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CSE460

Homework 4

Total Points: 45 Points

1. Consider the following snapshot of a system:

|  |  |  |  |
| --- | --- | --- | --- |
| Process | Allocation | Max | Available |
|  | 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.

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

1. 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.
2. 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

Compete 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

1. 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

1. 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.
2. 20
3. 4100
4. 8300
5. 29: Physical Address: 8K + 20 = 8212
6. 4100: Physical Address: 4K + (4100-4K) = 4100
7. 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.