

Solutions for exercise 04, Free Blocks

Moritz Eichhorn

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1. (10 %) **Free Blocks Management Using a Linked List** Consider a file system managing free blocks by using linked lists. The table below shows the final two blocks storing free blocks. Fill the empty tables below to show the changes which occur in the tables after the following scenarios. Highlight the changes using a color pencil.

- (a) Five new blocks are allocated
- (b) The block 22 is freed
- (c) Another 5 blocks are allocated
- (d) Another block is allocated
- (e) Another three blocks are allocated
- (f) Four blocks (23456, 8345345, 56, and 634534) are freed

Block #	17	18
Next Block	18	0
	4589	24353
	43546	98745
	718	76345
	345	9877
	23456	7345
	8345345	34535
	634534	154698
	3478	967
	56	8657

Block #	17	18	Block #	17	18	Block #	17	18
Next Block	18	0	Next Block	18	0	Next Block	18	0
	4589	24353		4589	24353			24353
	43546	98745		43546	98745			98745
	718	76345		718	76345			76345
	345	9877		345	9877			9877
		7345		22	7345			7345
		34535			34535			34535
		154698			154698			154698
		967			967			967
		8657			8657			8657

Block #	17	18	Block #		18	Block #	56	18
Next Block		0	Next Block		0	Next Block	18	0
		24353			24353			24353
		98745			98745			98745
		76345			76345			76345
		9877			9877			9877
		7345			7345			7345
		34535			34535			34535
		154698						23456
		967						8345345
		17						634534

2. **Free Blocks Management — Comparison** Given the two memory footprint scenarios for Free Blocks Management as presented in class. State the condition under which the linked list approach uses less space than the bitmap approach.

The more blocks are allocated the smaller the Linked List version gets. So when many blocks are allocated the linked list gets smaller than the bitmap version.