CS 3413
Assignment 10

ASSIGNMENT IS TO BE COMPLETED INDIVIDUALLY BY ALL STUDENTS!

Your solution (containing all disk scheduling algorithms) should be submitted via D2L. All solutions are to be written in C.

The simplest form of storing a file to a disk is to use linked allocation. To read a file with linked allocation you start by knowing the first block assigned to a file. When you read the first block then it gives you data belonging to the file, but also gives the next block to read. For example consider the example linked allocation below:

```
0 3
1 2
2 -1
3 1
4 -2
5 -1
…
```

Each line represents a cylinder number (sequential from 0 up to 99999) followed by a number indicating the next block in the file sequence. A -1 indicates the end of the file sequence. A -2 indicates the block is free. In this case, if we are told a file starts on block 0 then we can follow the linked allocation to see the order of blocks that contain the file are:

0 -> 3 -> 1 -> 2

One of the disadvantages of linked allocation is poor performance due to blocks scattered all over the disk. To improve performance we can *defragment* the disk. Defragmentation will move blocks on the disk such that blocks belonging to a file appear together and in order, while all free blocks are pushed to the end of the disk. For this assignment you are to defragment the disk that you are provided. When defragmenting, files will still appear in the same order that their first blocks appear in the original positioning. So, if file *A* starts on block *n* and file *B* starts on block *m*, then *A* will appear before *B* iff *n* < *m*.

For the above input, the new disk layout will be:

```
0 1
1 2
2 3
3 -1
4 -1
```

```
5 -2
…
```

Your program is to print the total number of blocks that are moved as part of the defragmentation process, and the new disk layout. The disk layout must have the same formatting as the sample disk layout file you are provided.

Note: Input and output to your program are through stdin/stdout. A sample disk_layout.txt file is provided for the assignment on D2L.