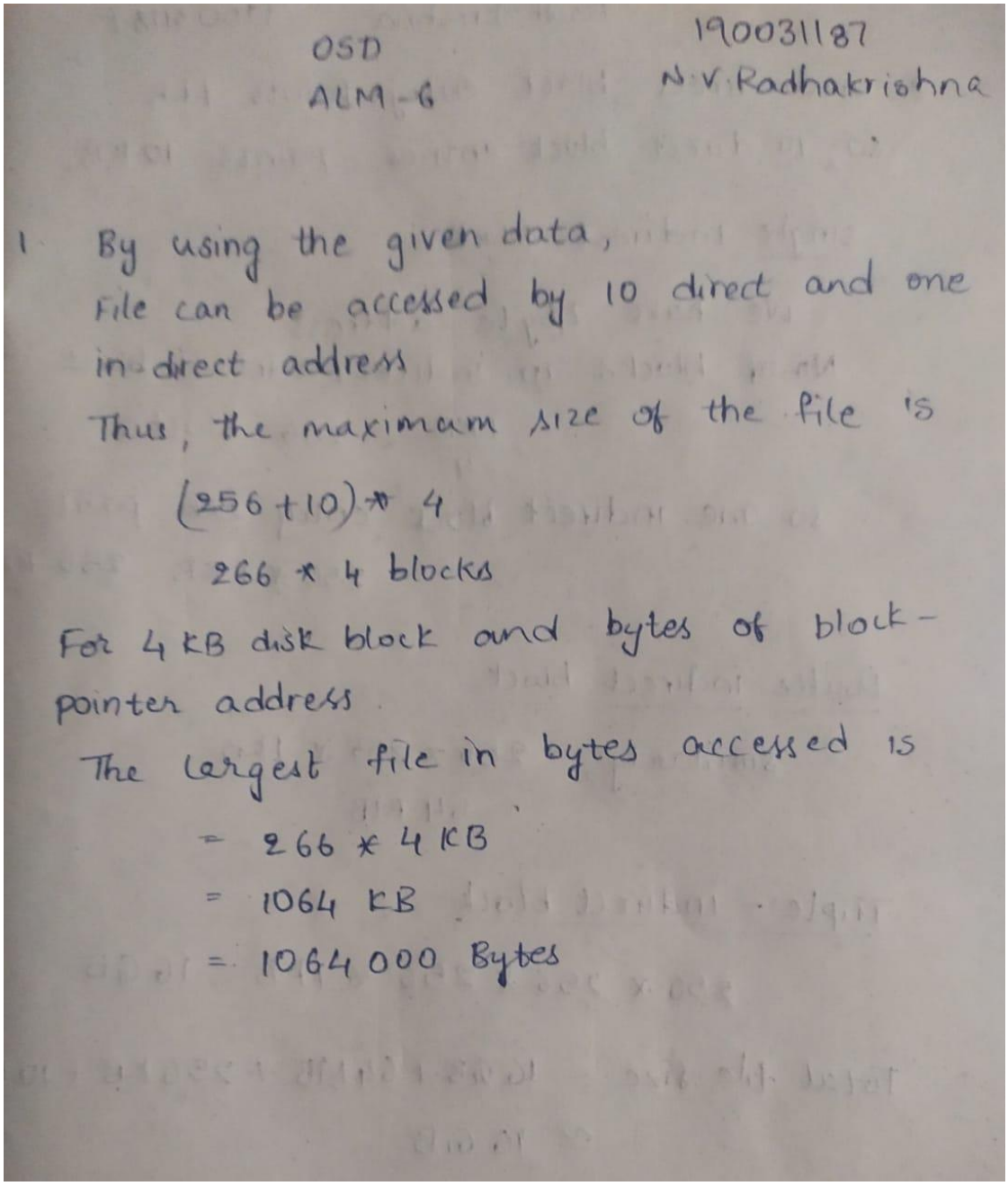
Operating Systems Design 19CS2106S
Session – 6
ALM

1. Given a disk-block size of 4 KB and block-pointer address value of 4 bytes, what is the largest file size (in bytes) that can be accessed using 10 direct addresses and one indirect block?

Solution:



OSD
ALM-6

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1. By using the given data,
File can be accessed by 10 direct and one in-direct address
Thus, the maximum size of the file is

$(256+10) * 4$

$266 * 4$ blocks

For 4 KB disk block and bytes of block-pointer address

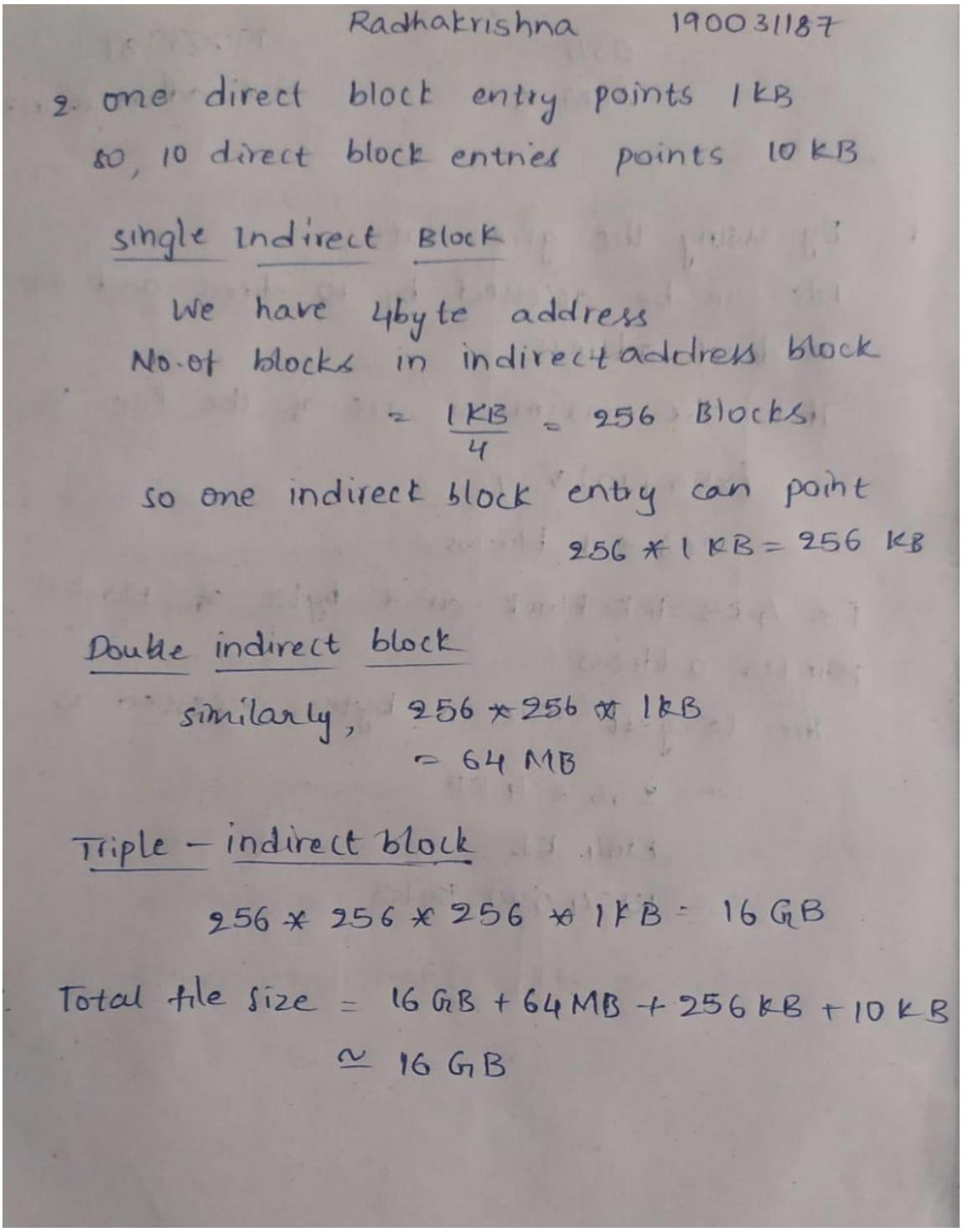
The largest file in bytes accessed is

$= 266 * 4\ KB$

$= 1064\ KB$

$= 1064000$ Bytes

2. A UNIX file system has 1-KB blocks and 4-byte disk addresses. What is the maximum file size if i-nodes contain 10 direct entries, and one single, double, and triple indirect entry each?
Solution:



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2. one direct block entry points 1KB
so, 10 direct block entries points 10 KB

single Indirect Block

We have 4byte address
No. of blocks in indirect address block
$= \frac{1KB}{4} = 256$ Blocks.
so one indirect block entry can point
$256 * 1KB = 256\ KB$

Double indirect block

similarly, $256 * 256 * 1KB$
$= 64\ MB$

Triple – indirect block

$256 * 256 * 256 * 1KB = 16\ GB$

Total file size $= 16\ GB + 64\ MB + 256\ KB + 10\ KB$
$\simeq 16\ GB$

3. How many disk operations are needed to fetch the i-node for afile with the path name */usr/ast/courses/os/handout.t*? Assume that the i-node for the root directory is in memory, but nothing else along the path is in memory. Also assume that all directories fit in one disk block.
Solution: