



# **SNS COLLEGE OF TECHNOLOGY**

**Coimbatore-35**  
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## **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

### **19ITT204 – MICROCONTROLLER & EMBEDDED SYSTEMS**

III YEAR - V SEM

UNIT 4 – Processes and Operating Systems

Topic- Task Communication



# What is a Task?



- It is defined as a program in execution and has an order of priority, schedule or timeline for execution.
- Also called a job
- A program/ part of task/ job in execution is called as a process



# Task Communication



- Task Communication comprises all mechanisms serving to exchange information among tasks
- Based on degree of interaction , processes running on OS are classified as,
  - Cooperating process
  - Competing process



# Cooperating Process



- It is a process of those that can affect or are affected by other processes running on the system.
- It may share data with each other
- Exchange of info and communication by

## **Cooperation by sharing**

Can operate with each other using shared data such as memory, variables, files, databases etc..,

Critical section is used to provide data integrity and writing is mutually exclusive to prevent inconsistent data

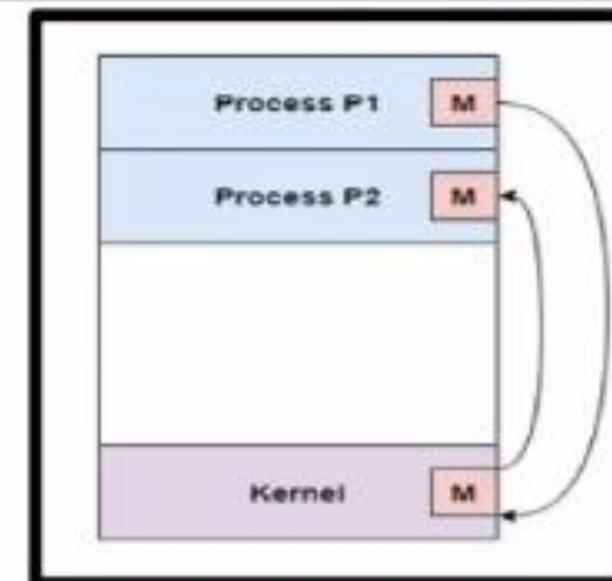


# Cooperating Process



## Cooperation by communication

No data is shared between processes . They communicate for synchronization . The cooperating processes can cooperate with each other using messages. This may lead to deadlock if each process is waiting for a message from the other to perform a operation. Starvation is also possible if a process never receives a message.





# Task Communication



## ➤ **Competing Process**

The processes do not share anything among themselves but they share system resources . These type of processes compete for system resources like file, display devices etc.





# Inter process Communication



## INTER PROCESS COMMUNICATION (IPC)

- ✓ The mechanism by which process or task communicate.
- ✓ Essential for process coordination
- ✓ IPC Mechanisms:
  - Shared Memory
  - Message Passing
  - Remote Procedure Call & Sockets





## Shared Memory

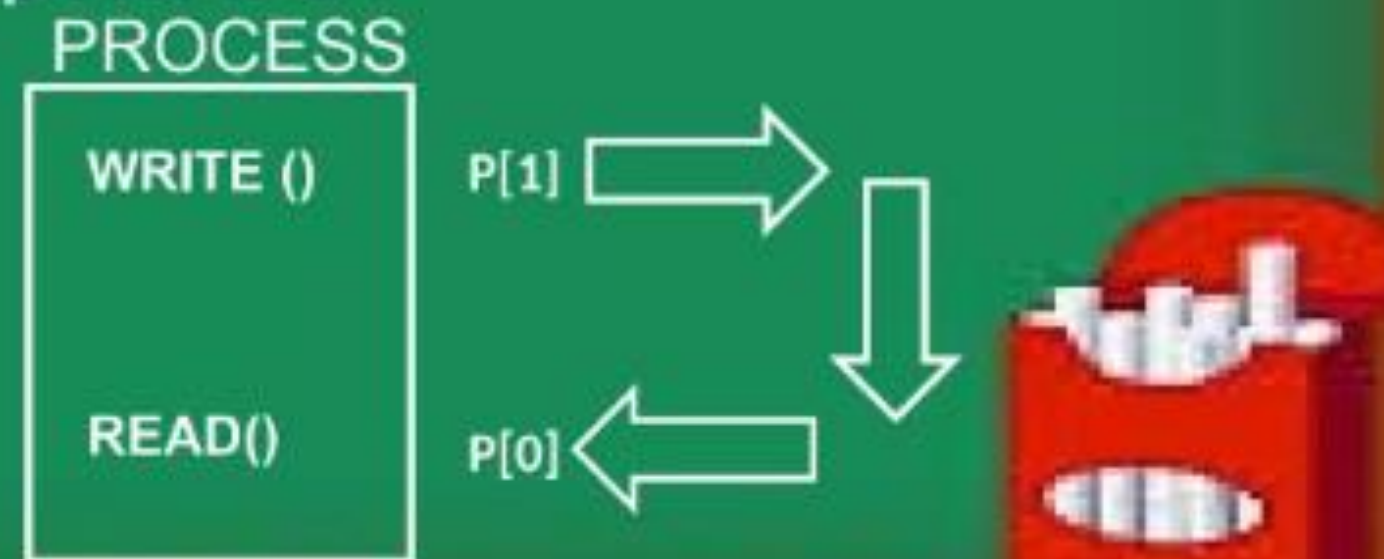
- ✓ Information to be communicated is written to shared memory. Process that require this information can read it from there.
- ✓ It's implementation is kernel dependant.
- ✓ Mechanisms for implementing shared memory for IPC :
  - *Pipes*
  - *Memory mapped objects*





## ➤ **PIPES**

- ✓ A section of shared memory used by processes for communicating .
- ✓ Process that create a pipe – Pipe Server
- ✓ Process that connect a pipe – Pipe Client
- ✓ There are two types of pipe for IPC :
  - *Anonymous pipes*
  - *Named pipes*





## Memory Mapped Objects

- ✓ A shared memory technique adopted by RTOS for allocating shared block of memory that can be accessed by multiple process simultaneously.
- ✓ Any process which want to share data with other process can map physical memory area of mapped object to it's virtual memory space and use it for sharing data.



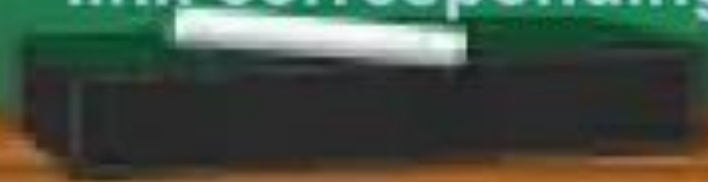
## ➤ **Direct communication**

- ✓ Each process must explicitly name the recipient or sender of communication.
  - `send(P, message)` – send a message to process P
  - `receive(Q, message)` – receive a message from process Q
- ✓ Communication link has the following properties
  - Link is automatically established. Process must only know the identity of other process.
  - Link is associated with exactly two processes
  - B/w each pair of processes, exists exactly one link



## ➤ **Indirect communication**

- ✓ Messages are sent and received through mailboxes or ports.
  - Send(A, message) – send a message to mailbox
  - Receive (A, message) – receive a message from mailbox A
- ✓ Link properties
  - Link is established between a pair of processes only if both members of the pair have a shared mailbox.
  - Link may be associated with more than two processes.
  - Between each pair of communicating processes, there may be a number of different links, with each link corresponding to one mailbox.





## Difference between Shared memory and Message passing



### Shared memory

1. Processes exchange information by reading or writing into the shared region.
2. Used for exchanging large amount of data.
3. Faster than message passing (system calls required only to establish shared region and rest all access are treated as normal memory access)

### Message passing

1. Direct exchange of messages.
2. Used for exchanging small amounts of data.
3. Slower than shared memory because it is implemented using system calls, which involves kernel intervention.



# References

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*Thank You*