IF.06.01 TINF Operating Systems – Free Blocks, Quotas – Exercises.

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

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

Block #	17	18
Next Block	18	0
		24353
		98745
		76345
		9877
		7345
		34535
		154698
		967
		8657

Block #	18	
Next Block	0	
	24353	
	98745	

Block #	18	
Next Block	0	
	24353	
	98745	

Block #	634534	18
Next Block	18	0
		24353
		98745

	76345			76345			76345
	9877			9877			9877
	7345			7345			7345
	34535			34535			34535
	154698						23456
	967						8345345
	17						56

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.

   x:=free Blocks

   LLBlocks(x) = x / 255
   BMBlocks(x) = 121 250

   LLBlocks(x) = BMBlocks(x)
   X / 255 = 121 250 |*255
   X = 30 918 750

   X = 30 918 495

   If(x <= 30 918 495)
   LinkedListUses("less space");

   Reason: less addresses to save = shorter linked list