

1. Fig.1 shows a FAT file system. Answer the following questions.
 - (1) How many files on disk?
 - (2) Which physical block do they start?
 - (3) What are physical blocks for these files?
 - (4) If physical block size is 4KB, what are their sizes?

Physical block	
0	-1
1	
2	10
3	11
4	7
5	
6	3
7	2
8	15
9	
10	12
11	14
12	8
13	
14	0
15	-1

2. Fig. 2 shows the sectors on a disk. If the physical block size is 2KB, how many physical blocks on this disk?

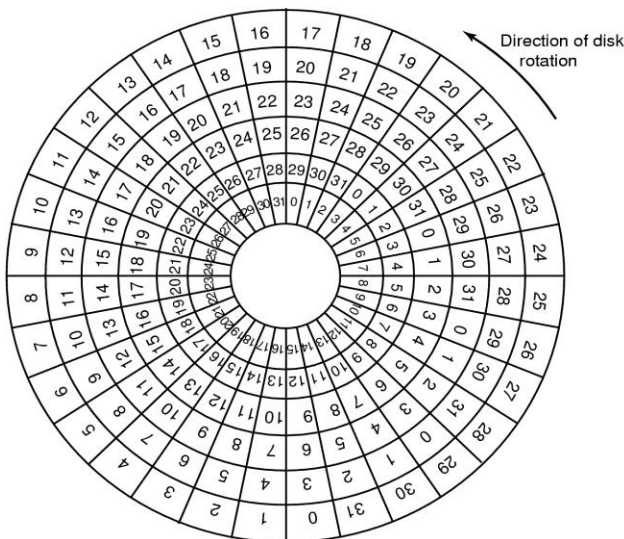


Fig.2

3. The performance of a file system depends critically on the cache hit rate (fraction of the blocks found in the cache). If it takes 1 msec to satisfy a request from the cache, but 40 msec to satisfy a request if a disk read is needed, give a formula for the mean time required to satisfy a request if the hit rate is h . Plot this function for $h:(0,1)$

4. A floppy disk has 40 cylinders. A seek takes 6 msec per cylinder moved. if no attempt is made to put the blocks of a file close to each other, two blocks that are logically consecutive (i.e., follow one another in the file) will be about 13 cylinders apart on average. If, however, the operating system makes an attempt to cluster related blocks, the mean interblock distance can be reduced to 2 cylinders (for example). How long does it take to read a 100 block file in both cases, if the rotational latency is 100 msec and the transfer time is 25 msec per block?