Disk Virtualization

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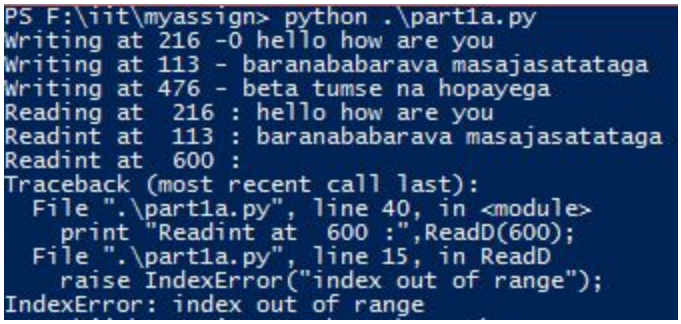
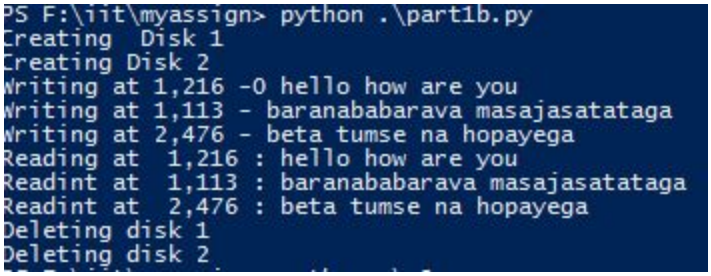
Disk Virtualization (Consolidation & Partitioning)

In the first part, we have created 2 arrays of sizes 200 and 300.To simulate these two arrays as a single array of size 500, we modified Read and Write functions in the following way.
If block number < 200 then perform read or write in first array.
If block number >200 then perform read or write in second array.
A function Checkinfosize is written to change the size of blockinfo to 100 bytes if it's size exceeds 100 bytes.



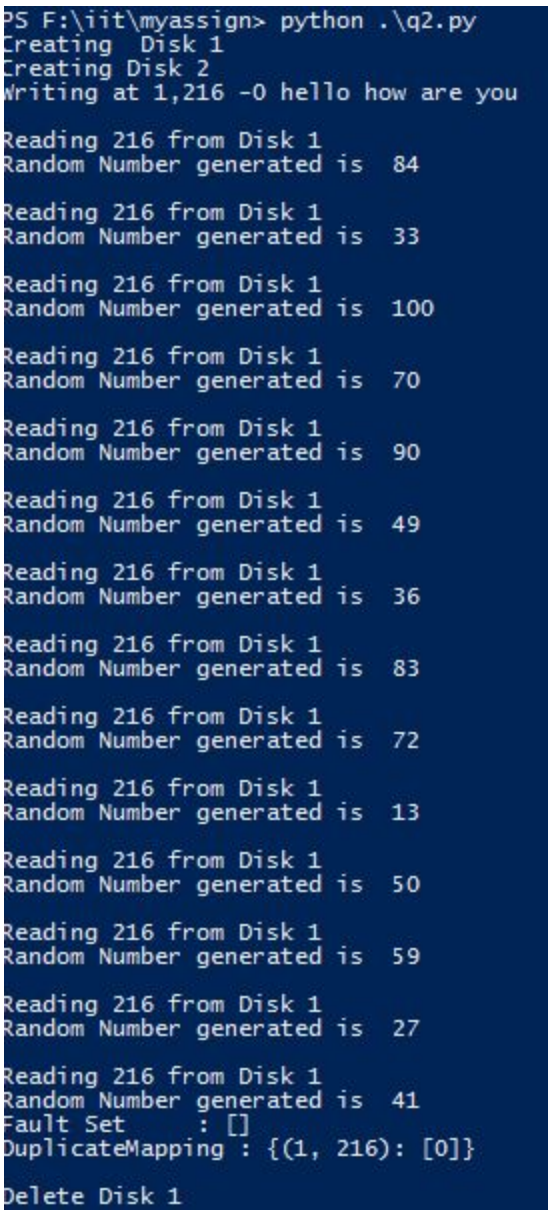
In the second part, we have created a dictionary to maintain all disks.Each key in dictionary contains its value as a tuple (disk contents list ,number of blocks in disk).Read and Write can be done easily if diskID, blockindex and blockinfo are given.CreateDisk creates a new key in dictionary with DiskID. DeleteDisk deletes the corresponding disk from dictionary.In no fragmentation occures since we are not storing blocks of disk in a contiguous array.



Block Replication

A dictionary Duplicate is created to store all the replicas of blocks and another dictionary Duplicatemap is used to store the mappings of block to its replicas.

If read error happens at a block, then its contents are brought from Duplicate dictionary and a copy of the same block is copied at the end of Duplicate.The mappings of these copies are then stored in Duplicatemap dictionary.



Snap shoting

We basically created a dictionary to store the contents of all disks when Checkpoint is called.So when roll back is called again we change the Disk dictionary to that dictionary which was present when checkpoint was called.