Problem Statement: Inter-Process Communication (IPC) using Pipes, Shared Memory, and Message Queues

Design and implement efficient and reliable inter-process communication (IPC) mechanisms using pipes, shared memory, and message queues in C to facilitate data exchange and synchronization between multiple processes within a single system.

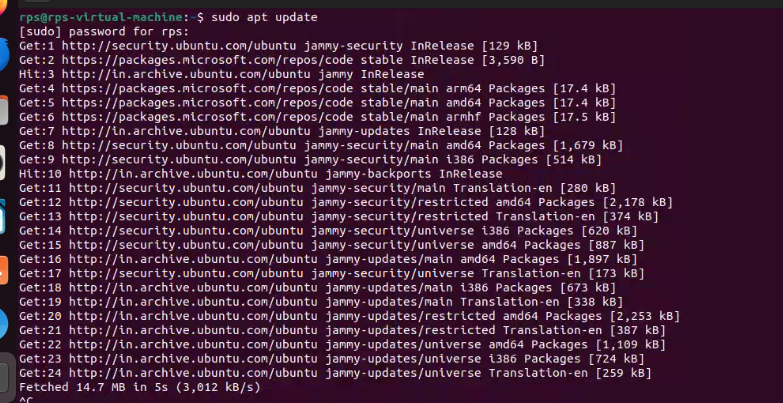
Specific Requirements:

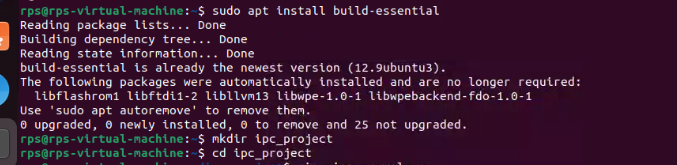
Pipe: Create and manage unidirectional and bidirectional pipes for simple data transfer between related processes.

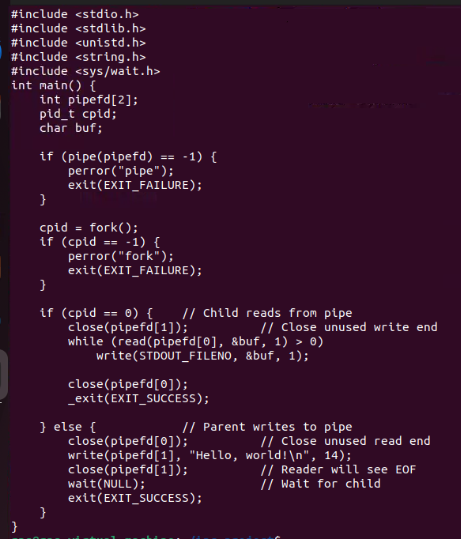
Shared Memory: Allocate and manage shared memory segments for efficient data sharing between multiple processes.

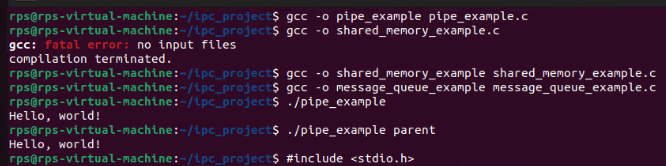
Message Queues: Create and utilize message queues for asynchronous communication and data exchange with message prioritization.

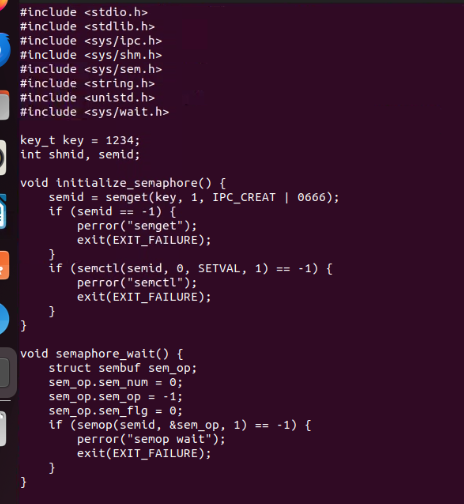
Synchronization: Implement appropriate synchronization mechanisms (e.g., semaphores, mutexes) to coordinate access to shared resources and prevent race conditions.

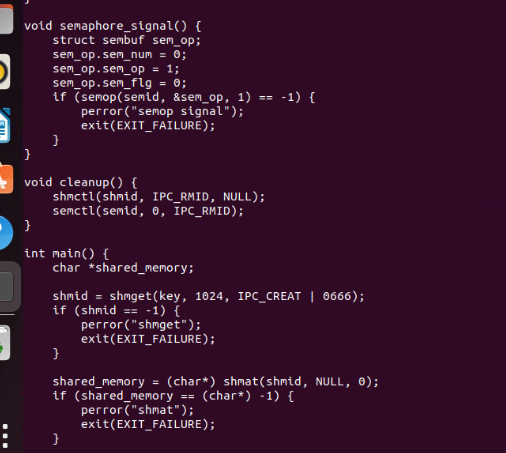
Error Handling: Incorporate robust error handling to manage potential IPC failures and resource leaks.  


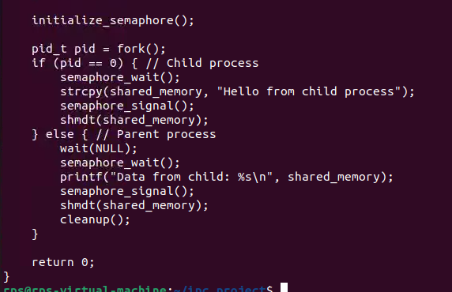


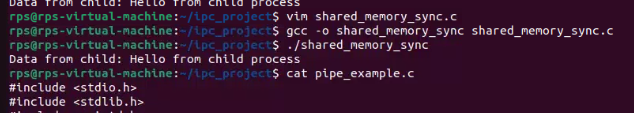


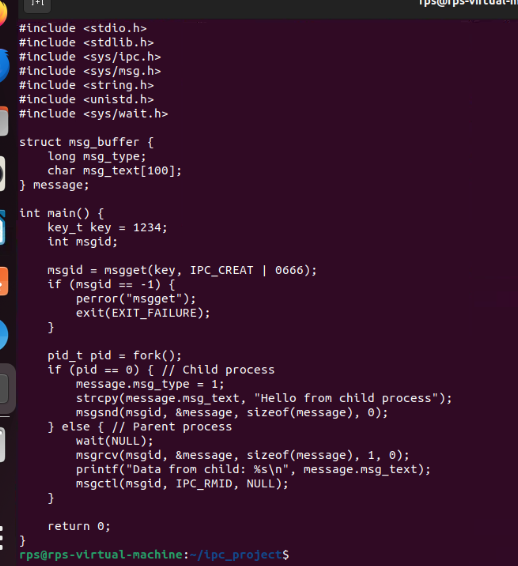


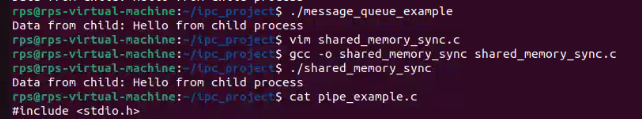












create a program that replicates the functionality of the standard cp command, but without using any standard library functions related to file I/O. Instead, you must employ system calls directly to perform file operations.

Requirements:

System calls: Utilize system calls like open, close, read, and write to interact with files.

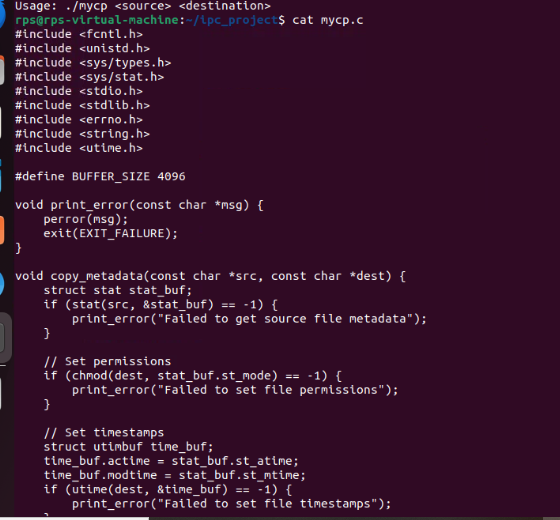
Error handling: Implement robust error handling for potential issues such as file not found, permission denied, disk full, etc.

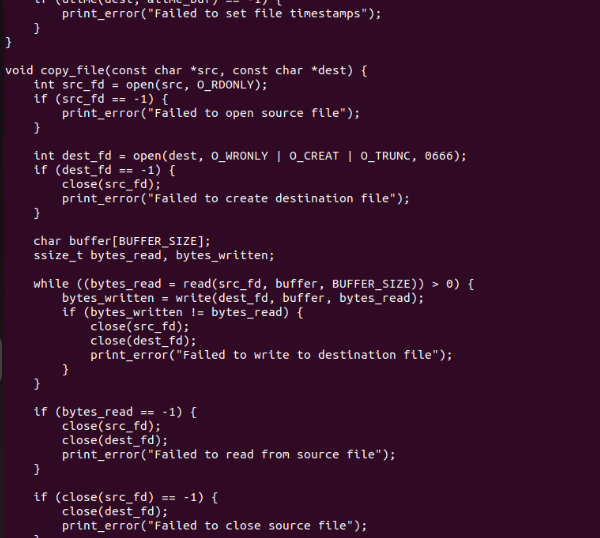
Efficiency: Optimize the copying process for performance, considering buffer sizes and read/write operations.

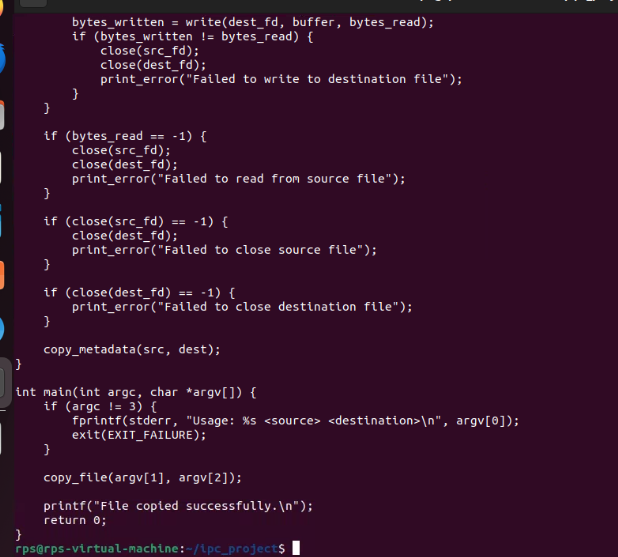
Metadata: Preserve file permissions, timestamps, and other relevant metadata during the copy process.

User interface: Provide a simple command-line interface with options for source and destination file paths.

Code:







Output:

