

Operating System Assignment

Topic: Deadlock

1. Explain the necessary conditions that may lead to a deadlock situation.
2. What are the various methods for handling deadlocks?
3. Is it possible to have a deadlock involving only one single process? Explain your answer.
4. Consider a system consisting of 4 resources of the same type that are shared by 3 processes, each of which needs at most 2 resources. Show that the system is deadlock free.
5. What is a resource allocation graph? How do you obtain a wait-for graph from it? Explain their uses.
6. Can a system detect that some of its processes are starving? If you answer “yes,” explain how it can. If you answer “no,” explain how the system can deal with the starvation problem.
7. Consider the following snapshot of a system:

	<i>Allocation</i>	<i>Max</i>	<i>Available</i>
	<i>A B C D</i>	<i>A B C D</i>	<i>A B C D</i>
<i>P0</i>	0 0 1 2	0 0 1 2	1 5 2 0
<i>P1</i>	1 0 0 0	1 7 5 0	
<i>P2</i>	1 3 5 4	2 3 5 6	

$P3 \quad 0 \ 6 \ 3 \ 2 \qquad 0 \ 6 \ 5 \ 2$

$P4 \quad 0 \ 0 \ 1 \ 4 \qquad 0 \ 6 \ 5 \ 6$

Answer the following questions using the banker's algorithm:

- a. What is the content of the matrix Need?
 - b. Is the system in a safe state?
 - c. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?
8. What is the meaning of the term *busy waiting*? What other kinds of waiting are there in an operating system? Can busy waiting be avoided altogether?

Explain your answer.

Last Date to Submit: 12th March 2014