

## Defragmenting Hard Disk

After some use, if you feel that your drive has started getting slow, DOS or Windows programs and data files take much more time to load, then most probably this could be due to a fragmentation problem.

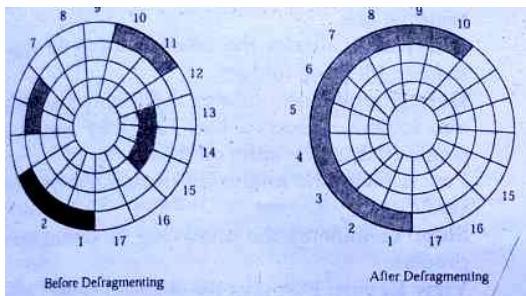
### Disk Fragmentation

On a disk drive, any information is stored in clusters. When all the clusters of a file are stored in consecutive sectors, then it is not fragmented but when the clusters which make a file are scattered across the disk, the file or the disk is said to be fragmented. As it takes the read/write head longer to read the file scattered across the disk surface, a fragmented file takes longer to load compared to an un-fragmented file. This can be compared with a real life situation. If your room is not in order, it takes you longer to find something compared to a room where everything is arranged properly.

The **fragmentation** occurs because whenever the operating system wants to write some information on the disk drive, it consults the FAT (File Allocation Table) to find an empty cluster. The FAT keeps a record of used, available and bad (unusable) areas on the disk surface. After finding an empty cluster, the operating system writes to that area and updates the FAT. If the complete file could not be written in one contiguous empty area, then the operating system looks for other areas where the rest of the file can be written. The FAT keeps record of this chain of clusters taken up by the file. When a file is removed from the disk, The FAT is again updated to show the cluster taken up by the file as an empty area. After some time, this removing of file and writing of new information produce a lot of holes, i.e., empty areas in between the data area, thus the files scattering across the disk surface. This is known as **disk fragmentation**.

### Disk Defragmentation

File fragmentation increases disk access time and decreases the chances of salvaging a file when there is a problem. The **disk defragmenter** utility reads and rewrites the files on the disk to reorder them so that each file is once again stored contiguously on the disk surface and can be read much more efficiently by the hard disk drive. Disk defragmenter moves the pieces of each file or folder to one location on the volume, so that each occupies a single, contiguous space on the disk drive.



First part of Figure shows a file fragmented across the disk surface and the second part shows the same file after it has been defragmented. Because the defragmentation software moves the information stored on the disk surface, it is always better to take a backup of the information on the disk surface before using these software. The **disk defragmenter** utility software are fully tested and

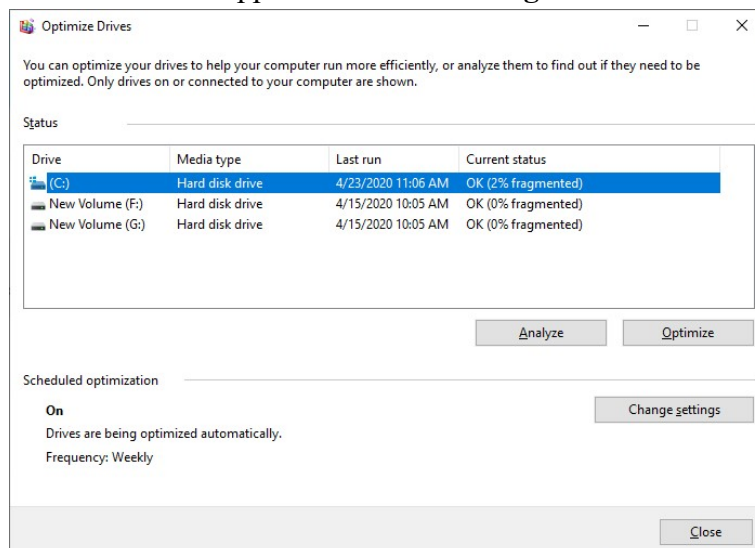
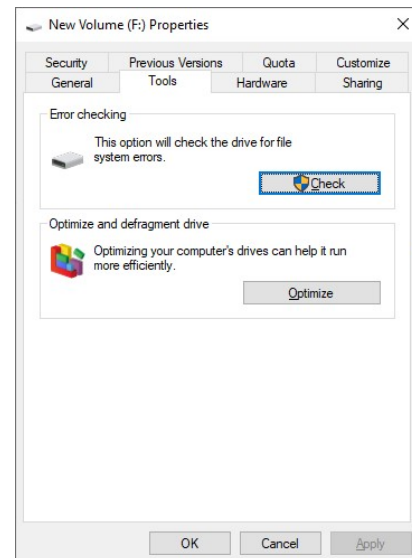
the chances of data corruption are very unusual case, but a power loss during

defragmentation or some other unexpected event may corrupt the data, so it is always better to have a current backup of all important information on the drive before using these programs. Depending on the frequency of creating editing/deleting of the files on the hard disk drive, you can defragment the drive once a week or once a month to keep the files in one place.

Defragmenting a drive also increases the drive's life as the read/write head will require to move less to get to the data on a properly defragmented drive, Another advantage is if the files are stored contiguously, it is easier to restore them in case of any accidental deletion. Files that are scattered make it impossible to restore them.

Let us now learn to use the Disk Defragmenter. But first, undertake the following steps to open the Disk Defragmenter window.

1. Double-click the My Computer icon.
2. Move the mouse-pointer over a disk partition name and click the left mouse-button. The disk partition name gets highlighted
3. Without de-selecting the disk partition name, click the right mouse-button. A shortcut menu appears
4. Inside the shortcut menu, move the mouse pointer over the Properties option and click the left mouse button.
5. The Properties dialog box of the selected hard disk partition appears. Move the mouse pointer over the Tools tab and click the left mouse button **as shown in Figure.**
6. Next, move the mouse pointer over the Optimize button and click the left mouse button.
7. The Optimized drive window appears **as shown in Figure.**



8. The hard disk partition name that you selected to defrag should appear highlighted in Optimized drive window. In case it is not highlighted, move the mouse pointer over the hard disk partition name and click the left mouse button. The options available in Disk Defragmenter window are:
  - **Analyze:** Evaluates the selected drive for fragmented files and folders.
  - **Optimized:** Consolidates the fragmented files and folders in such a way that they acquire a single adjacent location on the drive.
9. Next, move the mouse pointer over the Analyze button and click the left mouse button.
10. It updates current status of fragmentation.
11. Then left mouse click on Optimized button that defragment the partition.

Status

Drive	Media type	Last run	Current status
(C:)	Hard disk drive	Running...	Pass 1: 0% relocated
New Volume (F:)	Hard disk drive	4/15/2020 10:05 AM	OK (0% fragmented)
New Volume (G:)	Hard disk drive	4/15/2020 10:05 AM	OK (0% fragmented)

12. Once the defragmentation process is complete, click the Close button to close it.

## Exercise:

- 1: What is Disk Fragmentation?
- 2: What is Disk Defragmentation?
- 3: What are the advantages of Disk Defragmentation?
- 2: Write the steps to disk defragmentation of "c:" drive?