# ECS 408/608 : Operaitng System
# Interprocess Communication

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### Abstract

This assignment aims to familiarize you with interprocess communication and teach you how to implement it with shared memory.

## Prerequisite

- Process within the system may be independent or cooperating.

- Cooperating process can affect or be affected by other processes, including sharing data

- Cooperating processes need interprocess communication (IPC)

- Two model of interprocess communication:

    1. Shared Memory
    2. Message Passing

Figure 1 represents the conceptualized view of both mechanism:

### IPC-Shared Memory

- An area of memory shared among the processes that wish to communicate

- The communication is controlled by the user's processes, not the operating system.

### IPC-Message Passing

- Processes communicate with each other without resorting to shared variables

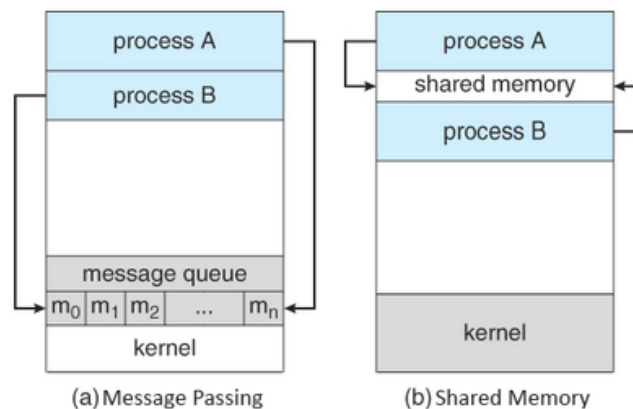- IPC facility provides two operations:(a) `send(message)`, (b) `recieve(message)`

Figure 1: Interprocess Communication using Shared Memory and Message passing

**Problems**

1. Write C program using IPC-Shared Memory that performs following two task using producer-consumer paradigm:

   (a) Producer (producer.c): Ask the user for an integer and string and place them in shared memory.

   (b) Consumer (consumer.c): Print the string input in the producer and check if the input number is even or not.

2. Write a C program using IPC-Shared Memory that perform the following task using producer-consumer paradigm:

   (a) Producer (producer.c): Generate 100 random numbers and place them in shared memory.

   (b) Consumer (consumer.c): Read all the 100 numbers and generate the cumulative sum and exit.

3. Write a C program using IPC-Shared Memory that perform the following tasks:

   (a) Use shared memory to store an array of numbers.

   (b) The parent process writes 10 numbers into the shared memory.

   (c) Create 3 consumer processes where:

      i. Consumer 1 computes the factorial of the first four numbers.
      ii. Consumer 2 computes the factorial of the next two numbers.
      iii. Consumer 3 computes the remaining numbers.

**Assignment Submission Instruction:**

- Based on your observed result, create a report with your name and roll number with assignment ID (For example, Sukarn_Agarwal_21056_Assign3.pdf).

- Submitted pdf file contains answers to all the questions above in order. **Any out-of-order answer results in a zero mark.**

- With each question, attach all the screenshots you observed on your screen. Make sure that your name should appear there. **If TA finds any discrepancy in this, zero marks will be awarded.**

- Use of CC computers are poprhibited for solving the assignment.

- **The last date to submit the assignment is by the end of day of 18 Feb 2025 (IST). Any late submission results in the 0 Marks. For any late submission, no requests to be entertained.**