

Michael Smith

CSE460

Homework 4

Total Points: 45 Points

1. Consider the following snapshot of a system:

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

Answer the following questions using the banker's algorithm.

- What is the content of the matrix **Need**?
- Is the system in a safe state? Why?
- If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately?

- The need content of the matrix is the

A B C D

P0 1 0 0 0

P1 0 7 5 0

P2 1 0 0 2

P3 0 0 2 0

P4 0 6 4 2

- Yes, the system is in a safe state. There are available resources that are required to complete the P1 and P3 processes. When those complete, the resources will allow the completion of the other 3 processes.
- The state would be as follows:

Process Allocation Need Available

A B C D A B C D A B C D

P0 0 0 1 2 1 0 0 0 2 1 0 0

P1 1 4 2 0 0 3 3 0

P2 1 3 5 4 1 0 0 2

P3 0 6 3 2 0 0 2 0

P4 0 0 1 4 0 6 4 2

Complete P0:

Process Allocation Need Available

A B C D A B C D A B C D

P1 1 4 2 0 0 3 3 0 2 1 1 2

P2 1 3 5 4 1 0 0 2

P3 0 6 3 2 0 0 2 0

P4 0 0 1 4 0 6 4 2

Complete P2:

Process Allocation Need Available

A B C D A B C D A B C D

P1 1 4 2 0 0 3 3 0 3 4 6 6

P3 0 6 3 2 0 0 2 0

P4 0 0 1 4 0 6 4 2

Complete P3:

Process Allocation Need Available

A B C D A B C D A B C D

P1 1 4 2 0 0 3 3 0 3 10 9 8

P4 0 0 1 4 0 6 4 2

Complete P4:

Process Allocation Need Available

A B C D A B C D A B C D

P1 1 4 2 0 0 3 3 0 3 10 10 12

Complete P1:

Process Allocation Need Available

A B C D A B C D A B C D

P1 4 14 12 12

2. Consider a swapping system in which memory consists of the following hole sizes in memory order: 16K, 14K, 4K, 20K, 18K, 7K, 9K, 12K, and 15K. Which hole is taken for successive segment requests of

- (a) 12K
- (b) 10K
- (c) 9K

for first fit? Now repeat the question for best fit, worst fit, and next fit.

FIRST FIT

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 20 18 7 9 13 15

A > H1

H1 H2 H3 H4 H5 H6 H7 H8 H9

4 14 4 20 18 7 9 12 15

B > H2

H1 H2 H3 H4 H5 H6 H7 H8 H9

4 4 4 20 18 7 9 12 15

C > H3

H1 H2 H3 H4 H5 H6 H7 H8 H9

4 4 4 11 18 7 9 12 15

BEST FIT

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 20 18 7 9 12 15

A > H8

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 20 18 7 9 0 15

B > H2

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 4 4 20 18 7 9 0 15

C > H7

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 20 18 7 0 0 15

WORST FIT

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 20 18 7 9 12 15

A > H4

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 8 18 7 9 12 15

B > H5

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 8 8 7 9 12 15

C > H1

H1 H2 H3 H4 H5 H6 H7 H8 H9

5 14 4 8 18 7 9 12 15

NEXT FIT

H1 H2 H3 H4 H5 H6 H7 H8 H9

16 14 4 20 18 7 9 12 15

A > H1

H1 H2 H3 H4 H5 H6 H7 H8 H9

4 14 4 20 18 7 9 12 15

H1 H2 H3 H4 H5 H6 H7 H8 H9

4 4 4 20 18 7 9 12 15

B > H2

H1 H2 H3 H4 H5 H6 H7 H8 H9

4 4 4 11 19 7 9 12 15

3. Using the page table shown below, give the physical address corresponding to each of the following virtual addresses. Explain briefly how you obtain the answers.

- a. 20
- b. 4100
- c. 8300

- a. 29: Physical Address: $8K + 20 = 8212$
- b. 4100: Physical Address: $4K + (4100 - 4K) = 4100$

c. 8300: Physical Address: $24K + (8300 - 8K) = 24684$

Evaluation: I was able to complete each problem successfully, with expected results. With clear answers, I believe I earned a full credit, 45/45, on this assignment.