Optimum condition is that the buffer is filled by the producer without much delay & consumer empty's the buffer without much waiting.

Some of methods used for implementing a link and send/receiver operation are:

- i) Direct or Indirect communication
- ii) Symmetric or Asymmetric communication.

iii, Automatic (or) Error of name

iv, send by copy (or) sending reference

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Naming:

- Sent (P, Message)

- Receive (Q, Message)

Properties:

* Unidirectional communication

Symmetric & Asymmetric

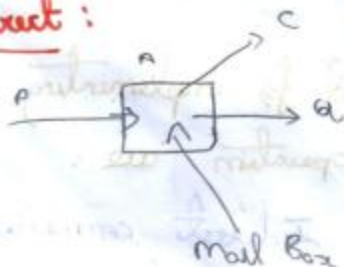
- Send (P, message)

- Receive (id, message)

Disadvantage:

Changing name of processor requires that all c.b reference of the process occurring to modified.

Indirect:



Send (A, Message)

Receive (A, Message)

Properties:

→ More than one link.

* A link is established a pair of process only if they share the mail box.

* A link may be associated with more than 2 process.

* A No. of different links may exist b/w each pair of communication process with each link corresponding to one mail box.

of (os == owner)

- Create new mail
- Send to Receiver msg
- Delete mail box

of (Process == owner)

- Receive mail box.

Synchronization:

- Synchronous [blocked]
 - Blocked send
 - Unblocked Receive
- Asynchronous [non blocked]
 - non-blocking send
 - Non-Blocking Receive

Blocking Send:

Sending process is blocked until the msg is received by the receiver process.

Nonblock Send:

Sending process sends the msg & continues with other process.

Blocking Receive:

Receiver process is blocked until msg is available.

Buffering:

Queue used for storage:

→ Zero capacity

→ Bounded capacity

Communication in client/server app:

Socket is the end point for communication to computers of IP address concatenated with

Java:

- Connection oriented (TCP)

- Connectionless (UDP)

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Two alternative

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XDR (External data rep)

- Since the communication takes place b/w client and server with different data user procedural machine independent data rep called External data rep.

Marshal Link converts Machine dependant format to XDR.

Unmarshal converts ^{XDR} machine dependant format to Machine dependant format.

Issue :

It prevents RPC to be duplicated & executed more than 1.

To overcome :

- Fixed port addr
- Rendezvous Mechanism.

RPC

- Procedure
- Fn calls
- data struct

RMI

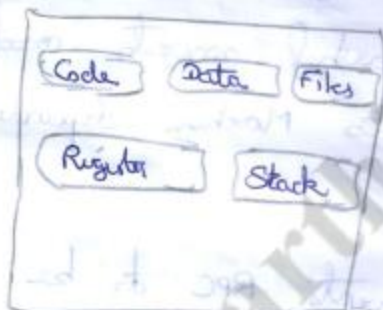
- Method
- Objects
- objects (parameters)

RMI → Object based, i.e supports invocation of methods on remote objects

RPC → Ordinary data struct can be passed as parameter.

Threads - light weight process (LWP)

(Thread id, Pgm Counter, reg set, stack)



- Resource sharing

→ Economy

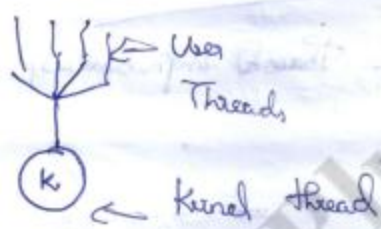
→ Multiprocess architecture

→ Responsibility.

Multithreading Models

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- Many to one model
- One to one "
- Many to many model



Threading Issue

→ fork () → Duplicates the entire process

~~exec ()~~
Two variants:

- i) Entire thread - duplicated
- ii) Only particular thread.

→ Exec ()

fork () → exec → all threads duplicate

fork () → after gap → exec → single thread duplicate

Terminating a thread before it has completed \rightarrow Cancelled

Thread to be cancelled is called Target Thread

Asynchronous Cancellation:

\rightarrow One thread immediately cancel the thread

Deferred:

\rightarrow Cancel the thread after safe point.

\rightarrow Checks periodically the cancel (target thread) thread

Safe Point \rightarrow Cancellation points by P thread.

Thread Pools:

Benefits of thread Pools:

i) Faster service to request
ii) limited threads as adv in case of system that cannot support large no. of concurrent threads.

iii) no. of thread decided on no. of cpu amount of physical memory + expected no. of request

Thread Specific Data:

Though threads share the data of the process creation there are some circumstances when thread might need its own copy of certain data, such data is called thread specific data.



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