

Name: _____

3. Consider the various possible types of message-passing.
 - a. Using direct communication, is it possible for a process to receive messages from more than one sender? Explain. (5 points)

 - b. What is the major benefit that indirect communication provides over direct communication? (10 points)

4. Suppose three threads are all part of the same process.
 - a. What resources do the three threads share? (8 points)

 - b. What resources are associated with each individual thread? (7 points)

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5. Semaphores can be used for both mutual exclusion and synchronization.
- a. In this context, what is meant by mutual exclusion? (8 points)

 - b. In this context, what is meant by synchronization? (7 points)
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6. There are many of similarities between semaphores and condition variables.
- a. What are the major differences between semaphores used for synchronization and condition variables, with respect to their operation inside a critical section of code? (10 points)

 - b. When used for synchronization, suppose a semaphore V operation occurs before a semaphore P operation. What happens when the P operation executes, and why? (5 points)

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c. Suppose a condition variable signal operation occurs before a condition variable wait operation. What happens when the wait operation executes, and why? (5 points)

7. What is the relationship between monitors, classes, and locks? (10 points)