

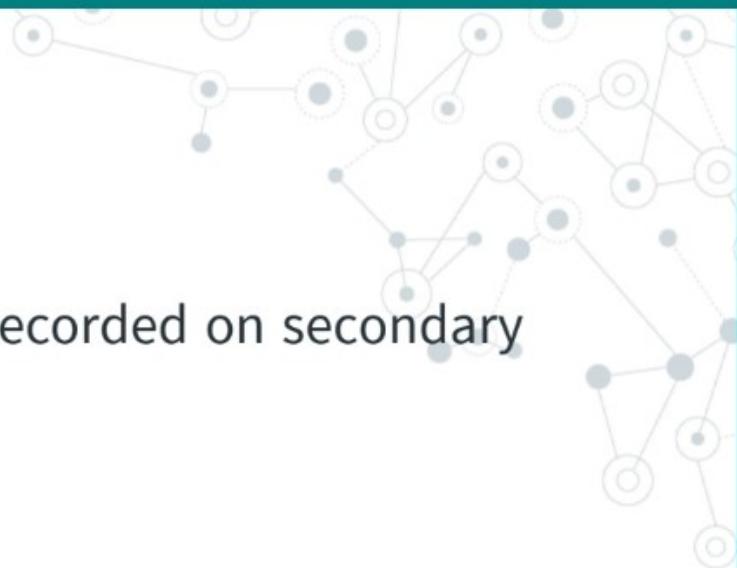


# Are You Ready?

Lets Begin the Unlimited Learning

# File

A file is a named collection of related information that is recorded on secondary storage.



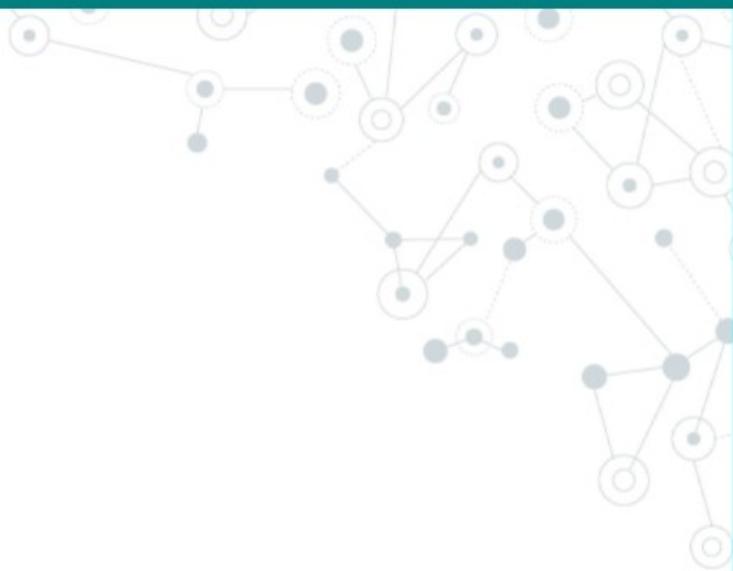
# File Attributes

1. Name
2. Extension
3. Size
4. Date
5. Author
6. Created, Modified, Accessed
7. Attributes: Read-only, hidden
8. Default Program
9. Security Details



# File Directory

Collection of files



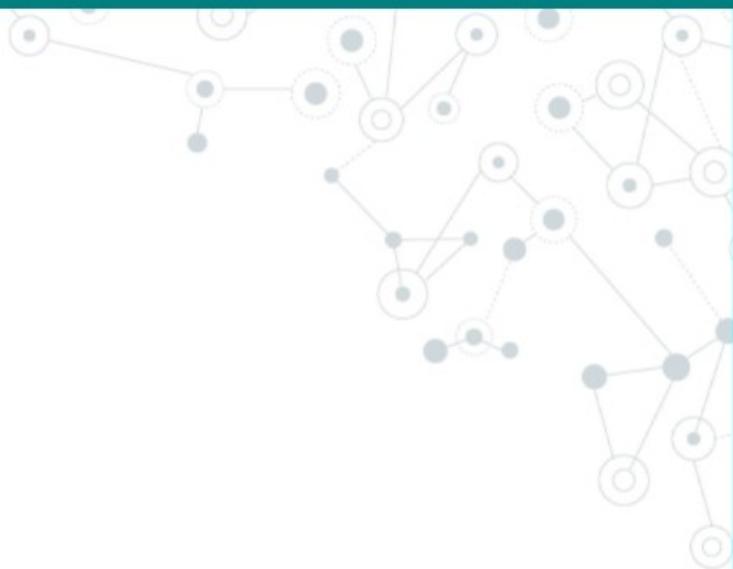
# File System

Module of OS which manages, controls and organizes files and related structures



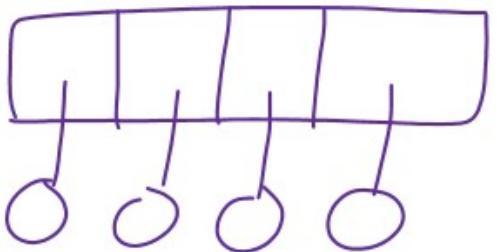
# Types of File Systems

1. FAT32
2. NTFS
3. HFS+
4. Ext2 / Ext3 / Ext4
5. Swap



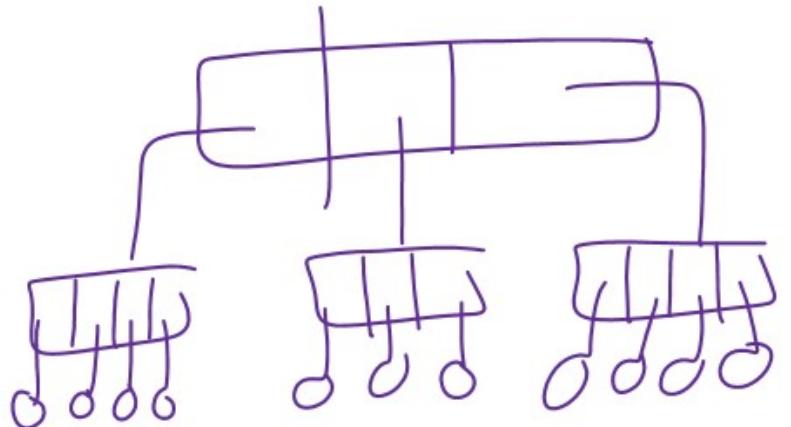
# File Directory Structure

## 1. Single-Level Directory



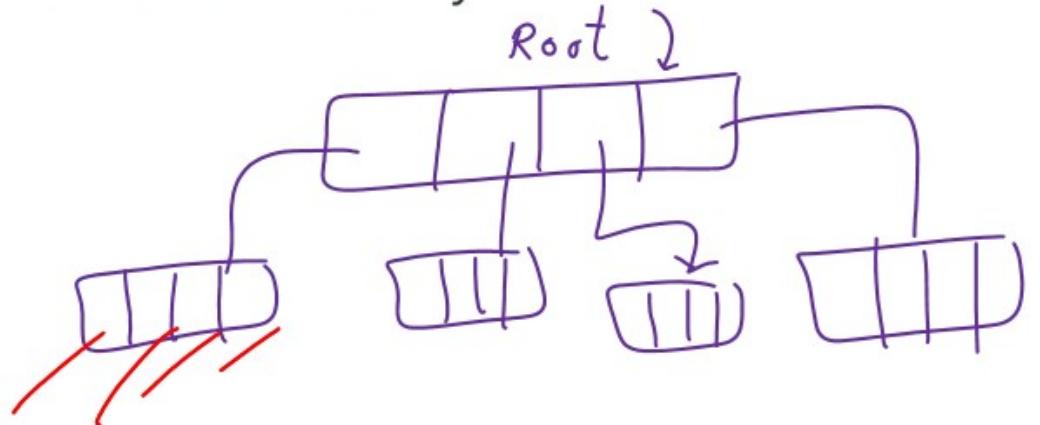
# File Directory Structure

## 2. Two-Level Directory

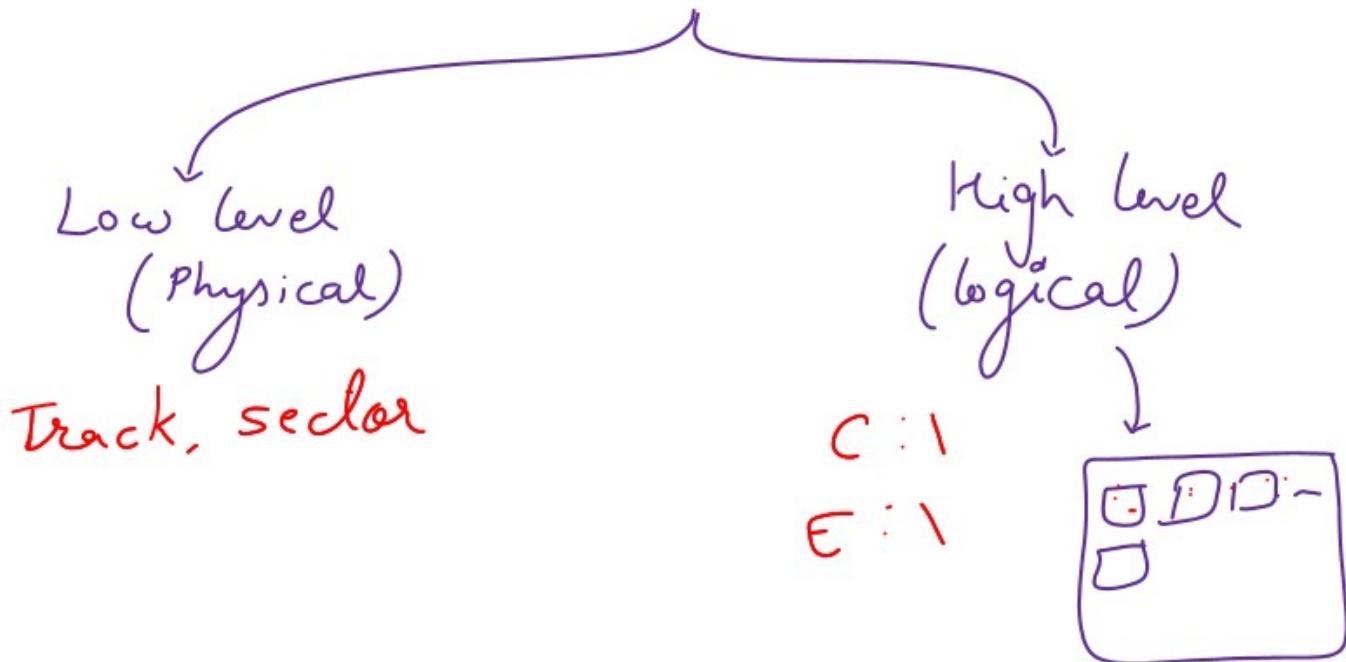


# File Directory Structure

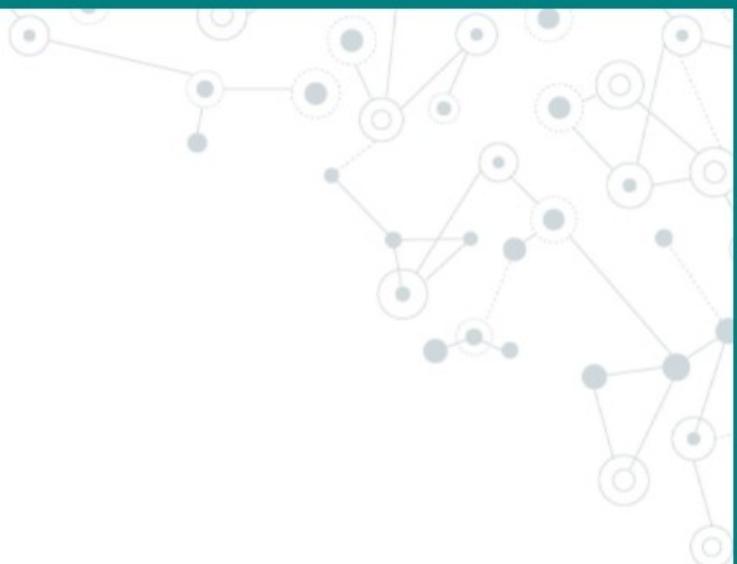
## 3. Tree Structure Directory



# Disk Partitioning



# Disk Blocks



# Question

Number of disk blocks =  $2^{16}$

Size of each block = 1KB

$$\text{Total Size of disk? } 2^{16} * 1KB = 2^{26} B = 64 MB$$

D. block no. = 16-bits



# Free Space Management

1. Free List
2. Bitmap Method



0 1 0 0 0 - - -

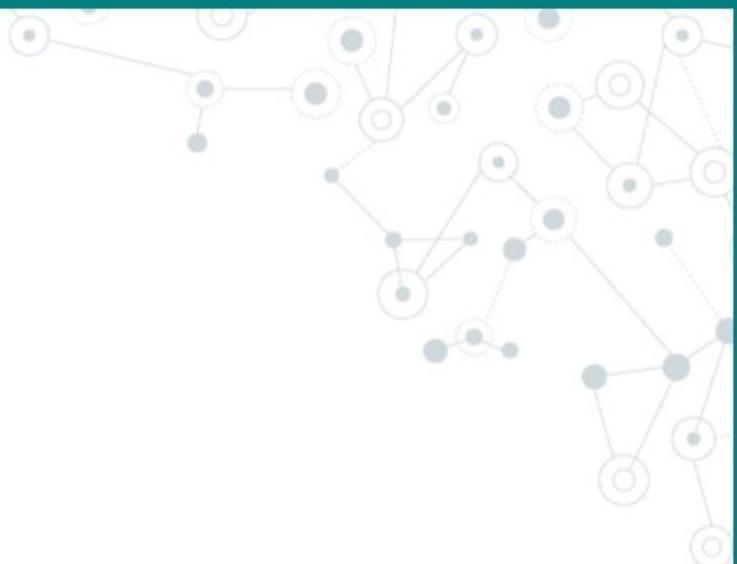


# Free Space Management

- ◎ No searching in free list, but in bitmap we search for first zero
- ◎ Free list is faster in allocating a free block
- ◎ Free list size is variable, whereas bitmap size is constant



# File Allocation Methods



# Question

Disk block address = 14 bits

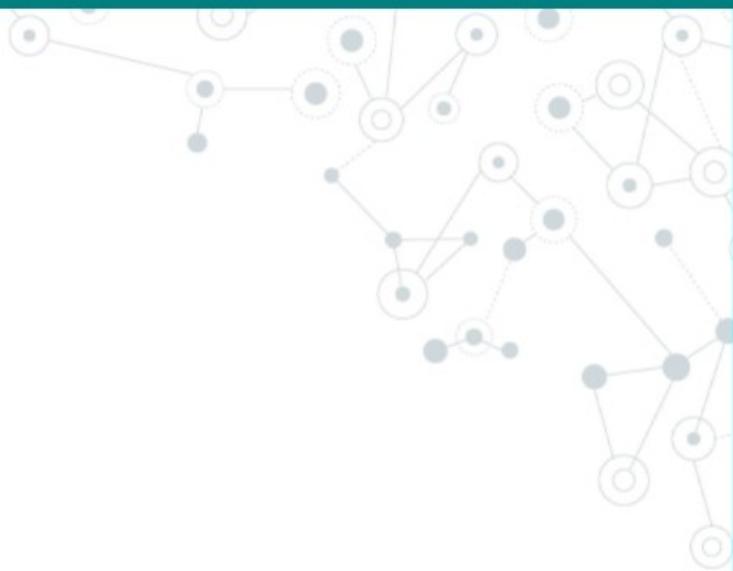
Each disk block size = 1KB

Maximum size of a file = ?

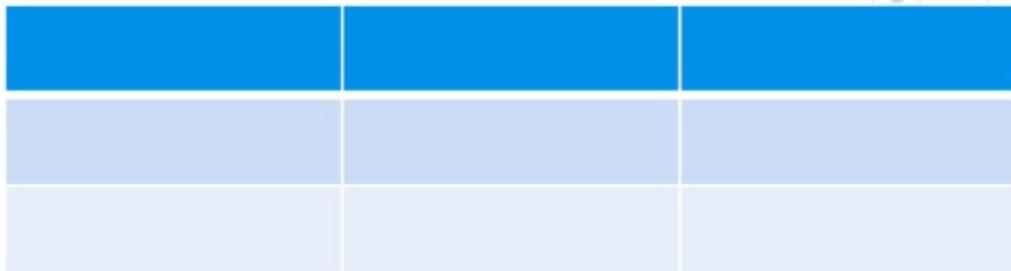
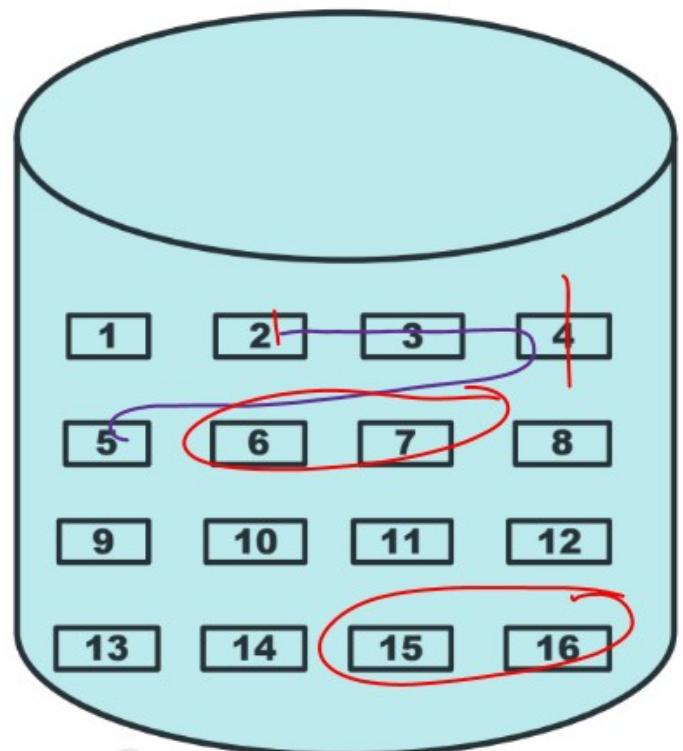


# File Allocation Methods

1. Contiguous Allocation
2. Linked Allocation
3. Indexed Allocation



# Contiguous Allocation

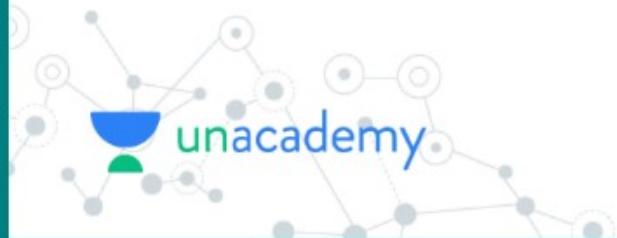


freq.  
Access      Internal, Exter  
seg. , Random

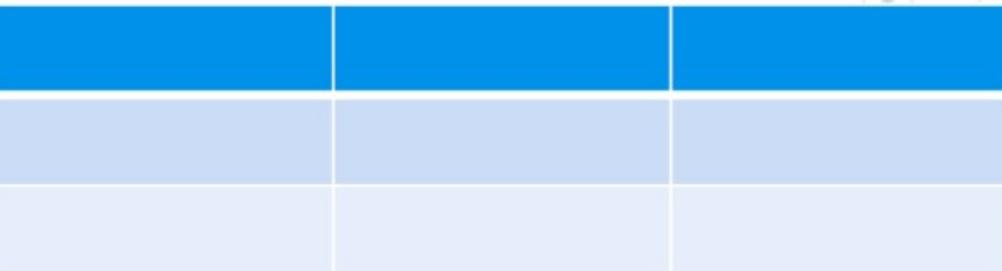
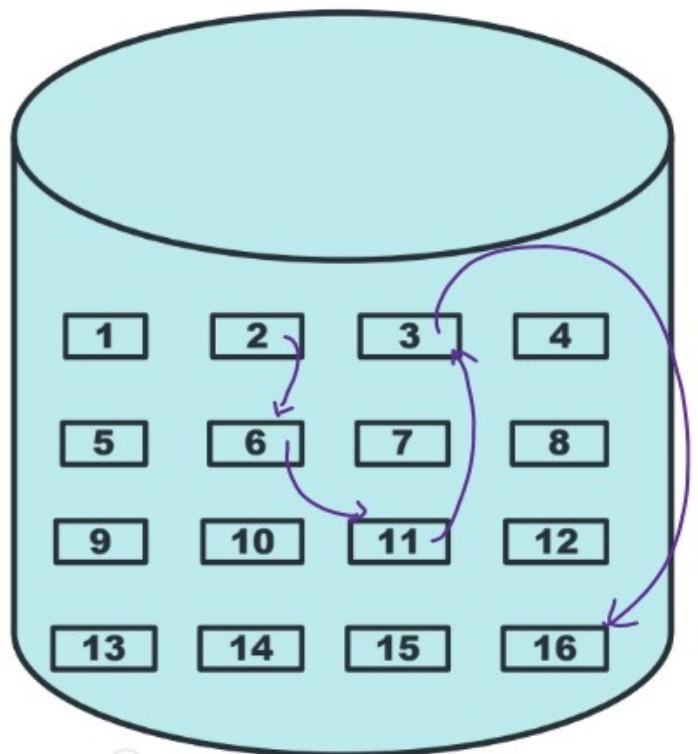
# Contiguous Allocation

## Performance:

1. Fragmentation: Internal, External ✓
2. Increase in File size: Inflexible ✓
3. Type of access: Sequential, Random/direct



# Linked Allocation



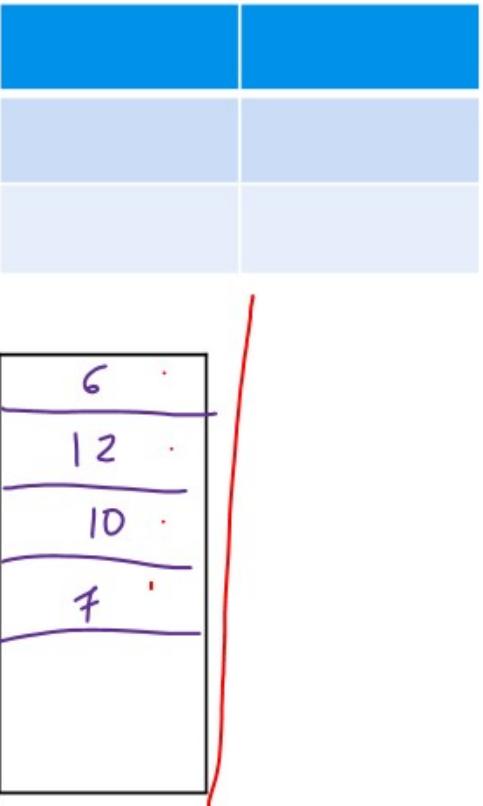
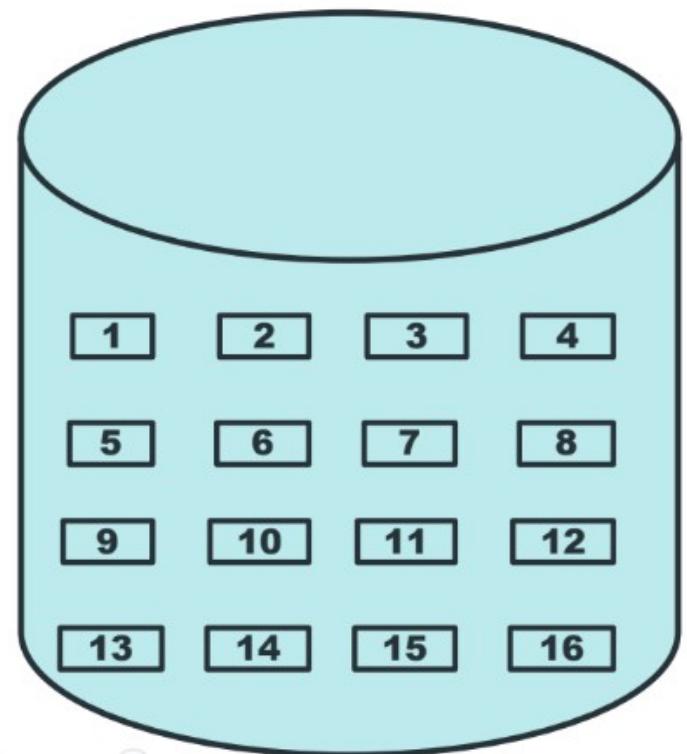
# Linked Allocation

## Performance:

1. Fragmentation: Internal
2. Increase in File size: Flexible
3. Type of access: Sequential  
✓



# Indexed Allocation



# Indexed Allocation

## Performance:

1. Fragmentation: Internal ✓
2. Increase in File size: Flexible ✓
3. Type of access: Sequential, Random/direct ✓



# Question

Disk block address = 16 bits

16  
2

Disk block size = 1KB

16  
 $2 * 1KB$

Index block = 1KB

Maximum file size?

$$(2^{16} - 1) * 1KB$$

# Unix I-node Structure

The inode (index node) is a data structure in a Unix-style file system that describes a file-system object such as a file or a directory.



# Question GATE-2019

The index node (inode) of a Unix-like file system has 12 direct, one single-indirect and one double-indirect pointer. The disk block size is 4 kB, and the disk block addresses 32-bits long. The maximum possible file size is (rounded off to 1 decimal place) \_\_\_\_\_ GB?

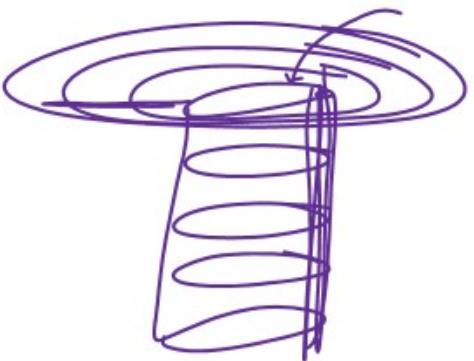
$$\frac{4KB}{4B} = 1K$$

$$12 * 4KB + 1K * 4KB + 1K * 1K * 4KB \\ =$$



# Cylinder

- ◎ Collection of tracks of same radius from all surfaces



# Disk Scheduling

- ◎ Done by operating systems to schedule I/O requests arriving for the disk



# Disk Scheduling Algorithms

1. FCFS (First Come First Serve)
2. SSTF (Shortest Seek Time First)
3. Scan
4. C-Scan (Circular-Scan)
5. Look
6. C-Look (Circular-Look)

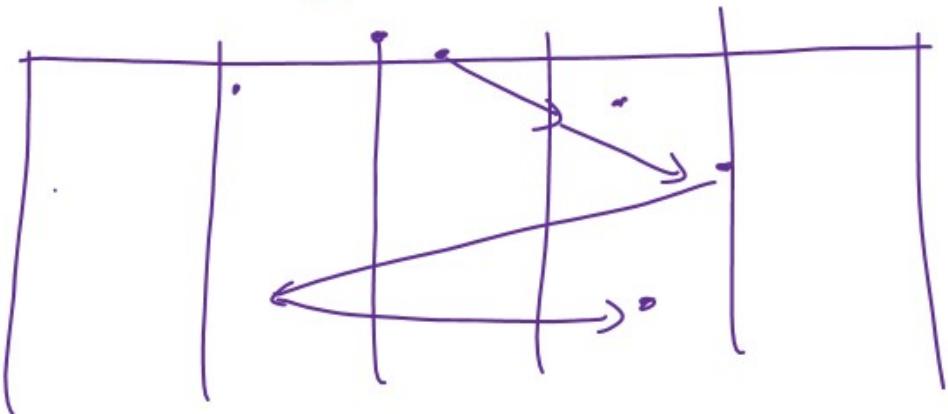


# FCFS (First Come First Serve)

Suppose the order of request is:

The Read/Write arm is at 50

72, 160, 33, 130, 14, 6, 180



# FCFS (First Come First Serve)

## Advantages:

- ◎ Every request gets a fair chance ✓
- ◎ No indefinite postponement ✓

## Disadvantages:

- ◎ Does not try to optimize seek time ✓
- ◎ May not provide the best possible service ✓



# SSTF (Shortest Seek Time First)

Suppose the order of request is:

The Read/Write arm is at 50

72, 160, 33, 130, 14, 6, 180

min head movement



# SSTF (Shortest Seek Time First)

## Advantages:

- ◎ Average Response Time decreases ✓
- ◎ Throughput increases ✓

## Disadvantages:

- ◎ Overhead to calculate seek time in advance ✓
- ◎ Can cause Starvation for a request if it has higher seek time as compared to incoming requests
- ◎ High variance of response time as SSTF favors only some requests ✓

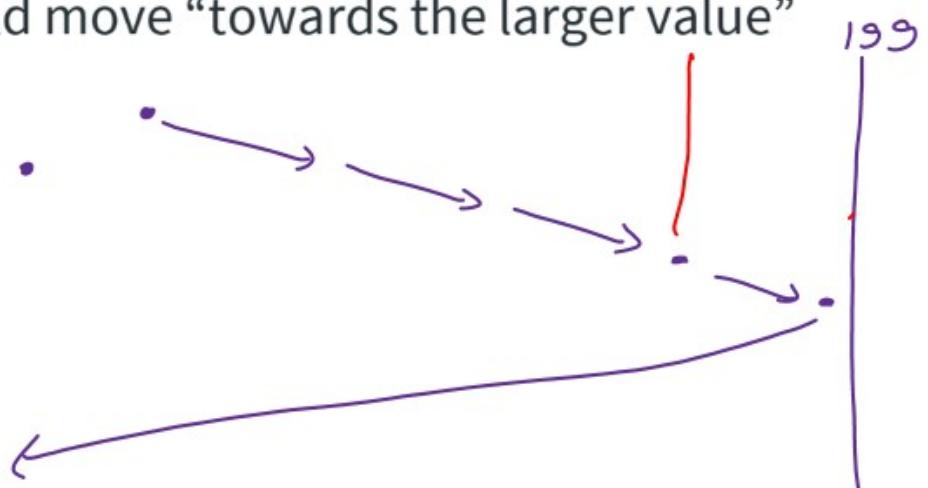
# Scan (Elevator)

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50,

The arm should move “towards the larger value”



# Scan

## Advantages:

- ◎ High throughput ✓
- ◎ Low variance of response time ✓
- ◎ Average response time ↘

## Disadvantages:

- ◎ Long waiting time for requests for locations just visited by disk arm



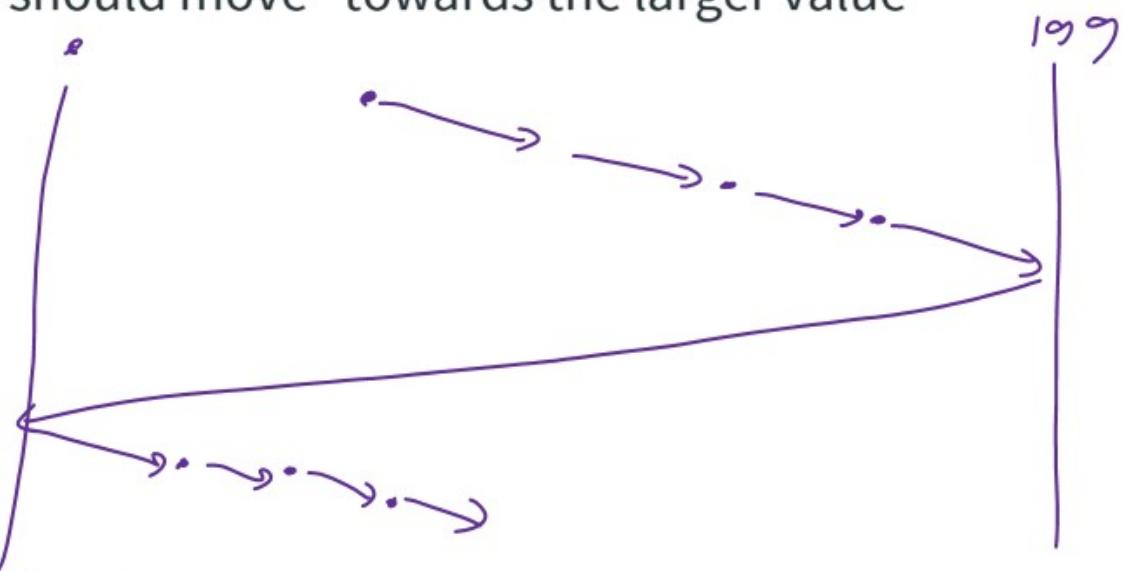
# C-Scan

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50,

The arm should move “towards the larger value”



# C-Scan

## Advantages:

- Provides more uniform wait time compared to SCAN

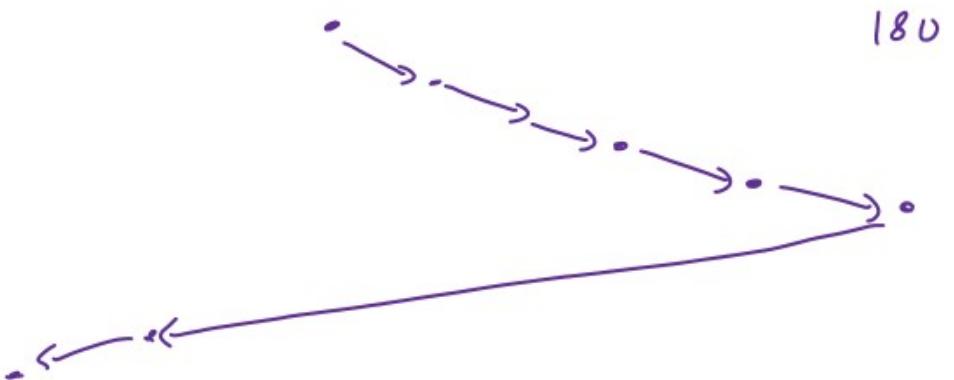
# Look

Suppose the order of request is:

72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50,

The arm should move “towards the larger value”

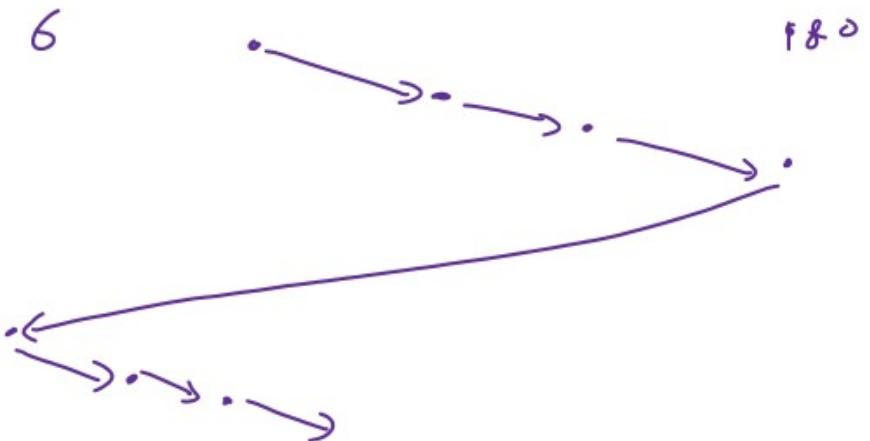


# C-Look

Suppose the order of request is: 72, 160, 33, 130, 14, 6, 180

The Read/Write arm is at 50,

The arm should move “towards the larger value”



# ICONIC

## Personal Coach



One on one guidance on preparation strategy



Dedicated Doubt  
Clearing Educators

# PLUS



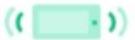
Live  
Classes



Weekly  
Tests



Structured  
Courses



Unlimited  
Access



RIB



Crash  
Courses



Preparatory Study  
Material

Specialised notes & practice sets

## Study Planner



Customized study plan and  
track your performance



Study Booster Sessions

Receive Essential Guidelines  
via Regular workshops



Personalised Test Analysis

Get in-depth analysis of tests by  
section & question type

# Unacademy Subscription



## Plus Subscription

GATE & ESE subscription

**PLUS**   **ICONIC**

No cost EMI available on 6 months & above subscription plans

<input checked="" type="radio"/> 24 months SAVE 56%	₹1,770 /mo ₹47,200 ₹22,480
<input type="radio"/> 18 months SAVE 49%	₹2,065 /mo ₹61,900 ₹37,170
<input type="radio"/> 12 months SAVE 40%	₹2,434 /mo ₹32,450 ₹29,205
<input type="radio"/> 6 months SAVE 16%	₹3,998 /mo ₹26,650 ₹23,985
<input type="radio"/> 4 months	₹4,050 /mo ₹17,999 ₹16,199

To be paid as a one-time payment

**VDEEP10** **Proceed to pay**

VDEEP10

## Iconic Subscription

GATE & ESE subscription

**PLUS**   **ICONIC**

No cost EMI available on 6 months & above subscription plans

<input type="radio"/> 24 months SAVE 51%	₹3,120 /mo ₹89,300 ₹74,880
<input type="radio"/> 18 months SAVE 43%	₹3,625 /mo ₹72,500 ₹65,250
<input checked="" type="radio"/> 12 months SAVE 34%	₹4,234 /mo ₹56,450 ₹50,805
<input type="radio"/> 6 months	₹6,374 /mo ₹42,490 ₹38,241

To be paid as a one-time payment

**VDEEP10** **Proceed to pay**



WE START WITH

Engineering Math  
by Pallav Gour

6:00  
PM

# FOUNDATION

BATCH FOR GATE 2023 & 2024

Bilingual

CS/IT

Batch - A

START DATE

19 JAN 2022

GET 10% OFF

USE CODE



Sanchit Jain



Subba Rao



Vishvadeep Gothi



Sweta Kumari



Venkata Rao M



Pallav Gour

# EVOLVE

## BATCH FOR GATE 2023

Bilingual

CS/IT

Batch - B

START DATE

19 JAN 2022

GET 10% OFF

USE CODE

WE START WITH

Theory of Computation by Sweta Kumari **2 PM**  
Engineering Math by Pallav Gour **6 PM**



Sanchit Jain



Subba Rao



Vishvadeep Gothi



Sweta Kumari



Venkata Rao M

# ASCEND

## BATCH FOR GATE 2024

Bilingual

CS/IT

Batch - A

START DATE

19 JAN 2022

GET 10% OFF

USE CODE

WE START WITH

Theory of Computation by Sweta Kumari

2 PM

Engineering Math by Pallav Gour

6 PM



Sanchit Jain



Subba Rao



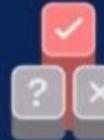
Vishvadeep Gothi



Sweta Kumari



Venkata Rao M



ALL INDIA MOCK TESTS  
FOR GATE 2022

VDEE P10

## Boost your readiness for GATE CS

With Top Educators

Every Sunday, January 2-30



Vishvadeep  
Gothi



Subbarao  
Lingamgunta



Sweta  
Kumari

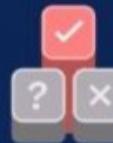


Pallav  
Gour



Saurabh  
Thakur

Enroll Now



ALL INDIA MOCK TESTS  
FOR GATE 2022

Complete your final revision for GATE  
**With All India Mock Test for GATE 2022**

Every Sunday, January 2-30



Curated by  
Top Educators



Cover your  
entire syllabus



Experience actual  
exam-like setting



Get your  
All India Ranking



Identify areas of  
improvement with detailed  
analysis and video solutions

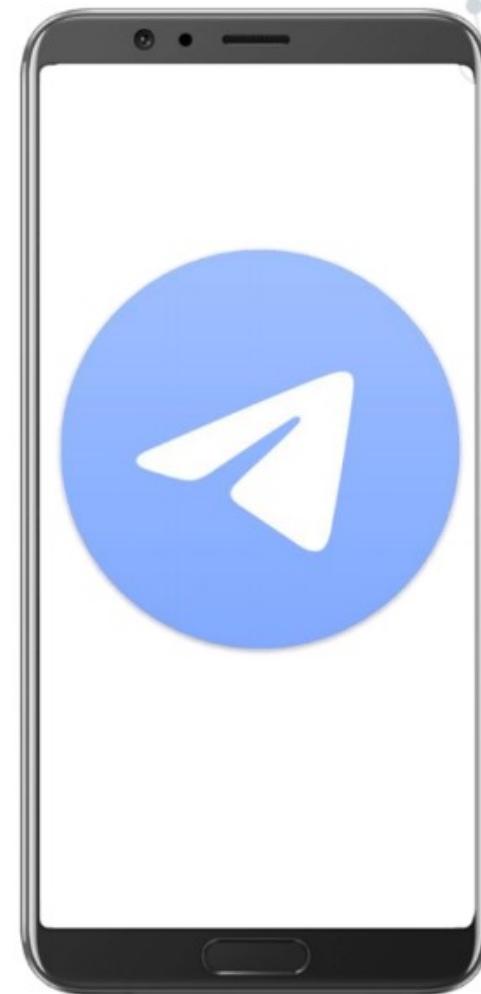
**Enroll Now**



## Join with us on Telegram

Telegram Channel

<https://t.me/Unacademygatecs>





# Happy Learning

## Thank you

+ SUBSCRIBE



