Experiment 9

Name of the Student: -

Roll No.

Date of Practical Performed: - Staff Signature with Date & Marks

**Aim: Write a program to perform Distributed Shared Memory (DSM) in distributed computing**

**Theory:**   
Distributed Shared Memory (DSM) is a concept in distributed computing that provides a virtual shared memory abstraction across multiple machines in a network. In DSM, multiple processes running on different machines in a distributed system are able to access and share memory as though they are accessing local memory, even though the actual physical memory is distributed across different nodes (machines) in the system.

The goal of DSM is to simplify the programming model in distributed systems by making memory appear as if it were shared, rather than having to deal with the complexities of message passing and synchronization between nodes.

**Working of DSM:**Memory Replication: DSM systems often replicate memory pages (chunks of memory) across nodes to provide fault tolerance and improve access speed. If one node fails, another replica can take over.

Page-based DSM: In many DSM systems, memory is divided into pages (usually of a fixed size), and pages are distributed across the nodes in the system. These pages are transferred between nodes as needed. For example, when a process on a node tries to access data that is not currently available in its local memory, the DSM system will fetch the page from another node.

Remote Memory Access: When a process needs to access data that is not stored in its local memory, the DSM system will handle the remote memory access, ensuring that the correct data is fetched from the appropriate node.

Communication: For DSM to work, processes need to communicate over the network to update memory locations, ensure consistency, and synchronize access. Communication can be done using a variety of protocols like Remote Procedure Calls (RPCs) or message-passing libraries like MPI (Message Passing Interface).

**Examples of DSM Systems:**

TreadMarks: TreadMarks is a distributed shared memory system that supports distributed applications by replicating memory pages. It uses a form of page-based DSM with lazy consistency, where pages are only updated after a process attempts to modify them.

Linda: Linda is a coordination language that provides a shared memory space across multiple distributed processes. It uses tuples (data structures) to be exchanged and accessed across different machines.

JVM Distributed Shared Memory (JDSM): The JDSM is an implementation of DSM for Java, which allows objects to be shared between Java Virtual Machines (JVMs) running on different hosts in a distributed system.

DSM on Cloud: Many cloud platforms provide DSM-like abstractions for memory in distributed computing. Examples include Amazon Web Services (AWS) and Microsoft Azure, where distributed data can be stored in-memory and accessed by processes across multiple virtual machines.

**Code:**

**Output:**

**Conclusion:** Hence, we have successfully completed and understood Distributed Shared Memory (DSM).

| **Abbreviation** | **Meaning** |
| --- | --- |
| CC | coordinating conjunction |
| CD | cardinal digit |
| DT | determiner |
| EX | existential there |
| FW | foreign word |
| IN | preposition/subordinating conjunction |
| JJ  JJR | This NLTK POS Tag is an adjective (large)  adjective, comparative (larger) |
| JJS  LS | adjective, superlative (largest)  list market |
| MD | modal (could, will) |
| NN | noun, singular (cat, tree) |