

## Assignment #3

Covers: Chapters 7 and 8

Due Date: Thursday 8/5/2018

### Questions:

#### Question 1:

Consider a system consisting of  $m$  resources of the same type being shared by  $n$  processes. A process can request or release only one resource at a time. Show that the system is deadlock free if the following two conditions hold:

- The maximum need of each process is between one resource and  $m$  resources.
- The sum of all maximum needs is less than  $m + n$ .

#### Question 2:

Consider the following snapshot of a system:

	<u>Allocation</u>				<u>Max</u>			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>P0</i>	3	0	1	4	5	1	1	7
<i>P1</i>	2	2	1	0	3	2	1	1
<i>P2</i>	3	1	2	1	3	3	2	1
<i>P3</i>	0	5	1	0	4	6	1	2
<i>P4</i>	4	2	1	2	6	3	2	5

Using the banker's algorithm, determine whether or not each of the following states is unsafe. If the state is safe, illustrate the order in which the processes may complete. Otherwise, illustrate why the state is unsafe.

- Available = (0, 3, 0, 1)
- Available = (1, 0, 0, 2)

#### Question 3:

Consider the following snapshot of a system:

	<u>Allocation</u>				<u>Max</u>				<u>Available</u>			
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>P0</i>	2	0	0	1	4	2	1	2	3	3	2	1
<i>P1</i>	3	1	2	1	5	2	5	2				
<i>P2</i>	2	1	0	3	2	3	1	6				
<i>P3</i>	1	3	1	2	1	4	2	4				
<i>P4</i>	1	4	3	2	3	6	6	5				

Answer the following questions using the banker's algorithm:

- a) Illustrate that the system is in a safe state by demonstrating an order in which the processes may complete.
- b) If a request from process P1 arrives for (1, 1, 0, 0), can the request be granted immediately?
- c) If a request from process P4 arrives for (0, 0, 2, 0), can the request be granted immediately?

#### Question 4:

Consider a system Consider a logical address space of 256 pages with a 4-KB page size, mapped onto a physical memory of 64 frames.

- a) How many bits are required in the logical address?
- b) How many bits are required in the physical address?

#### Question 5:

Consider a computer system with a 32-bit logical address and 4-KB page size. The system supports up to 512 MB of physical memory. How many entries are there in each of the following?

- a) A conventional single-level page table
- b) An inverted page table.

## Submission

On 8/5/2018, the writeup of your solution should be submitted. Follow the following instructions carefully, otherwise your submission will not be accepted:

- Covert your solution to a pdf file and name it "CSE325\_SP18\_Assign3\_YOURNAME.pdf", where YOURNAME is your name.
- Attach the pdf file into an email message which have the subject "CSE325 SP18 Assignment3" exactly.
- In the body of the message include your full name and bench number. You could also add any notes or special instructions.
- Send the message to the email address of your teaching assistant [s.khalil9191@gmail.com](mailto:s.khalil9191@gmail.com)

## Important Notes:

This assignment must be done individually; any act of plagiarism will be penalized and reported.