4. Suppose a small system has a physical memory size of 16KB, which is divided into 16 blocks (each block has 1KB) for applying a contiguous memory allocation scheme. The blocks are numbered 0x0 through 0xF.

Three processes are loaded in memory for execution:

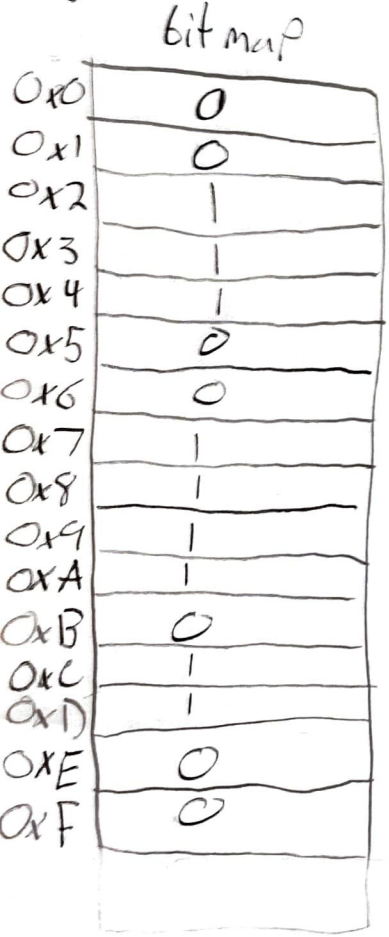
Process	Start block	End block
P_1	0x3	0x5
P_2	0x8	0xB
P_3	0xD	0xE

a) Draw a bitmap to track memory allocations of the blocks with 1 signifying the block is occupied and 0 signifying the block is free. Block 0 should be placed to the right at the lowest significant bit of the bitmap.

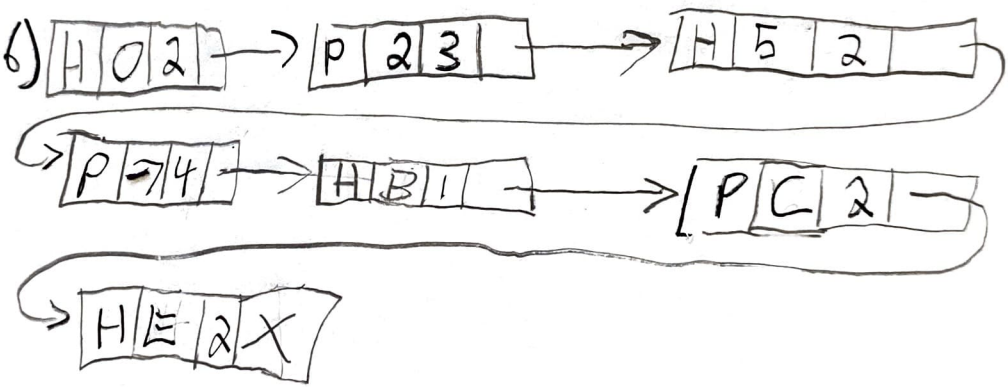
b) Draw a linked list representation of the memory allocation showing both processes and holes.

c) Redo a) and b) if P_2 exits.

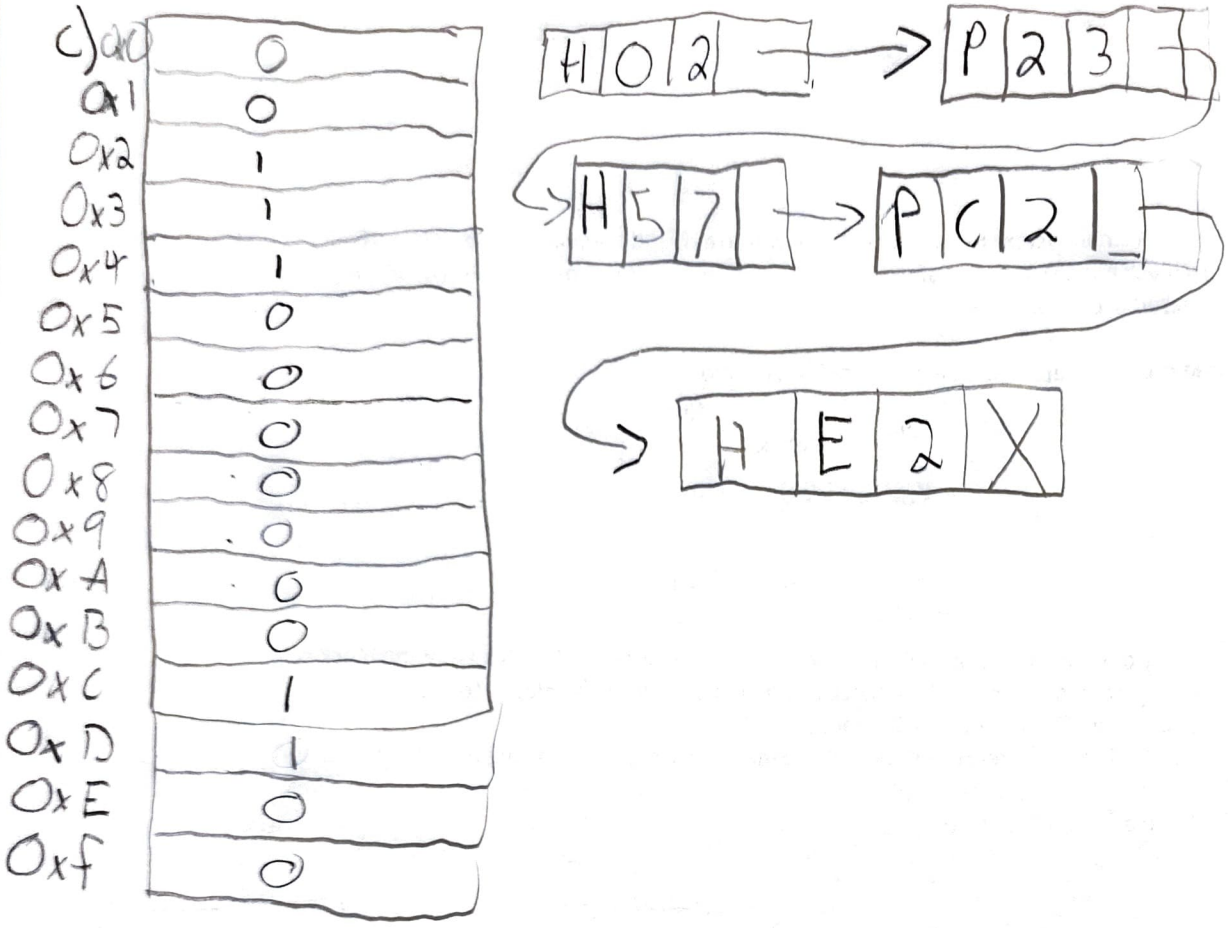
a)



b)



c)


0x0
0x1
0x2
0x3
0x4
0x5
0x6
0x7
0x8
0x9
0xA
0xB
0xC
0xD
0xE
0xF
0
0
1
1
1
0
0
0
0
0
0
0
1
1
0
0
H
0
2
P
2
3
H
5
7
P
C
2
H
E
2
X