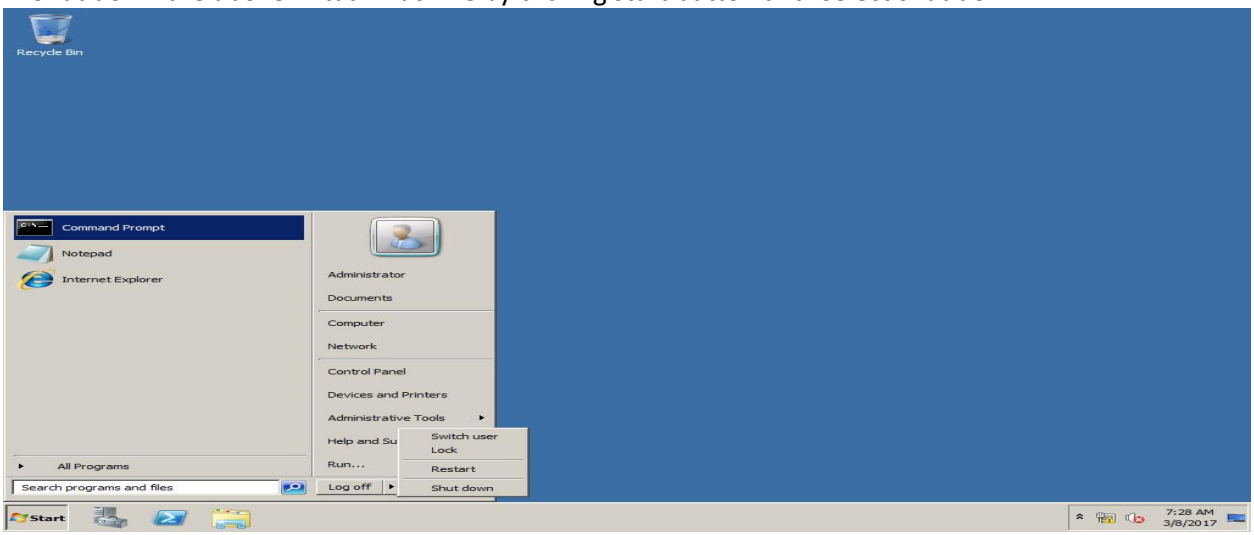
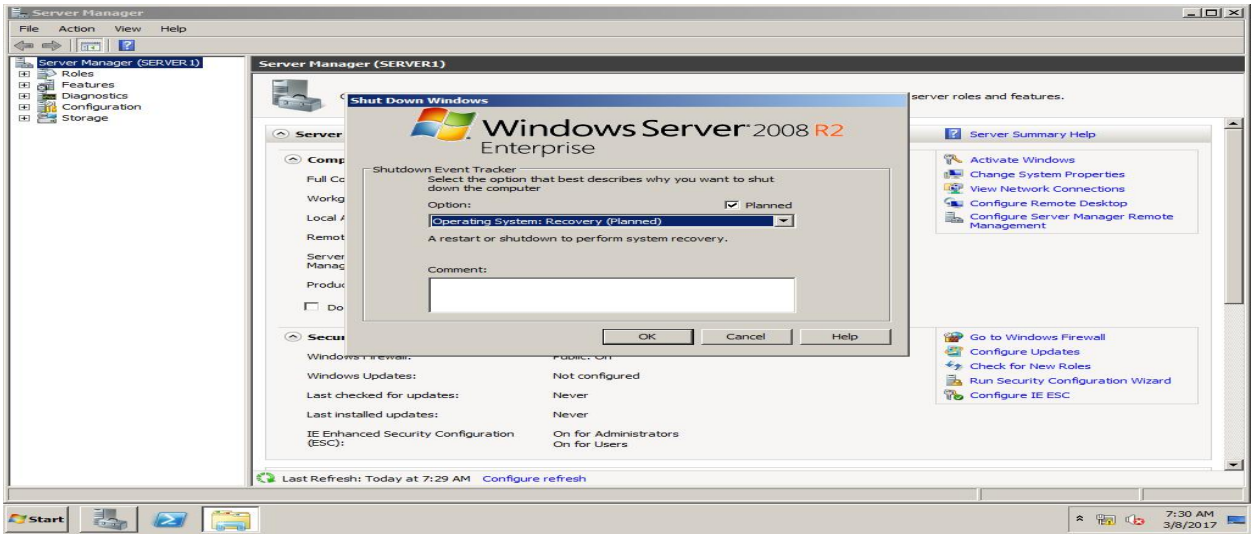
Configuring RAID

Steps to add new hard disk to virtual machine.

1. Shut down the above virtual machine by clicking start button and select shut down.

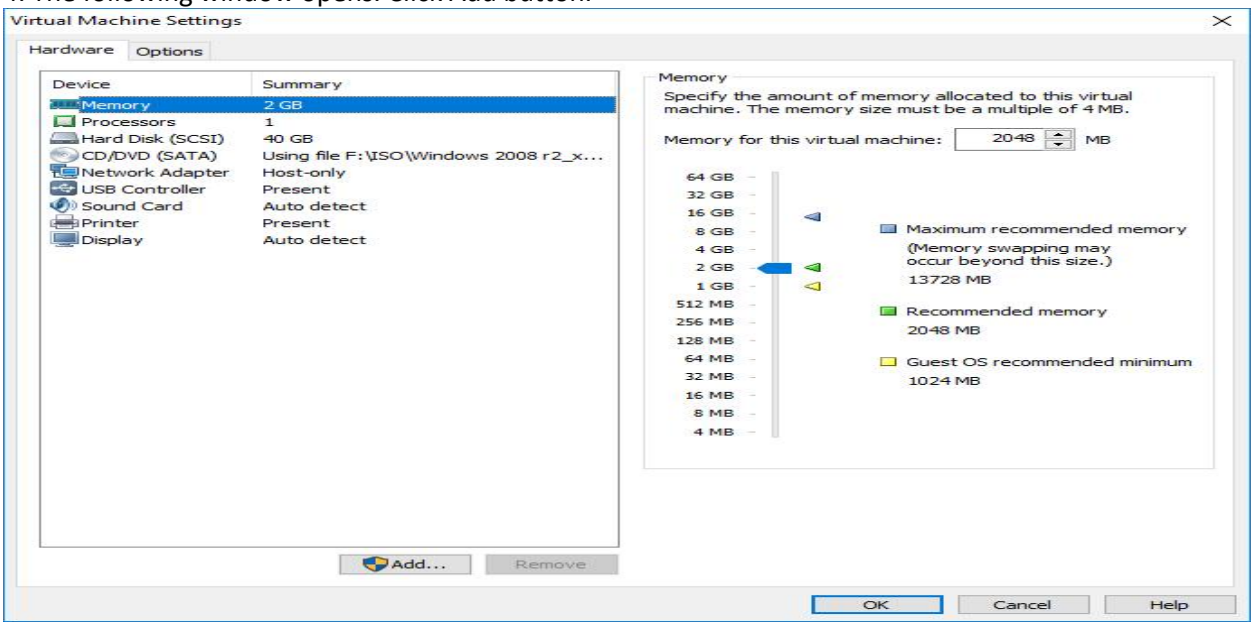


2. In the window that opens, using drop down list select any reason as shown below. Click Ok to shutdown the Windows.

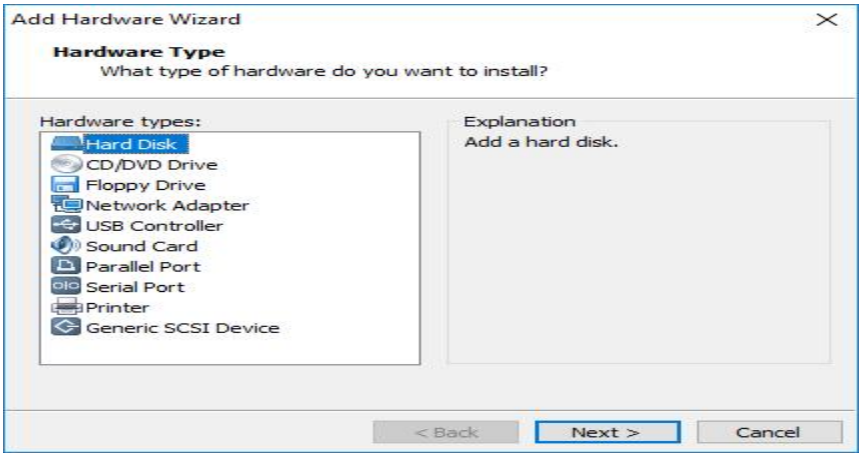


3. Once the virtual machine is off, select **Edit virtual machine settings** option.

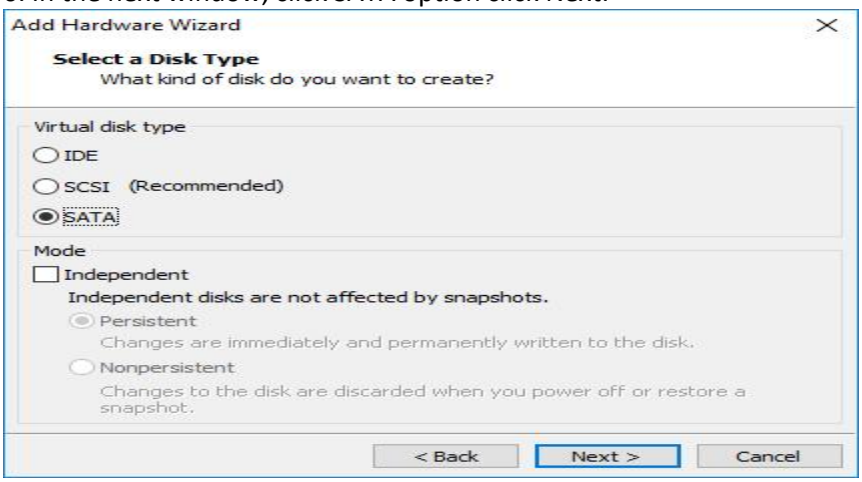
4. The following window opens. Click Add button.



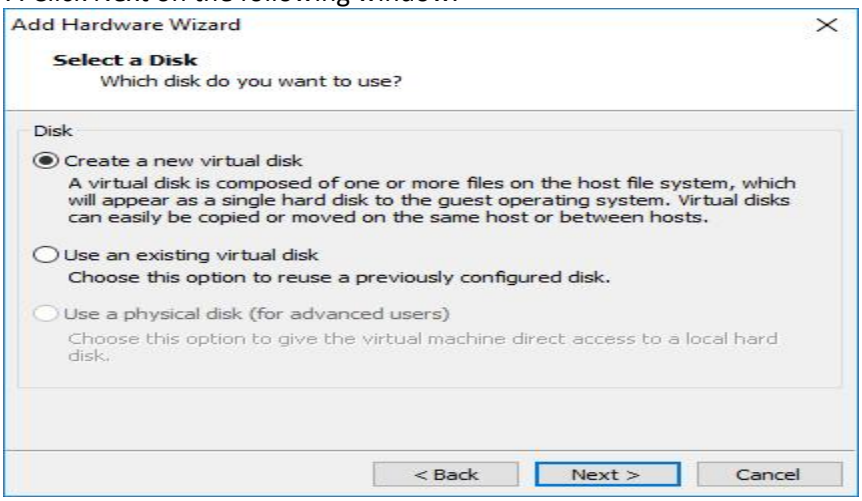
5. It may prompt for administrator privileges, click yes. Following window opens. Select Hard Disk and click Next.



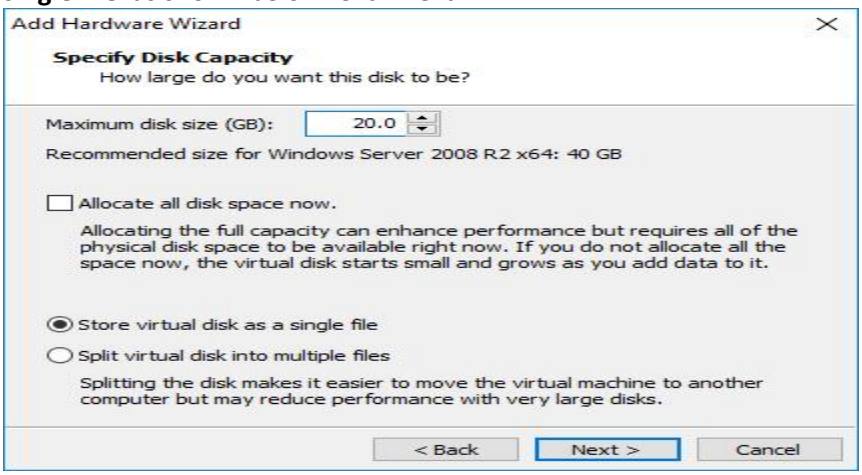
6. In the next window, click SATA option click Next.



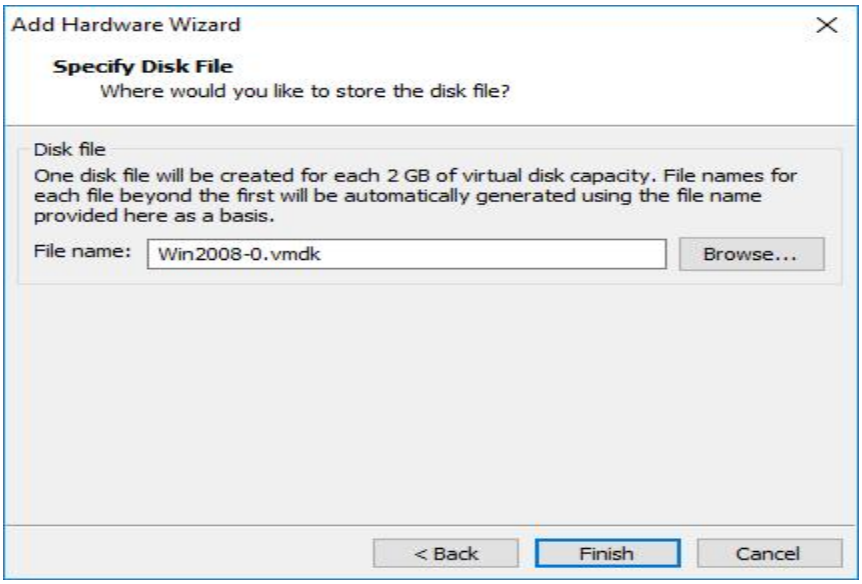
7. Click Next on the following window.



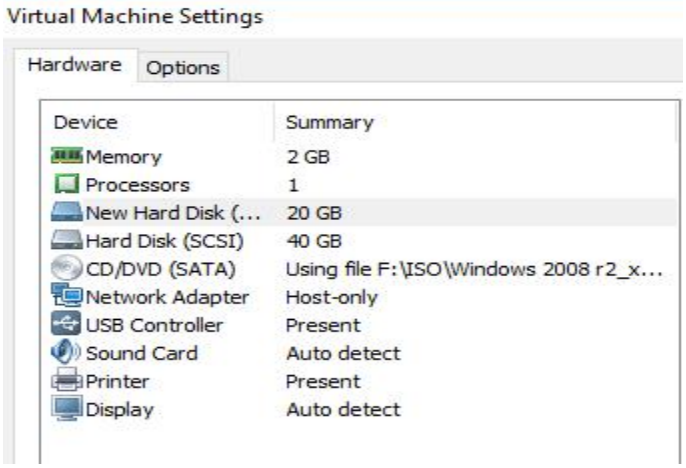
8. On the next screen select size of new hard disk as **20GB** and also select option **store virtual disk as a single file** as shown below. Click Next.



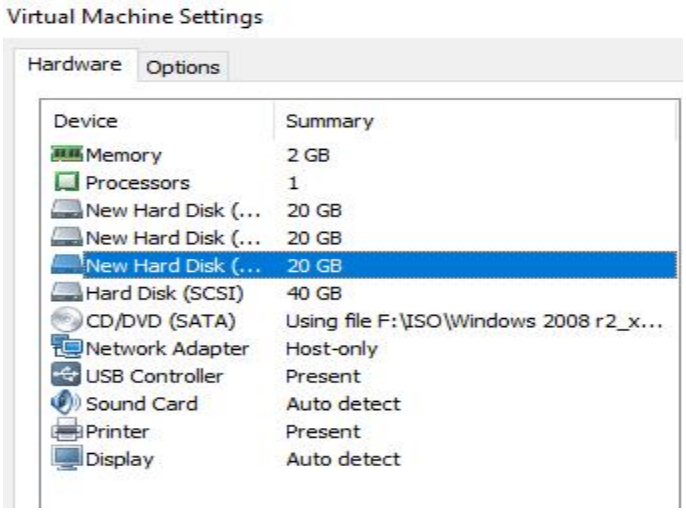
9. Click Next to select the default name for the hard disk file.



10. Click Finish. This will create a new hard disk in the Virtual machine settings as shown below.



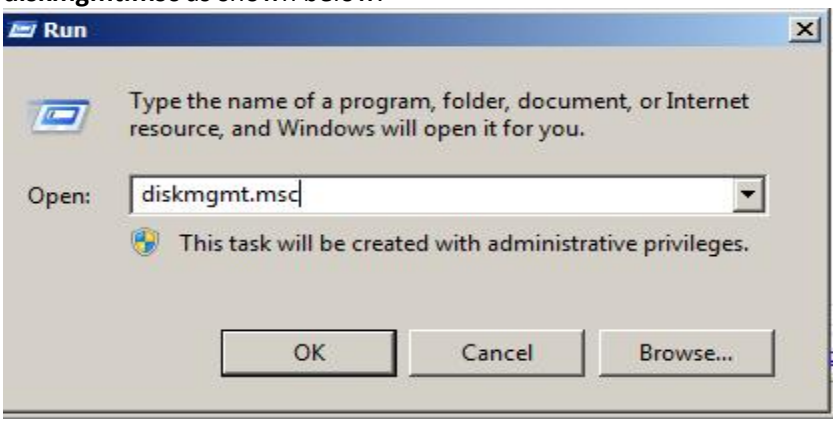
11. Repeat above steps to add 2 more hard disks to the virtual machine. After this the final virtual machine configuration should show 4 hard disks in the settings as shown below.



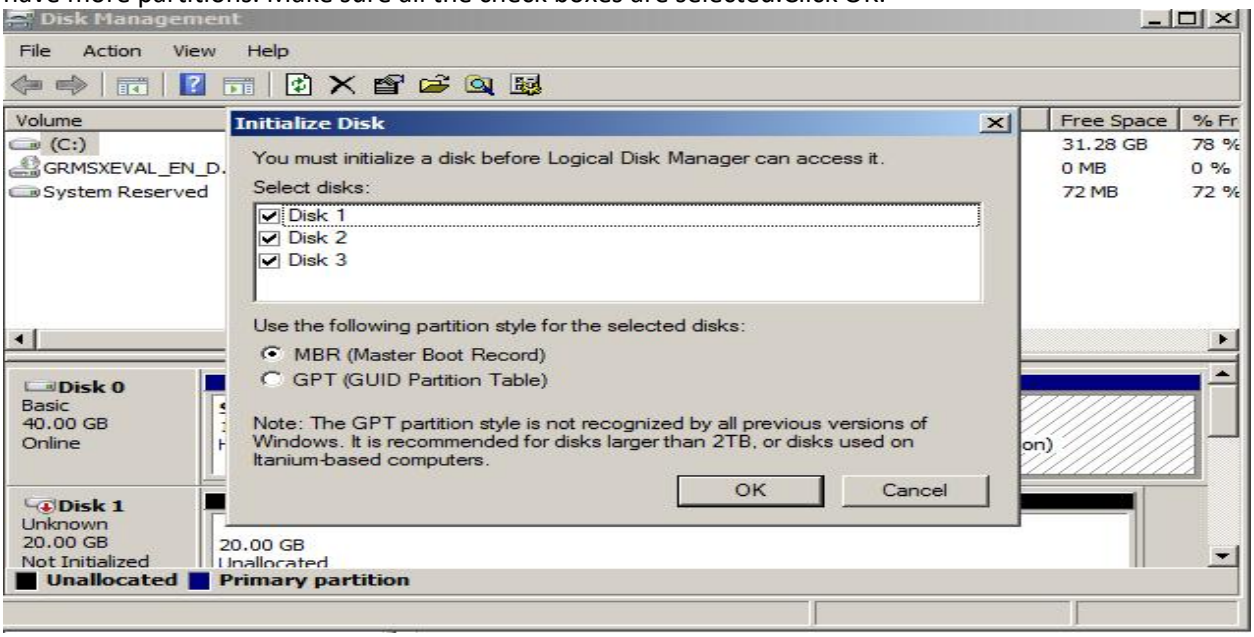
12. Now click OK to close virtual machine settings window and click power on virtual machine to start virtual machine and boot windows.

13. Once the windows starts, login as administrator.

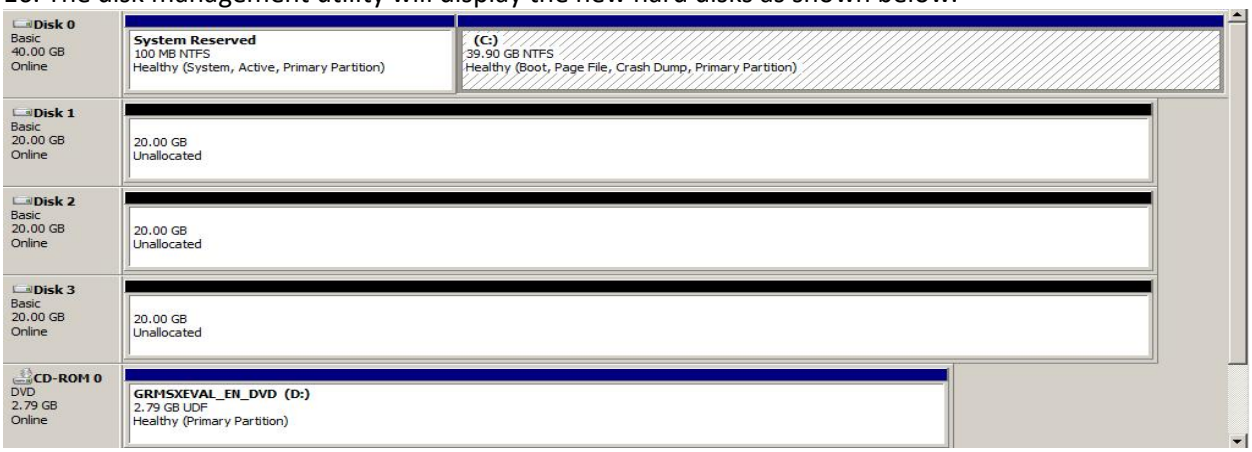
14. Once you login as administrator, click start and open run window. In the run window type **diskmgmt.msc** as shown below.



15. As the disk management utility opens the following screen is displayed. Select MBR or GPT option as per your requirement. The MBR disk allows you to have only 4 partitions. The GPT disk allows you to have more partitions. Make sure all the check boxes are selected.Click OK.

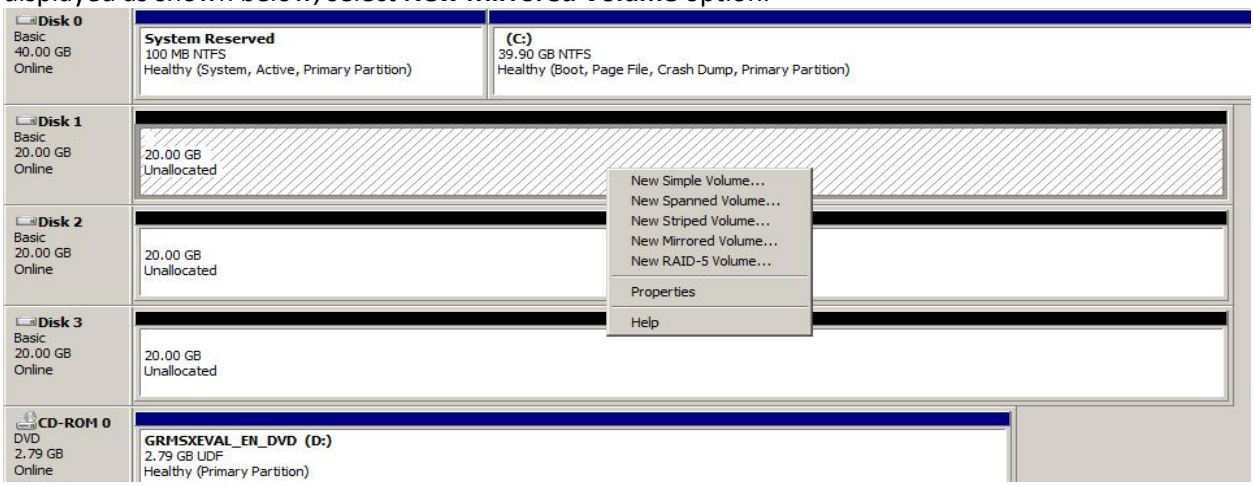


16. The disk management utility will display the new hard disks as shown below.

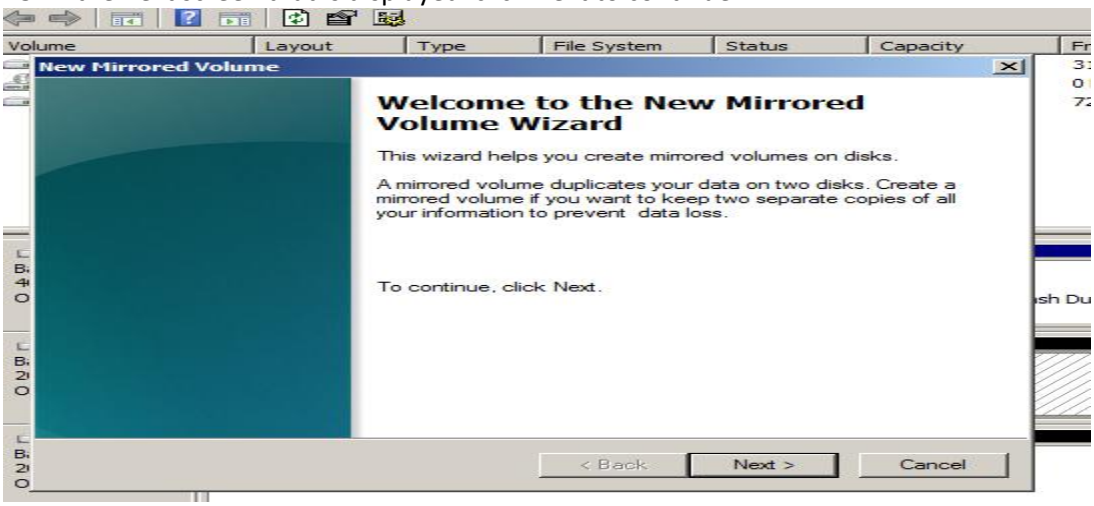


17. Creating RAID 1 - Mirroring

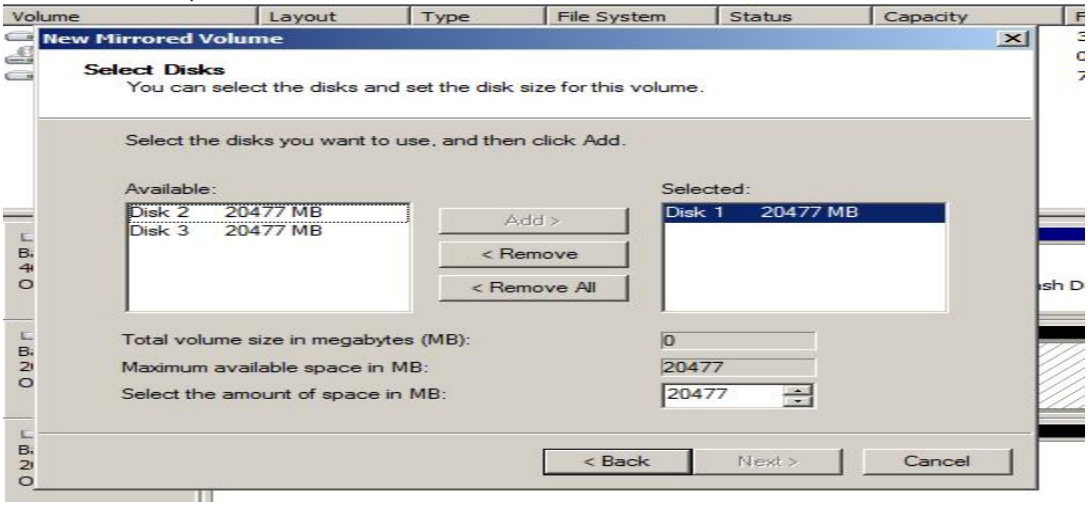
Right click in the unallocated space of Disk1. The disk number may be different. In the options that are displayed as shown below, select **New Mirrored Volume** option.



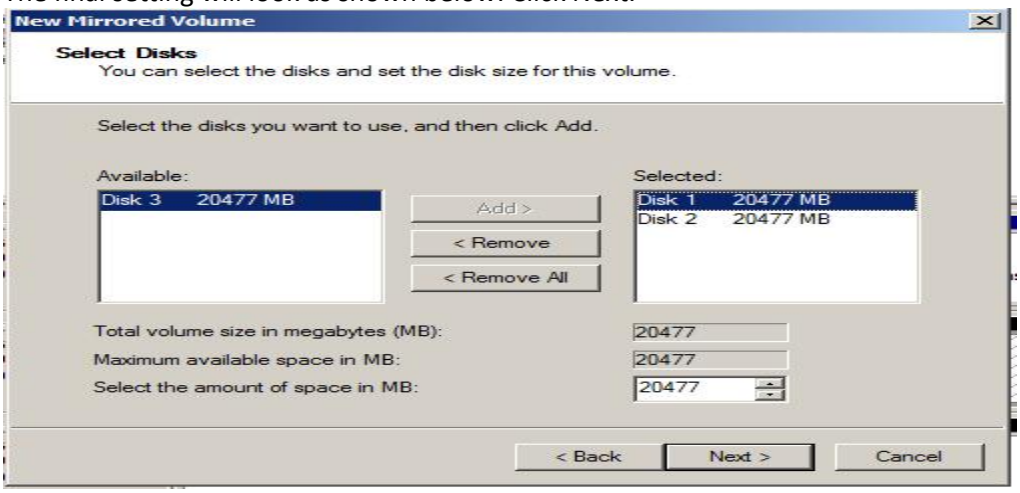
18. In the next screen that is displayed click Next to continue.



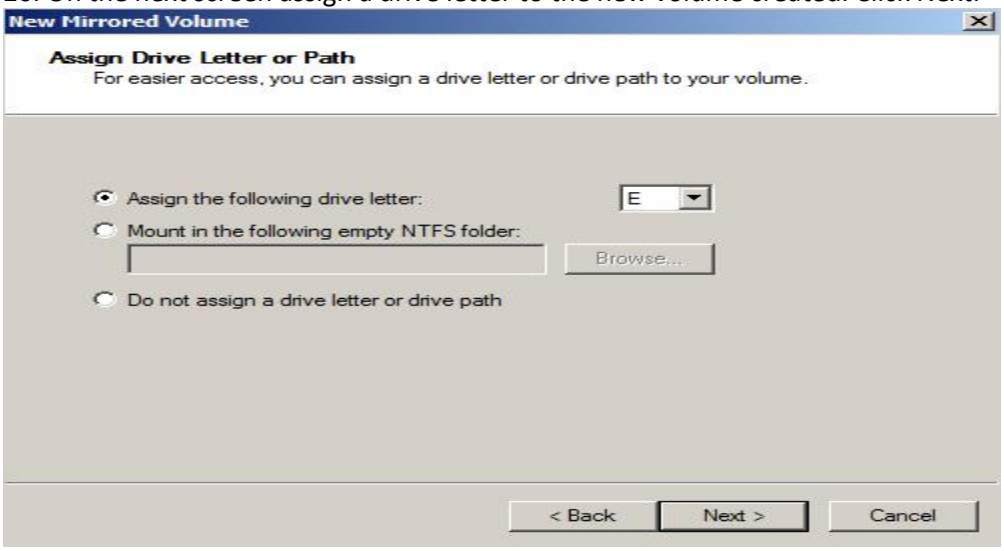
19. In the next window that is displayed select Disk 2 in the left side in Available section. The Add button will be enabled , click Add.



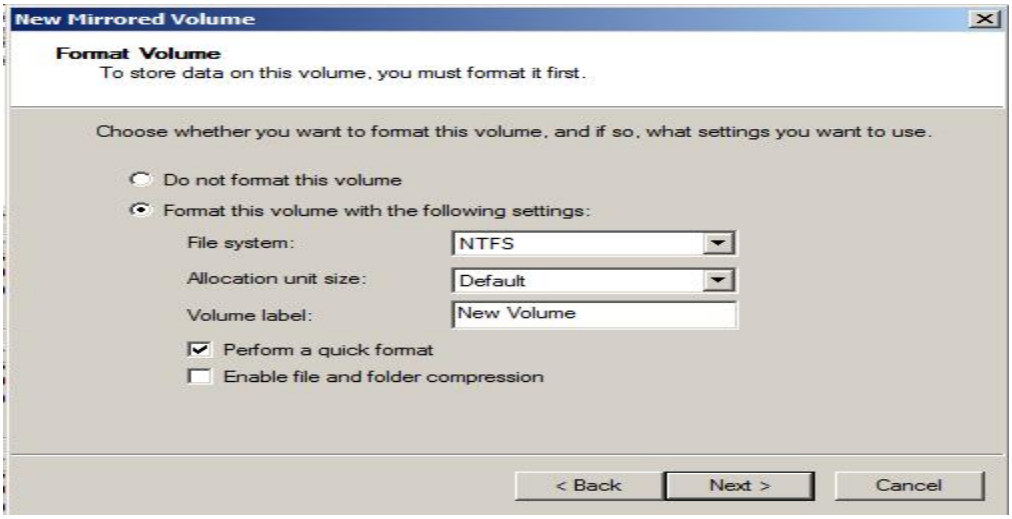
The final setting will look as shown below. Click Next.



20. On the next screen assign a drive letter to the new volume created. Click Next.

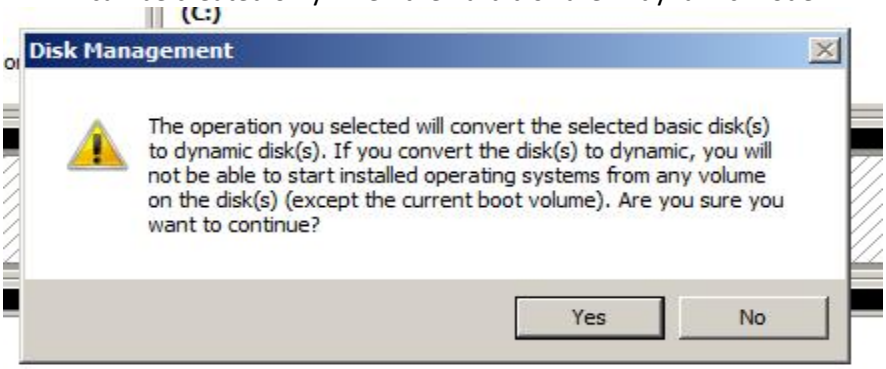


21. On the next screen keep the default options. Make sure perform a quick format option is selected. Click Next.

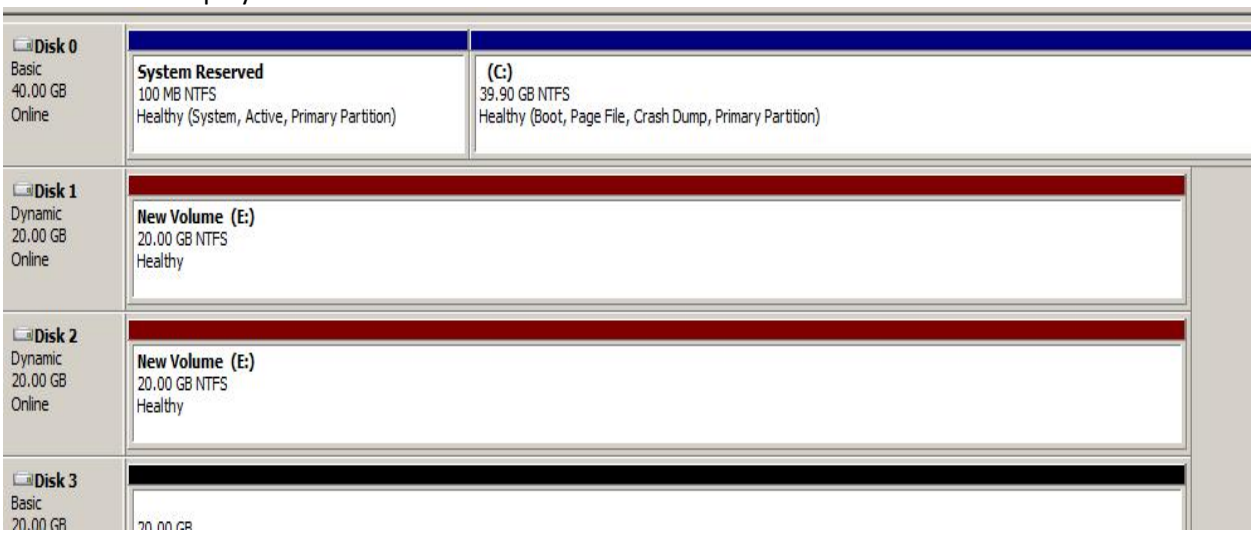


22. Click finish to create and format the volume.

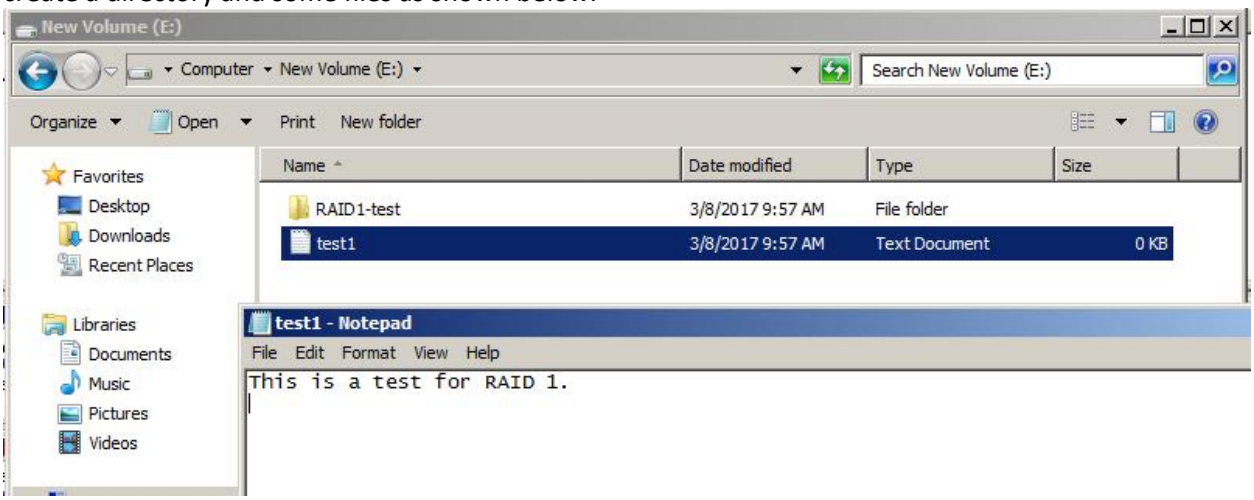
23. A message is displayed to convert the hard disk from basic mode to dynamic mode. Click Yes. RAID 1 can be created only when the hard disk are in dynamic mode.



24. The OS will now create the volume and format it. The process may take some time. Once it finishes the volume is displayed as shown below.

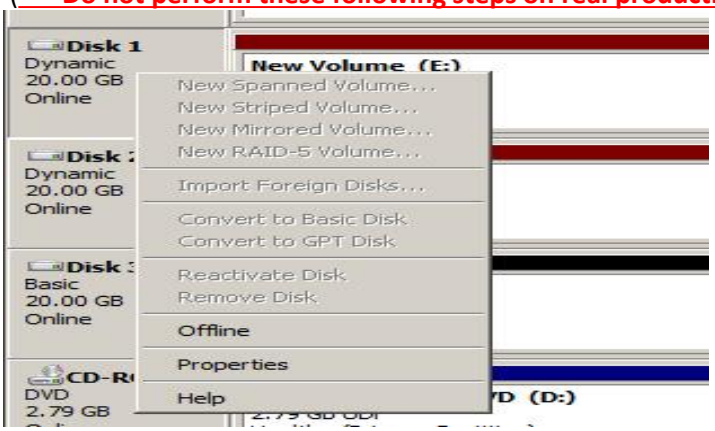


25. To test Mirrored volume, open Windows explorer. Go to new volume created i.e. E: in this case. And create a directory and some files as shown below.

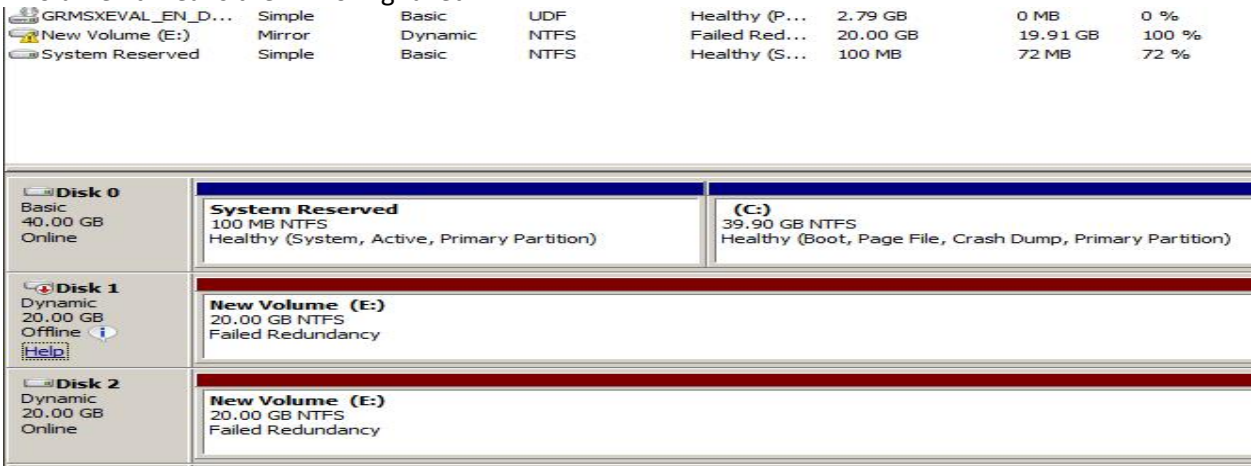


26. Now to test RAID 1, we will deliberately create failure in Mirroring. To do this go to disk management utility and select the first hard disk in the mirrored set. Right click the button written DISk1. Click Offline option. This is shown below.

(***Do not perform these following steps on real production systems)

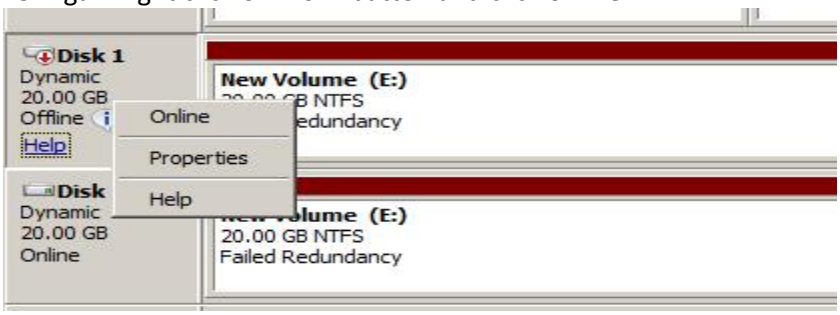


27. As soon as the Disk 1 goes offline, for OS it is similar to a hard disk failure. The following screen is displayed. The Mirrored volume is displayed as Failed Redundancy and a yellow mark is displayed to the E volume. It means the mirroring failed.



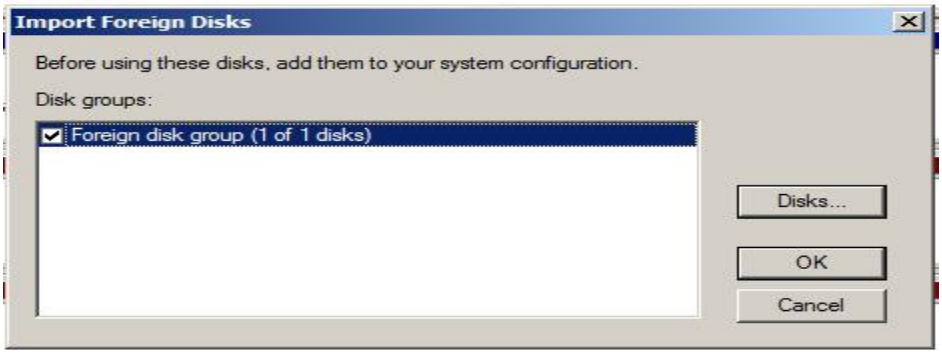
28. Now go to Windows explorer again. Go to the E volume. You will be able to access the earlier data. The data is now served from the second hard disk by the OS.

29. Again right click on Disk1 button and click online.

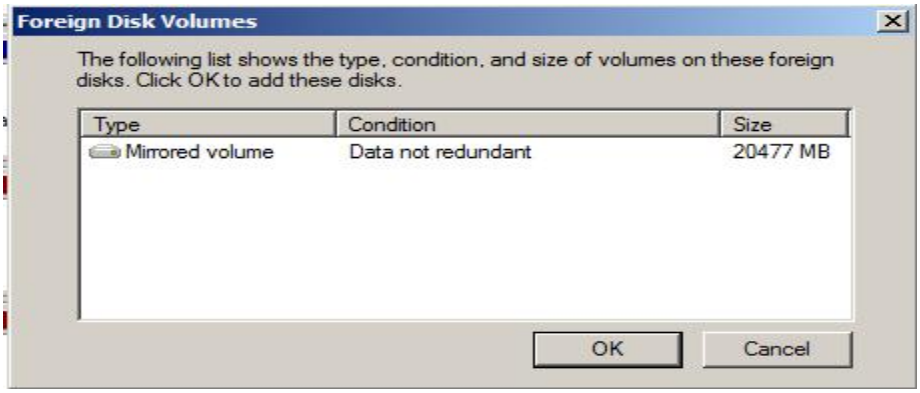


30. Once you click Online, a yellow mark will be displayed on Disk 1 button. Right click on it and select **Import foreign disks** option.

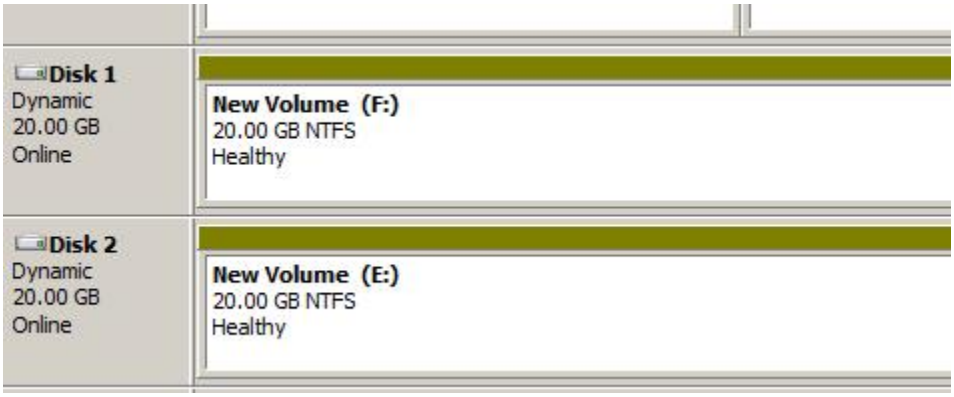
31. Click ok on the following screen.



32. Click OK on the next screen also.



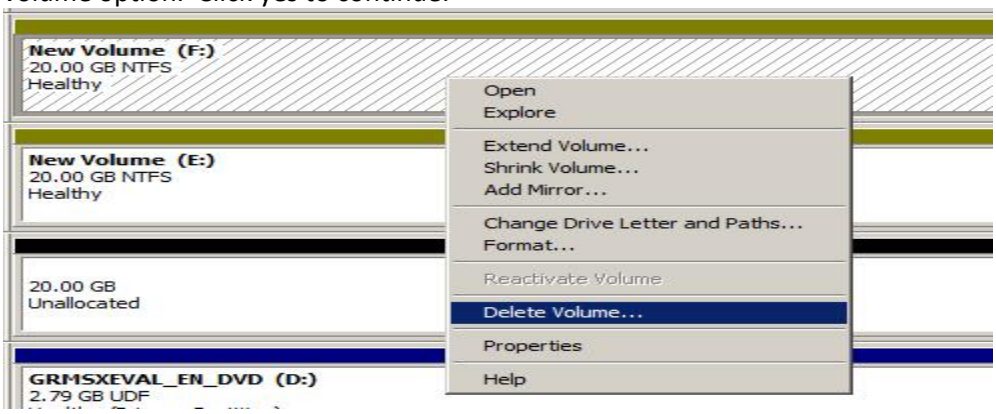
33. As Windows OS thinks as a new disk is attached. Thus it initializes the new disk and creates a new drive letter for the volume found on the Disk 1.



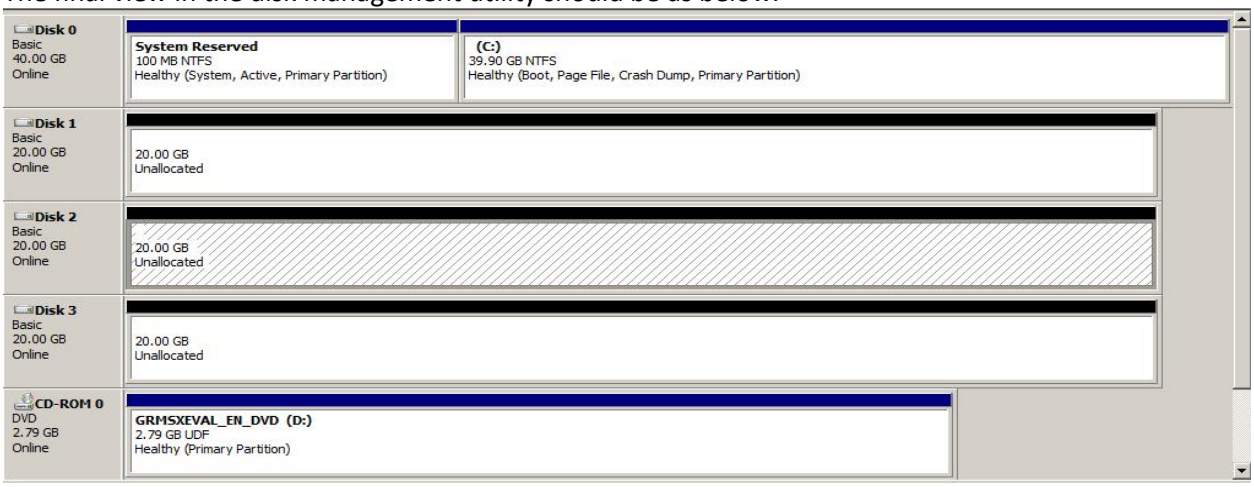
34. If you check the data on both volumes. It will be same as you created on the Mirrored volume initially when it was created.

This shows that in Mirrored volumes data written on one disk is written to the other disk also.

Thus we created a RAID 1 (Mirrored) volume and tested it for failure.
35. Now delete the volumes created and make the disks blank. Right click on the F: and select delete volume option. Click yes to continue.

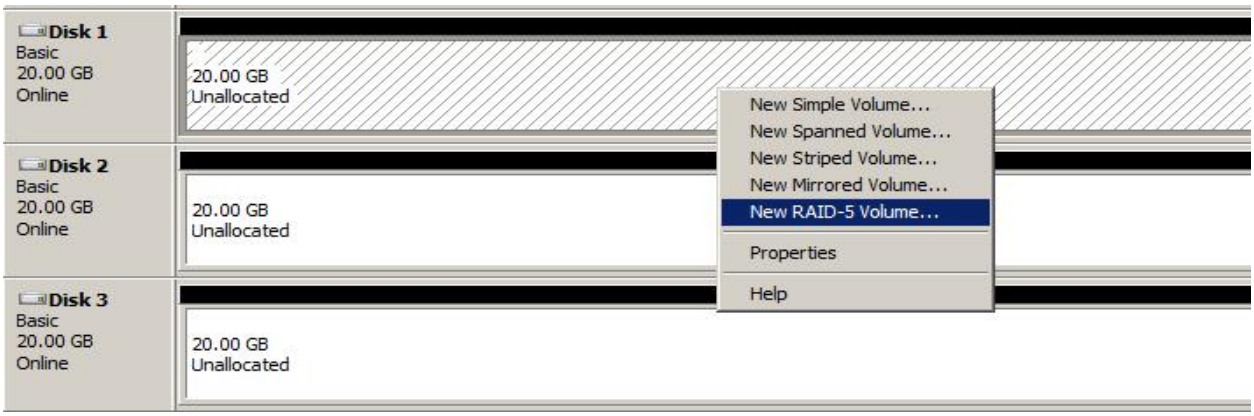


Similarly delete the E volume also.
The final view in the disk management utility should be as below.



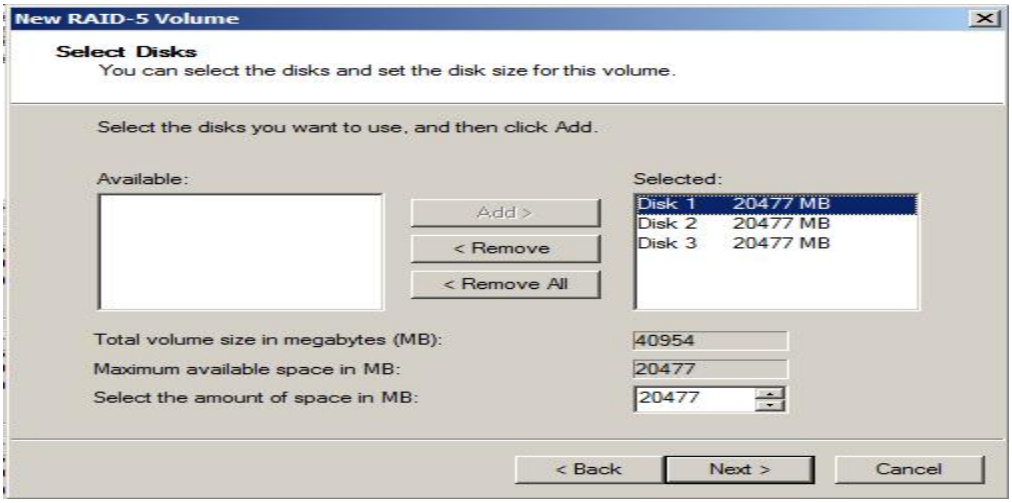
36. **RAID 5 Configuration.**

37. To create a RAID 5 array open disk management. The view will be as shown in the above image. Right click the Disk 1 in the unallocated space and click **New RAID 5 Volume** option as shown below.

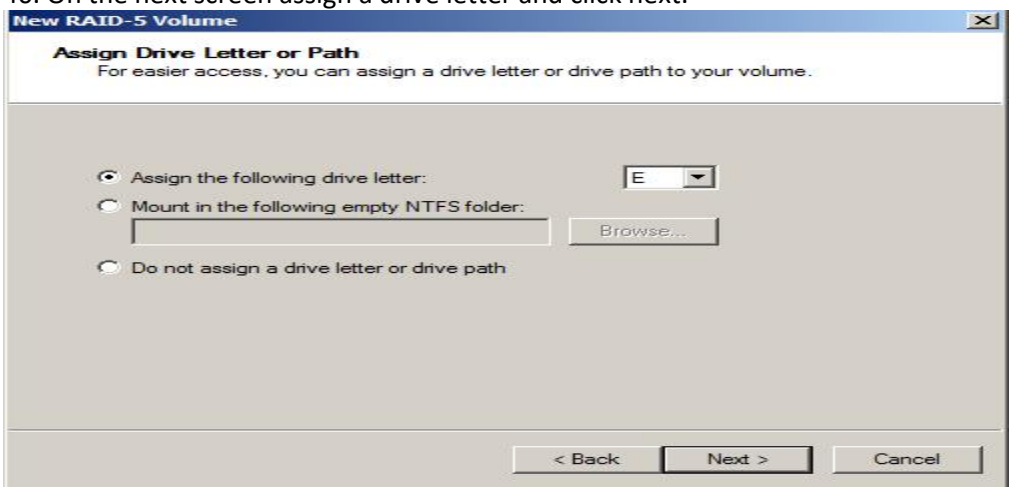


38. Click Next on the following screen.

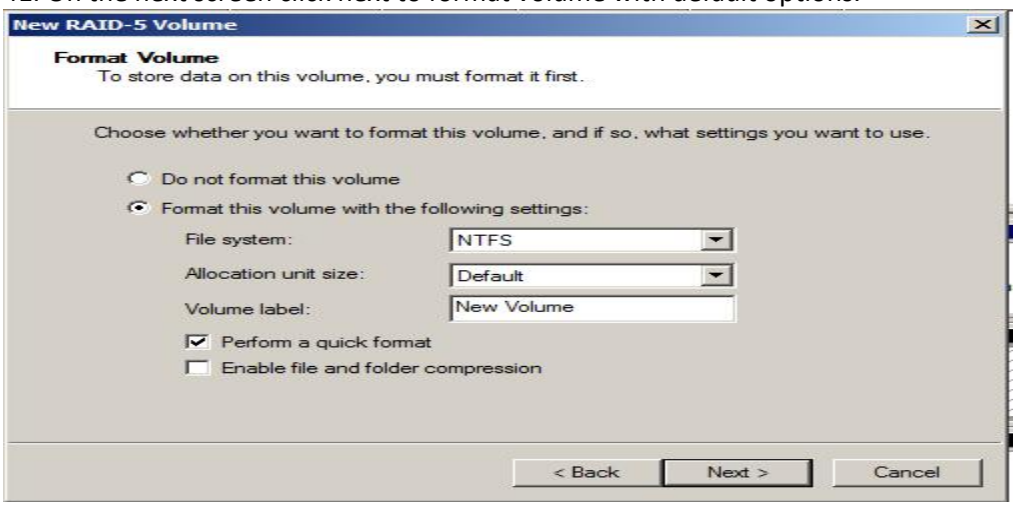
39. On the next screen that is displayed, select Disk 2 and click Add. The Next button will not be enabled as RAID 5 requires minimum 3 hard disks. Thus select Disk 3 and click Add. The final view should be as shown below. Then click Next.



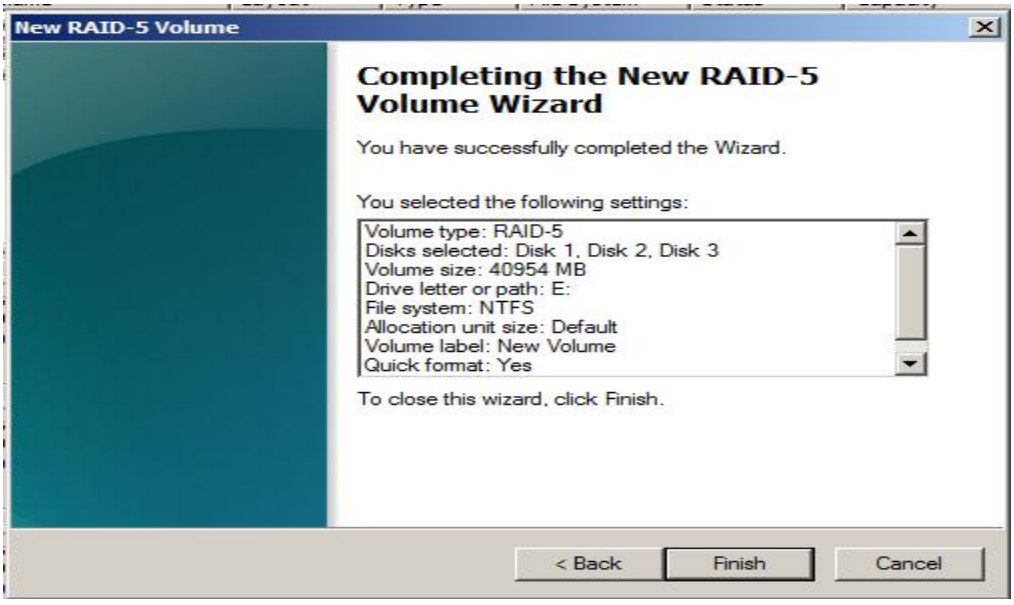
40. On the next screen assign a drive letter and click next.



41. On the next screen click next to format volume with default options.

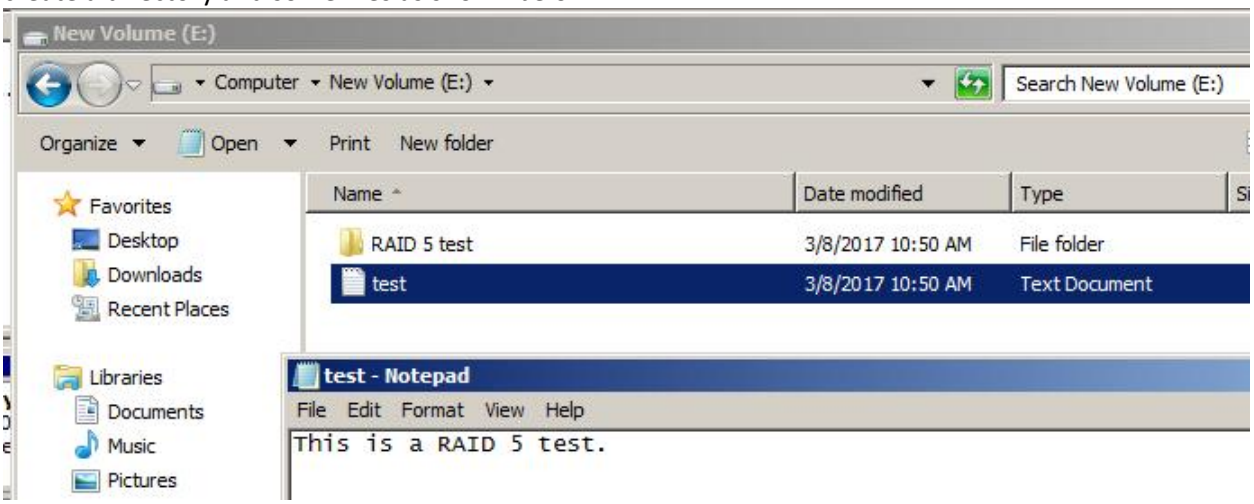


42. Click Finish on the next screen to create and format the volume.



43. A message to convert disks from Basic mode to Dynamic mode is displayed. **Click Yes** to allow.
44. The OS will now create the volume and format it. The process may take some time. Once it finishes the volume is displayed as shown below.

45. To test Mirrored volume, open Windows explorer. Go to new volume created i.e. E: in this case. And create a directory and some files as shown below.



Now follow the same process to test the RAID 5 failure that was used to test RAID 1 failure.
Thus take only one had disk as offline and check the availability of the data.

This is how the RAID 5 volume is created.

Please do not perform the RAID array test steps on the real production systems. On those systems just create the array.