

Unit-II

Message Passing

Introduction

Two basic methods for for information sharing as as follows

1. Shared Data Approach



Figure: Shared Data Approach

2. Message Passing Approach

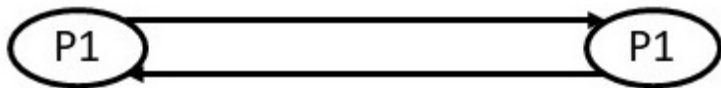


Figure: Message Passing Approach

Desirable Features of a good Message Passing System

1. Simplicity
2. Uniform Semantics
 - ▶ Local Communication
 - ▶ Remote Communication
3. Efficiency
4. Reliability
5. Correctness

Issues related to correctness are

 - ▶ Atomicity
 - ▶ Ordered Delivery
 - ▶ Survivability
6. Flexibility
7. Security
8. Portability

Issues in IPC by Message Passing I

A message is a block of information formatted by a sending process in such a manner that it is meaningful to the receiving process. In the designing of an IPC protocol for message-passing system, the following important issues need to be considered.

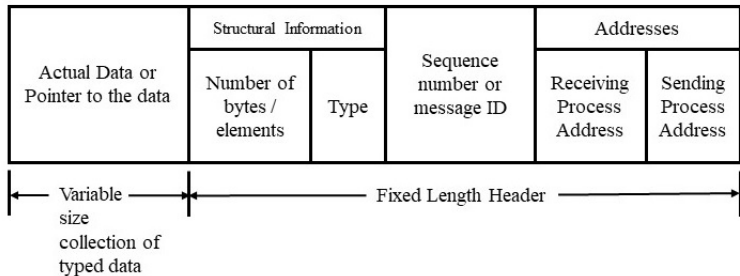


Figure: A Typical Message Structure

Issues in IPC by Message Passing II

In designing of an IPC for MPS, the following important issues need to be considered:

1. Who is the sender?
2. who is the receiver?
3. Is there one receiver or many receivers?
4. Is the message guaranteed to have been accepted by its receiver?
5. Does the sender need to wait for a reply?
6. What should be done is a catastrophic event such as a node crash of a communication link failure occurs during the course of communication?
7. What should be done if the receiver is not ready to accept the message: Will the message be discarded or stored in a buffer? In case of buffering, what should be done if the buffer is full?
8. Is there are several outstanding messages for a receiver, can it choose the order in which to service the outstanding messages?

Synchronization I

A central issue in the communication structure is the synchronization. The semantics used synchronization may be broadly classified as

- ▶ Blocking
- ▶ Non-Blocking

When both the send and receive primitives of a communication between two processes use blocking semantics, the communication is said to be synchronous; otherwise it is asynchronous.

Synchronization II

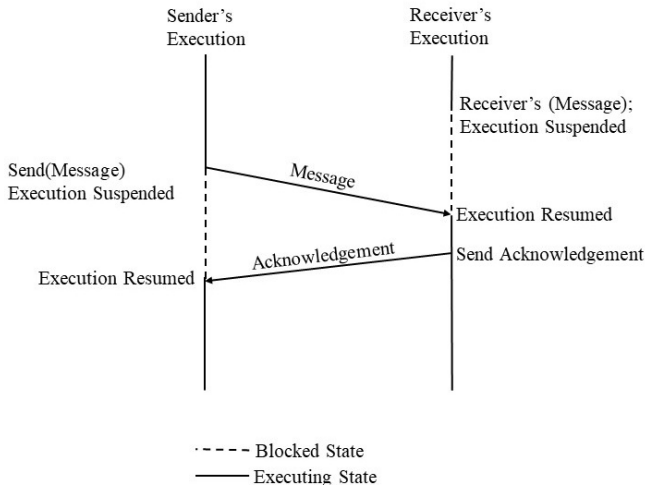


Figure: Synchronous Mode of Communication with send and receive primitives having blocking type semantics.

Buffering I

The synchronous and asynchronous mode of communication correspond respectively to the two extremes of buffering: a Null Buffer or No Buffering and a buffer with unbounded capacity. Other two commonly used buffering strategies are Single-buffering and finite bound or multiple message buffers. These four types of buffering strategies are;

- ▶ Null Buffer or No Buffering
- ▶ Single Message Buffer
- ▶ Unbounded-Capacity Buffer
- ▶ Finite Bound or Multiple Message Buffer

Buffering II



Fig. (a) Message Transfer in synchronous send with no buffering strategy

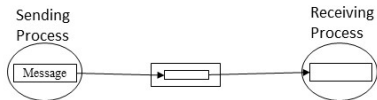


Fig. (a) Message Transfer in synchronous send with single message buffering strategy

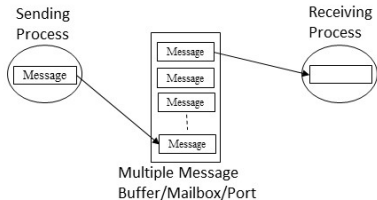


Fig. (a) Message Transfer in asynchronous send with multiple message buffering strategy

Multidatagram Messages

- ▶ Datagram
- ▶ MTU
- ▶ Single Datagram Messages
- ▶ Multi Datagram Messages

Encoding and Decoding of Message Data