

Disk Virtualization

B.Praveen(2013CS10216)

K.Sumanth(2013CS10232)

Ankush Singhal(2013CS10210)

Akhil Soni(2013CS50300)

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.

```
PS F:\iit\myassign> python .\part1a.py
Writing at 216 -0 hello how are you
Writing at 113 - baranababarava masajasatataga
Writing at 476 - beta tumse na hopayega
Reading at 216 : hello how are you
Readint at 113 : baranababarava masajasatataga
Readint at 600 :
Traceback (most recent call last):
  File ".\part1a.py", line 40, in <module>
    print "Readint at 600 :",ReadD(600);
  File ".\part1a.py", line 15, in ReadD
    raise IndexError("index out of range");
IndexError: index out of range
```

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 occurs since we are not storing blocks of disk in a contiguous array.

```
PS F:\iit\myassign> python .\part1b.py
Creating Disk 1
Creating Disk 2
Writing at 1,216 -0 hello how are you
Writing at 1,113 - baranababarava masajasatataga
Writing at 2,476 - beta tumse na hopayega
Reading at 1,216 : hello how are you
Readint at 1,113 : baranababarava masajasatataga
Readint at 2,476 : beta tumse na hopayega
Deleting disk 1
Deleting disk 2
```

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.

```
PS F:\iit\myassign> python .\q2.py
Creating Disk 1
Creating Disk 2
Writing at 1,216 -0 hello how are you

Reading 216 from Disk 1
Random Number generated is 84

Reading 216 from Disk 1
Random Number generated is 33

Reading 216 from Disk 1
Random Number generated is 100

Reading 216 from Disk 1
Random Number generated is 70

Reading 216 from Disk 1
Random Number generated is 90

Reading 216 from Disk 1
Random Number generated is 49

Reading 216 from Disk 1
Random Number generated is 36

Reading 216 from Disk 1
Random Number generated is 83

Reading 216 from Disk 1
Random Number generated is 72

Reading 216 from Disk 1
Random Number generated is 13

Reading 216 from Disk 1
Random Number generated is 50

Reading 216 from Disk 1
Random Number generated is 59

Reading 216 from Disk 1
Random Number generated is 27

Reading 216 from Disk 1
Random Number generated is 41
Fault Set      : []
DuplicateMapping : {(1, 216): [0]}

Delete Disk 1
```

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.

```
PS F:\iit\myassign> python .\q3.py
Creating Disk 1
Creating Disk 2
Writing at 1,216 -0 hello how are you
Writing at 1,113 - baranababarava masajasatataga
Check Point 1 for disk1 : {1: ({216: 'hello how are you', 113: 'baranababarava masajasatataga'}, 5000), 2: ({}, 5000)}
Writing at 2,476 - beta tumse na hopayega
Writing at 2,466 - hello beta tumse na hopayega
Check Point 2 for disk 2 : {1: ({216: 'hello how are you', 113: 'baranababarava masajasatataga', 476: 'beta tumse na ho
payega'}, 5000), 2: ({466: 'hello beta tumse na hopayega'}, 5000)}

Roll Back 1 : {1: ({216: 'hello how are you', 113: 'baranababarava masajasatataga'}, 5000), 2: ({466: 'hello beta tumse
na hopayega'}, 5000)}

Roll Back 2 : {1: ({216: 'hello how are you', 113: 'baranababarava masajasatataga'}, 5000), 2: ({466: 'hello beta tumse
na hopayega'}, 5000)}

Delete Disk 1
Delete Disk 2
```