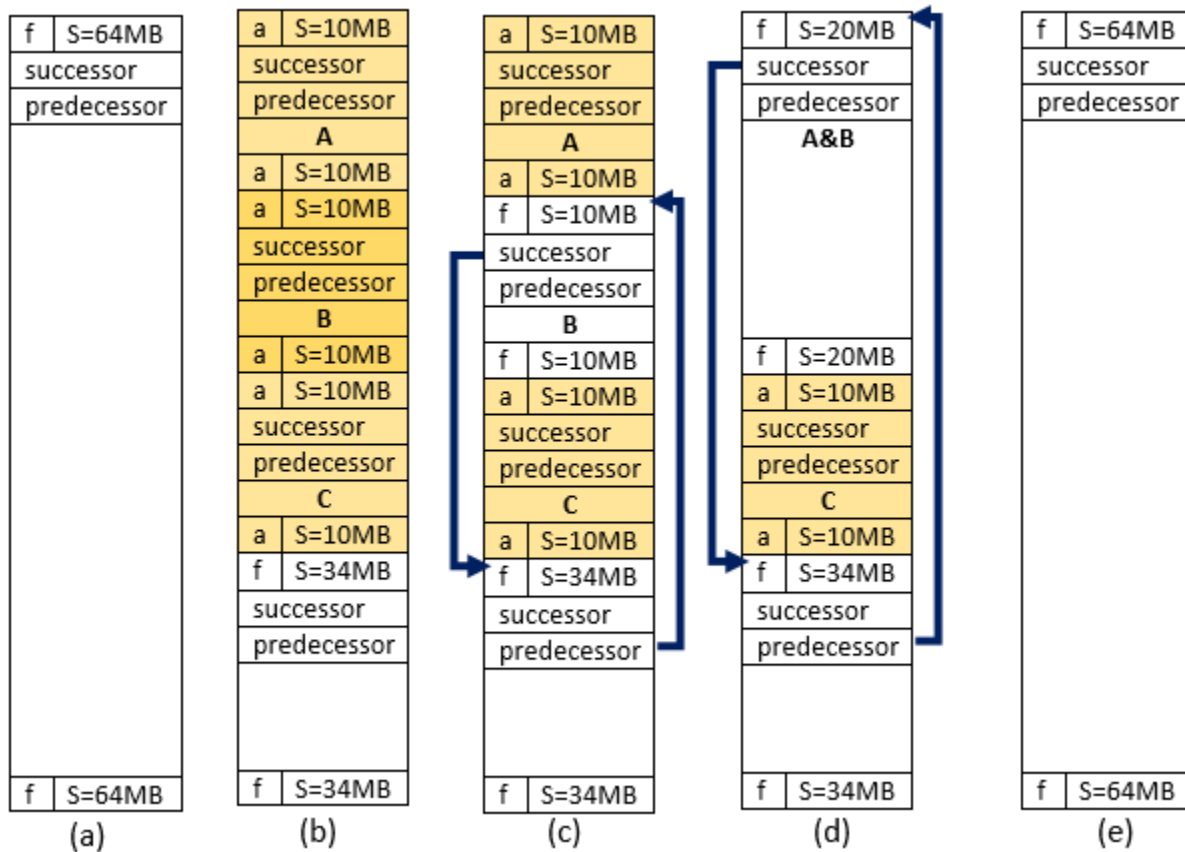


Chengjun Yuan Homework 4 CS6456. Operating Systems. Fall, 2015.

1. (2 points) Consider a variable partition scheme where tags are replicated at the beginning and at the end of each block and each hole as shown in class. Draw a diagram showing the layout of main memory after each of the following operations.

- Memory is initialized to empty; the total memory size is 64 MB.
- Three blocks (A, B, and C), each of size 10 MB, are requested and allocated in the sequence of A, B, and C.
- Block B is released.
- Block A is released.
- Block C is released.

Solutions:



2. (2 points) Assume that the list of holes in a variable partition memory system contains the following entries (in the given order): 190 KB, 550 KB, 220 KB, 420 KB, 650 KB, 110 KB. Consider the following sequence of requests (in the given order): A = 210 KB, B = 430 KB, C = 100 KB, D = 420 KB. Determine which hole would be allocated to which request by each of the following placement strategies. Show the intermediate steps leading to your answer.

- (a) first fit
- (b) next fit
- (c) best fit
- (d) worst fit

Solutions:

(a) first fit

...	190	...	550	...	220	...	420	...	650	...	110	...			
...	190	...	A	340	...	220	...	420	...	650	...	110	...		
...	190	...	A	340	...	220	...	420	...	B	220	...	110	...	
...	C	90	...	A	340	...	220	...	420	...	B	220	...	110	...
...	C	90	...	A	340	...	220	...	D	...	B	220	...	110	...

(b) next fit

...	190	...	550	...	220	...	420	...	650	...	110	...			
...	190	...	A	340	...	220	...	420	...	650	...	110	...		
...	190	...	A	340	...	220	...	420	...	B	220	...	110	...	
...	190	...	A	340	...	220	...	420	...	B	C	120	...	110	...
...	190	...	A	340	...	220	...	D	...	B	C	120	...	110	...

(c) best fit

...	190	...	550	...	220	...	420	...	650	...	110	...		
...	190	...	550	...	A	10	...	420	...	650	...	110	...	
...	190	...	B	120	...	A	10	...	420	...	650	...	110	...

...	190	...	B	120	...	A	10	...	420	...	650	...	C	10	...
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...	190	...	B	120	...	A	10	...	D	...	650	...	C	10	...
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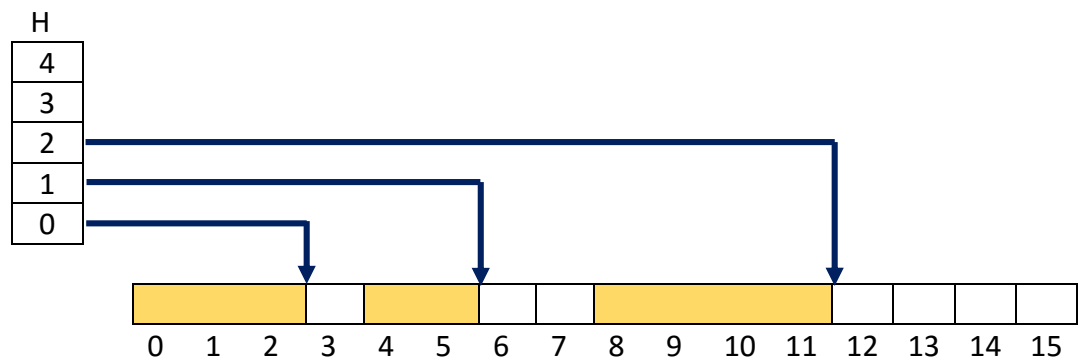
(d) worst fit

...	190	...	550	...	220	...	420	...	650	...	110	...			
...	190	...	550	...	220	...	420	...	A	440	...	110	...		
...	190	...	B	120	...	220	...	420	...	A	440	...	110	...	
...	190	...	B	120	...	220	...	420	...	A	C	340	...	110	...
...	190	...	B	120	...	220	...	D	...	A	C	340	...	110	...

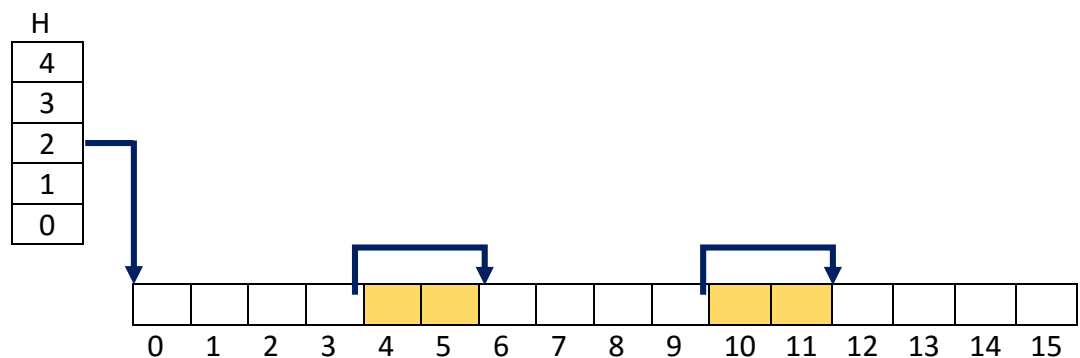
3. (2 points) Consider a buddy system with 5 different hole sizes (2^0 through 2^4).
- (a) Assume a sequence of requests of the following sizes is made: 2, 1, 2, 4. Show the memory layout, including the header array H , after all requests have been accommodated.
 - (b) Assume that the four blocks (each of size 1) at addresses 4, 10, 5, 11 are released one at a time. Show the memory layout, including the header array H , after each release.

Solutions:

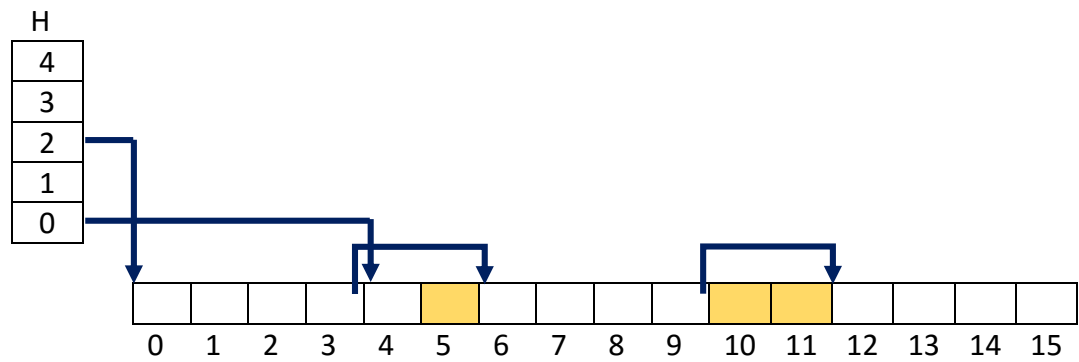
(a)



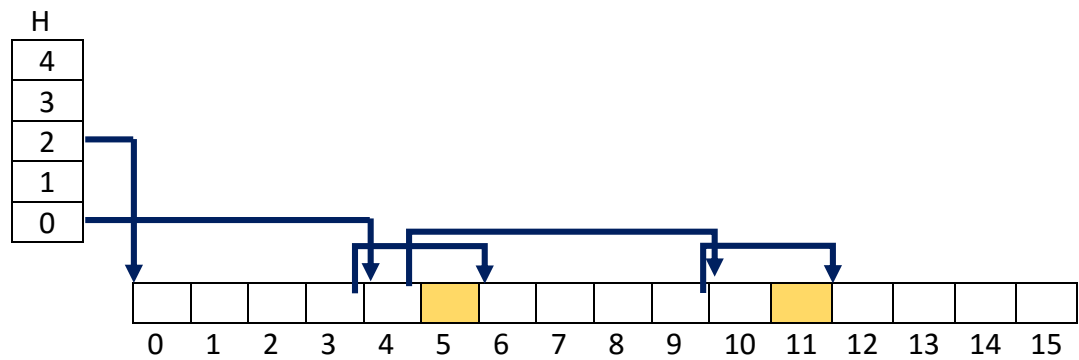
(b) original status



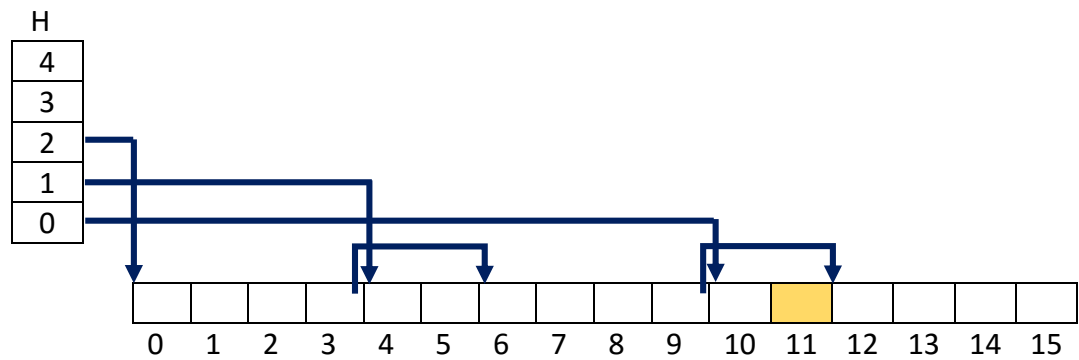
Release 4:



Release 10:



Release 5:



Release 11:

