ASSIGNMENT 3
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Part 1.

Q Page 254 #4

[Memory hole][Memory Size] order:
[0][10MB], [1][4MB], [2][20MB],
[3][18MB], [4][7MB], [5][9MB],
[6][12MB], [7][15MB]

a) 12 MB

First Fit : [2][20MB]
Best Fit : [6] [12MB]
Worst Fit : [2] [20MB]
Next Fit : [2][20MB]

b) 10MB

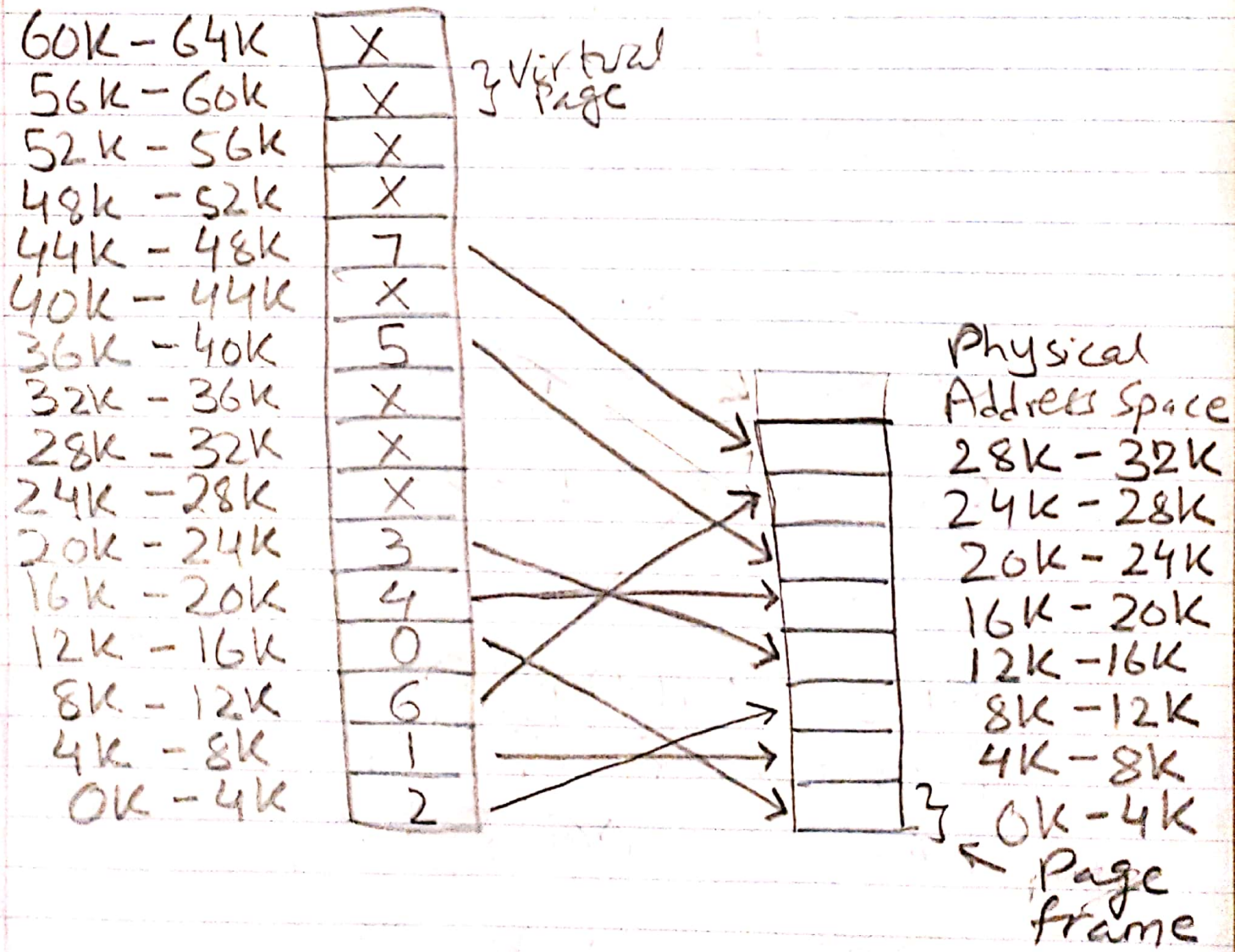
First Fit : [0][10 MB]
Best Fit : [0][10 MB]
Worst Fit : [3] [10MB]
Next Fit : [3] [18 MB]

c) 18 MB
First Fit: [3][18 MB]
Best Fit : [5][9 MB]
Worst Fit : [7] [9MB]
Next Fit : [5][9MB]

Q. Page 254 #7

Page begins on multiple of 4096 and ends 4095 addresses higher,
4K - 8K means 4096 - 8191
8K - 12K means 8192 - 12287

Virtual Address Space



(a) Virtual Addresses

a) 20
Physical Address
= 8192 + 20
= 8212

b) 4100
Physical Address
= 4096 + 4
= 4100

c) 8300
Physical Address
= 24576 + 108
= 24684

Q Page 257 #28

a) FIFO page - 4 page frames and 8 pages, reference string = 0 1 7 2 3 2 7 1 0 3
FIFO : ⓪ ① ⑦ ② ③ 2 7 1 ⓪ 3
⇒ there will be 6 page faults

b) LRU : ⓪ ① ⑦ ② ③ 2 7 1 ⓪ ③
⇒ there will be 7 page faults.

Q Page 258 #38

int X[64][64]
4 frames, 128 words per frame

Fragment A

Number of rows in array on one page = $\frac{\text{words per frame}}{\text{words per row}}$

= $\frac{128}{64}$ = **2**

So, for this fragment the inner loop loops through rows of X for each column. Any other reference to X[i][j] beyond those rows & columns will lead to a page fault.

total page faults = $64 \times \frac{64}{2}$

= **2048**

Fragment B

In this fragment the array is being initialized row-wise. For every iteration of the outer loop one page fault occurs in the inner loop.

total page faults = $1 \times \frac{64}{2}$ = **32**

⇒ Fragment B will generate the lowest page faults.