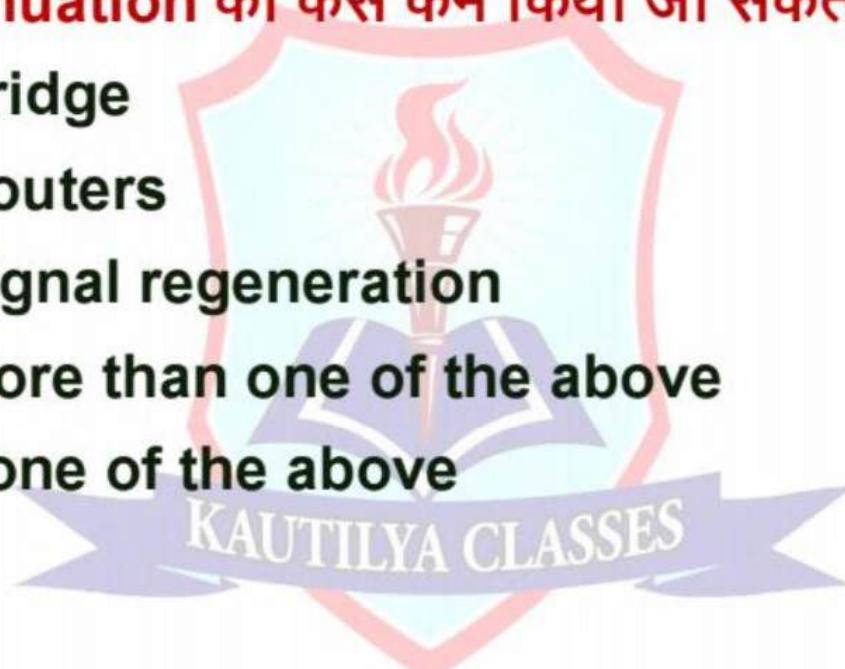


IP Header Format

Version	Length (IHL)	Type of Service (TOS)	Total Length			
Identification			Flag	Fragment Offset		
Time To Live (TTL)	Protocol		Header Checksum			
Source IP Address						
Destination IP Address						
Options						

25. Attenuation can be minimized by-
Attenuation को कैसे कम किया जा सकता है-

- A. Bridge
- B. Routers
- C. Signal regeneration
- D. More than one of the above
- E. None of the above



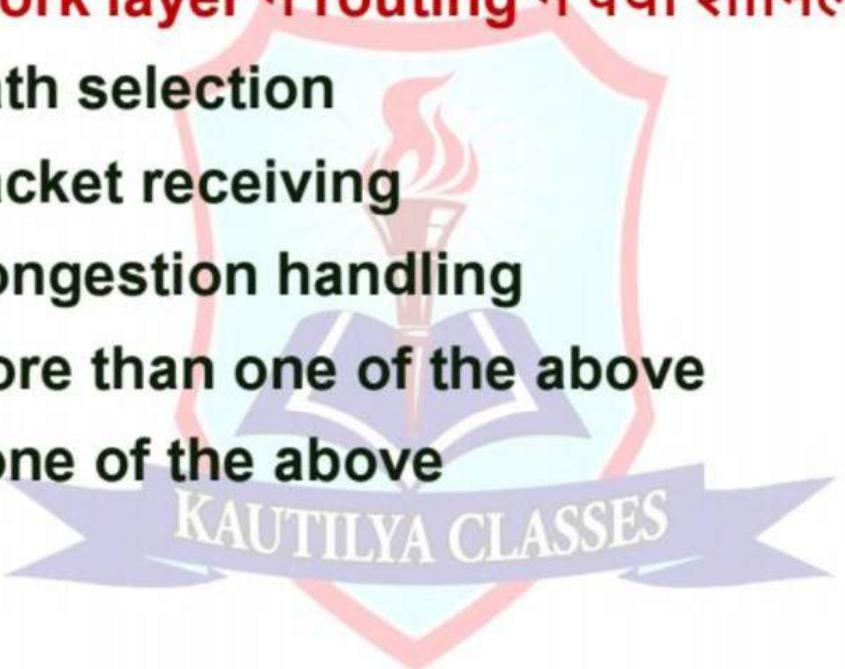
24. IPv4 packet header contains-
IPv4 packet header में क्या-क्या होता है-

- A. Only destination IP
- B. TTL field
- C. Socket field
- D. More than one of the above
- E. None of the above

23. Routing in network layer involves-

Network layer में routing में क्या शामिल है-

- A. Path selection**
- B. Packet receiving**
- C. Congestion handling**
- D. More than one of the above**
- E. None of the above**



KAUTILYA CLASSES

22. Polling-based MAC protocol drawback is-

Polling-based MAC protocol का नुकसान क्या है?

- A. Centralized control
- B. Idle time overhead
- C. Delay increases with nodes
- D. More than one of the above
- E. None of the above

21. Contention-based MAC protocols suffer from- Shared Medium में Competition

Contention-based MAC protocols किस समस्या से ग्रस्त होते हैं-

- A. Collision
- B. Overhead
- C. Unpredictable delay
- D. More than one of the above
- E. None of the above

WINTERIS
15%
599
✓ 5b

Reliable
node to node
delivery

MTU
1500

20. Frame design in Data Link Layer
considers-

Data Link Layer में frame design किन
बातों को ध्यान में रखता है?

- ✓ A. Addressing → Source & dest. MAC
- ✗ B. Error correction Defect only
- ✓ C. Packet size
- D. More than one of the above
- E. None of the above

19. TCP/IP model differs from OSI model because-

TCP/IP मॉडल, OSI मॉडल से अलग है क्योंकि-

- ✗ A. It has **more** ^{layer} layers
- ✗ B. It is not protocol-oriented
- C. It is practically implemented**
- D. More than one of the above
- E. None of the above

TCP/IP

KAUTILYA CLASSES

layering
↓
System को Modular & standard करती है।

18. Layered architecture in networking helps in-

नेटवर्किंग में layered architecture किसमें मदद करता है?

- A. De modularity
- B. Interoperability
- C. Tough troubleshooting
- D. More than one of the above
- E. None of the above

ज्ञानग्रन्थ सिस्टम्स
easily Comm.

EASY

17. HTTP is considered stateless because-

HTTP को stateless क्यों कहा जाता है?



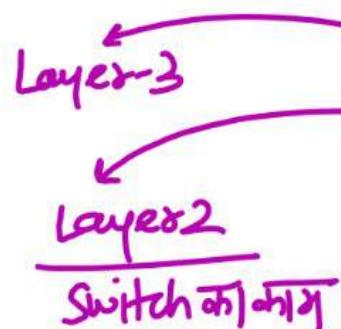
- A. Each request is independent
- B. Server stores client context
- C. Connection state is maintained
- D. More than one of the above
- E. None of the above

16. Process-to-process delivery is ensured by-

✓ Transport layer

Process-to-process delivery किससे सुनिश्चित होती है?

- A. Socket numbers → process identify
- X B. Application layer
- C. Socket abstraction → IP+Port का combo
- D. More than one of the above
- E. None of the above



15. A router does NOT consider-

- Router** किस चीज़ पर विचार नहीं करता-
- A. MAC address for forwarding decision
 - B. IP destination address
 - C. Routing table entries
 - D. More than one of the above
 - E. None of the above

14. Classless routing protocols differ because they-

✓
Subnet Mask
के साथ
Routing

Classless routing protocols अलग होते हैं क्योंकि वे-

- ✓ A. Carry subnet mask information
- ✓ B. Support VLSM
- ✓ C. Enable CIDR
- ✓ D. More than one of the above
- E. None of the above

13. Subnetting helps in-

Subnetting किसमें मदद करता है-

IP Address
का wastage
कम करता है।

A. Efficient IP utilization

B. Enhanced routing table size

C. Reduced network management

D. More than one of the above

E. None of the above

Reduced
Enhanced

Collision Detect
↓
WIRELESS
✓ में नहीं

12. CSMA/CD fails completely in-
CSMA/CD पूरी तरह fail हो जाता है-
- ✓ A. Wireless networks
 - ✗ B. Half-duplex Ethernet → CSMA/CS
 - ✗ C. Low propagation delay networks
 - D. More than one of the above
 - E. None of the above

11. A frame with CRC error is-

CRC एरर वाला फ्रेम है-

Error detected ✓
Error Corrected ✗

- A. Detected but not corrected
- B. Discarded by receiver - *Corrupt frame drop*
- C. Retransmission may be requested
- D. More than one of the above
- E. None of the above

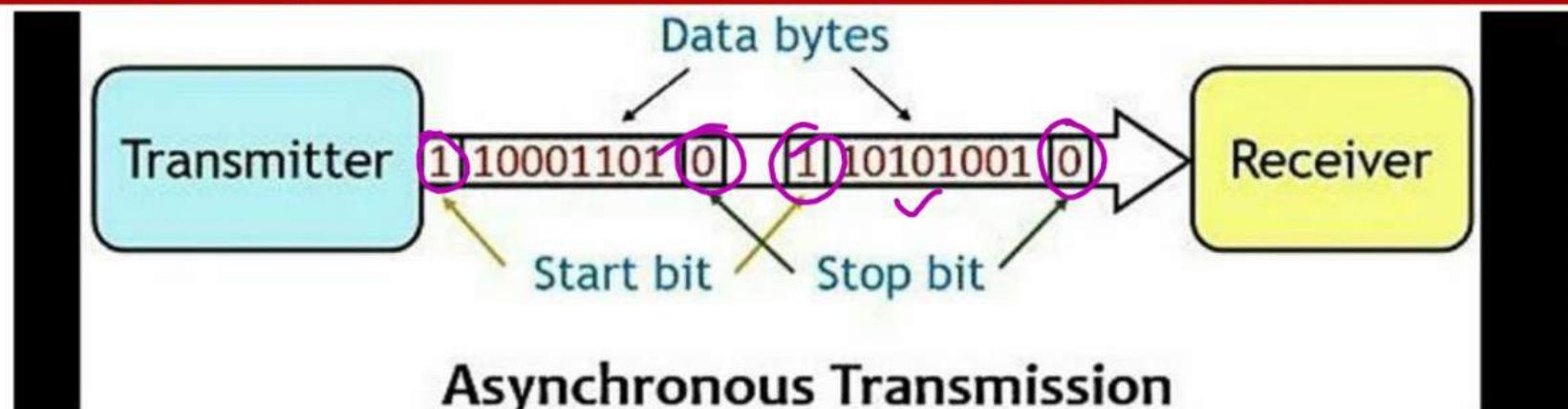
10. Session layer services are often ignored in TCP/IP because-

Separate session layer X

Manage

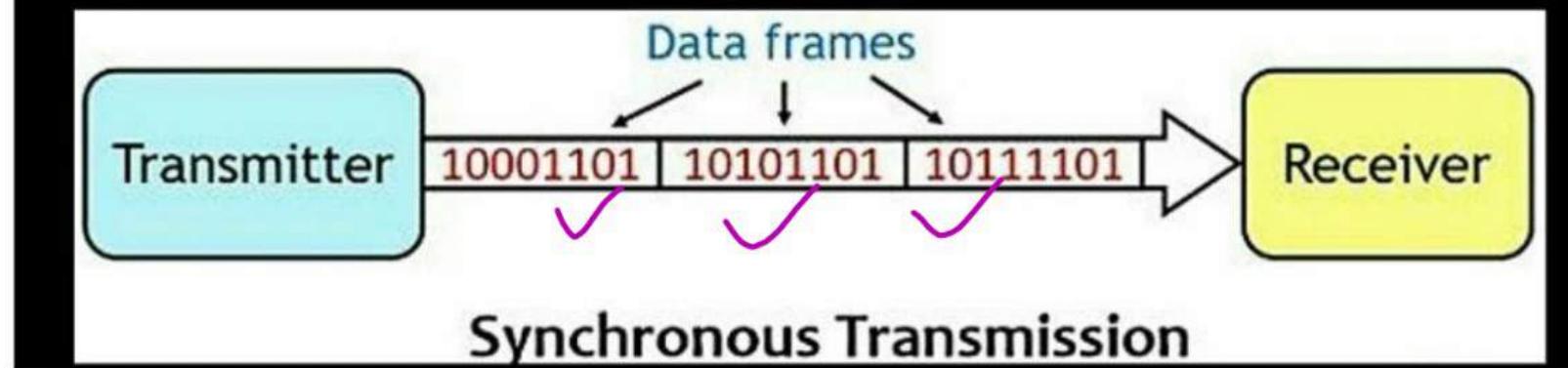
TCP/IP में सेशन लेयर सर्विसेज को अक्सर नज़रअंदाज कर दिया जाता है क्योंकि-

- A. Implemented in network layer -ROUTING
- B. Handled by transport layer
- C. Applications doesn't manage sessions themselves self-manageable
- D. More than one of the above
- E. None of the above



Asynchronous Transmission

Asynchronous and Synchronous transmission



Synchronous Transmission

1. Synchronous -

2. Asynchronous -

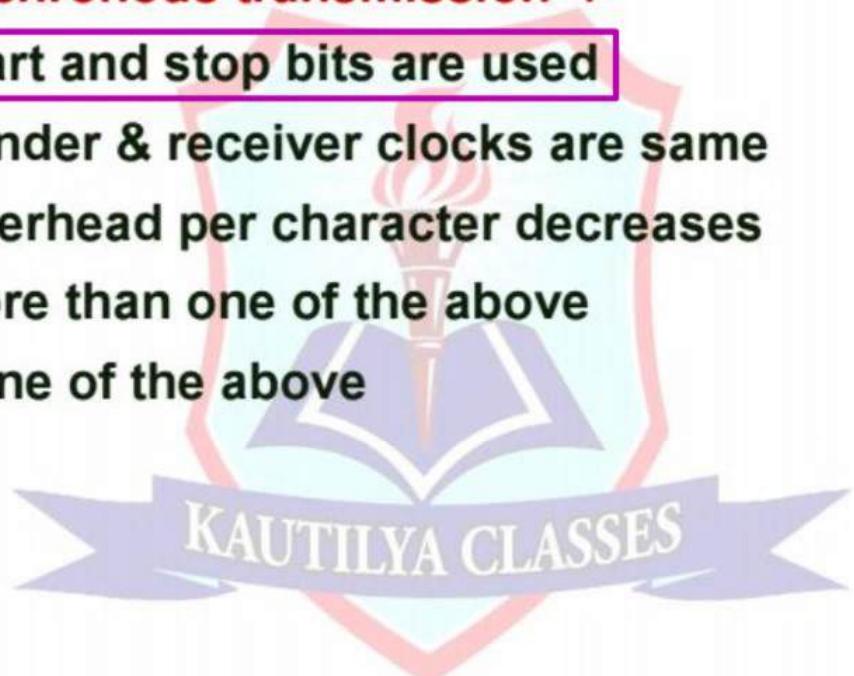
9. In asynchronous transmission-

Asynchronous transmission में-

- A. Start and stop bits are used
- B. Sender & receiver clocks are same
- C. Overhead per character decreases
- D. More than one of the above
- E. None of the above

Clock
Independent

Increase



8. In mesh topology, cost increases exponentially because-

कठिन / Complex

मेश टोपोलॉजी में, लागत तेज़ी से बढ़ती है क्योंकि-

- A. Number of links grows as $n(n-1)/2$
- B. Dedicated point-to-point links required
- C. Easy installation & maintenance
- D. More than one of the above
- E. None of the above

8. In mesh

exponentially b

मेश टोपोलॉजी

A. Number

B. Dedicated

C. Easy ins

D. More th

E. None of

~~कठिन | Complex~~

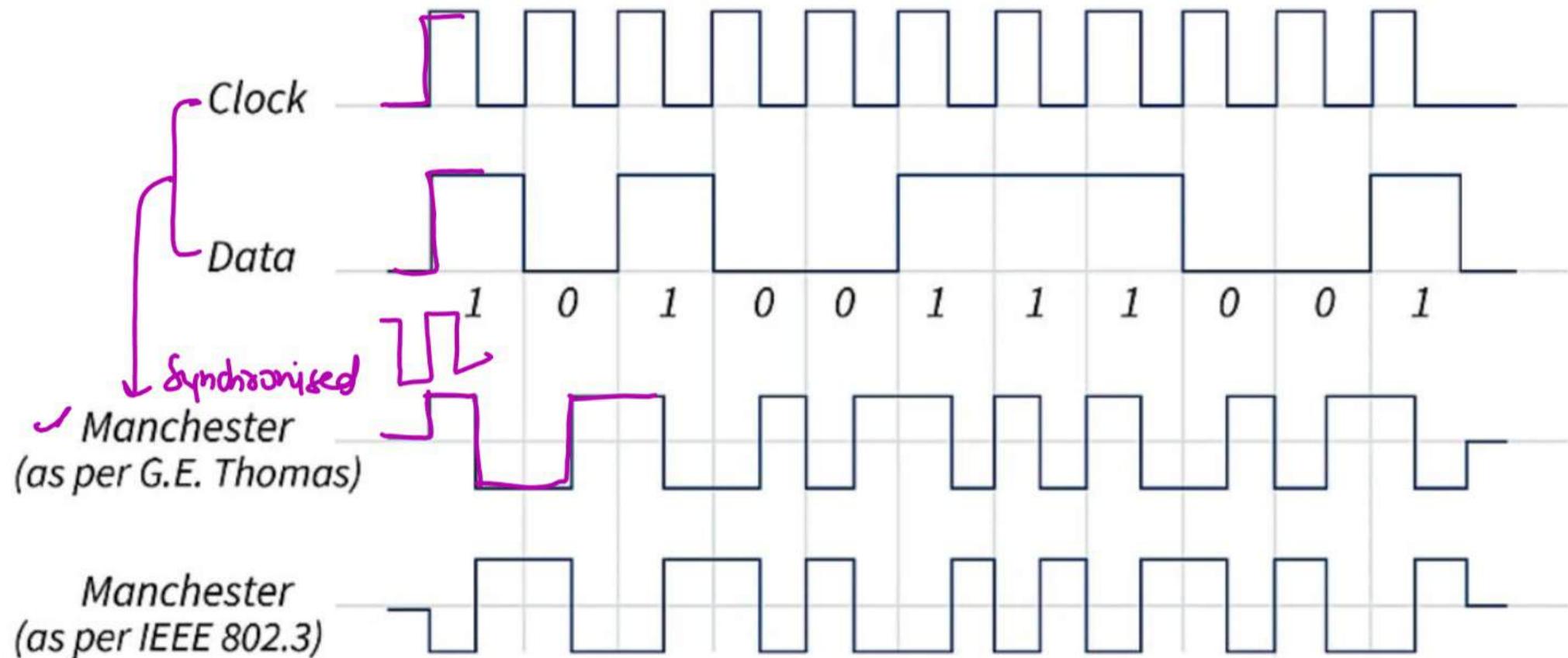


7. Data compression improves performance mainly by-

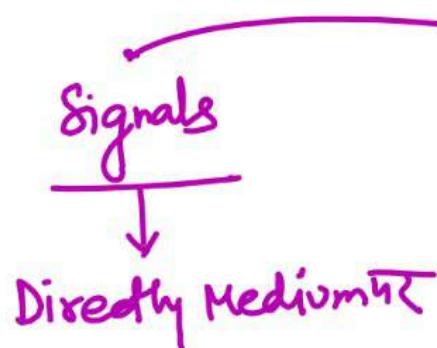
Data size
कम करना

डेटा कम्प्रेशन मुख्य रूप से इन तरीकों से परफॉर्मेंस को बेहतर बनाता है-

- A. Enhancing redundancy → Redundancy Remove
- B. Saving bandwidth → कम Bits use
- C. Reducing transmission time → fast Transm'l.
- D. More than one of the above
- E. None of the above



6. Which encoding schemes are baseband transmission techniques?



बेस बैंड ट्रांसमिशन तकनीकें कौन सी एन्कोडिंग रकीमें हैं?

- A. NRZ → Binary signals, Direct Voltage level
- B. Manchester → Data + clock Synchronized
- C. Differential Manchester → Timing Based Encoding
- D. More than one of the above
- E. None of the above

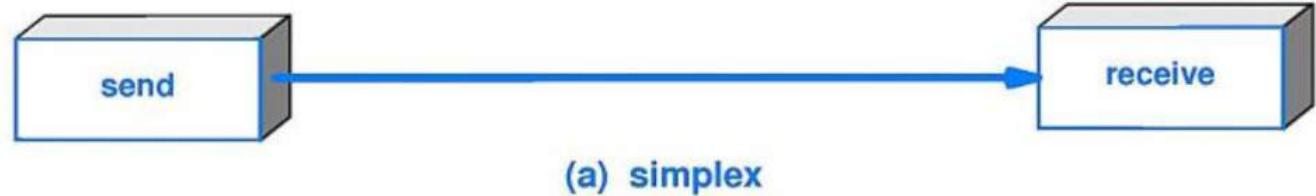
Bandwidth

- ↓
1. Capacity of channel
 2. frequency range

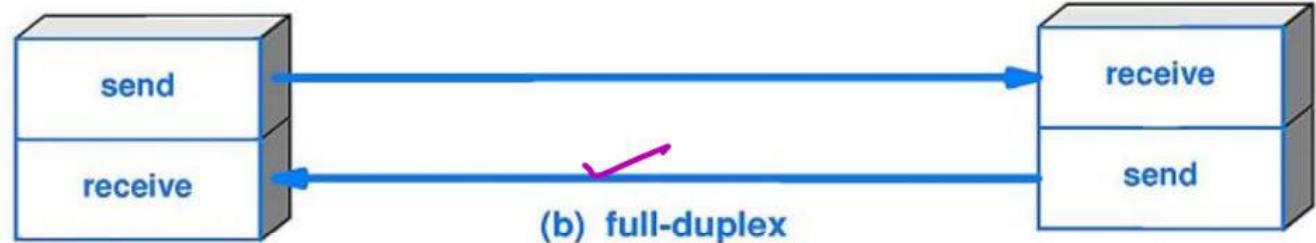
5. Bandwidth in data communication represents-

डेटा कम्युनिकेशन में बैंडविड्थ क्या है?

- A. Range of frequencies
- B. Data carrying capacity
- C. Channel capability
- D. More than one of the above
- E. None of the above



(a) simplex



(b) full-duplex



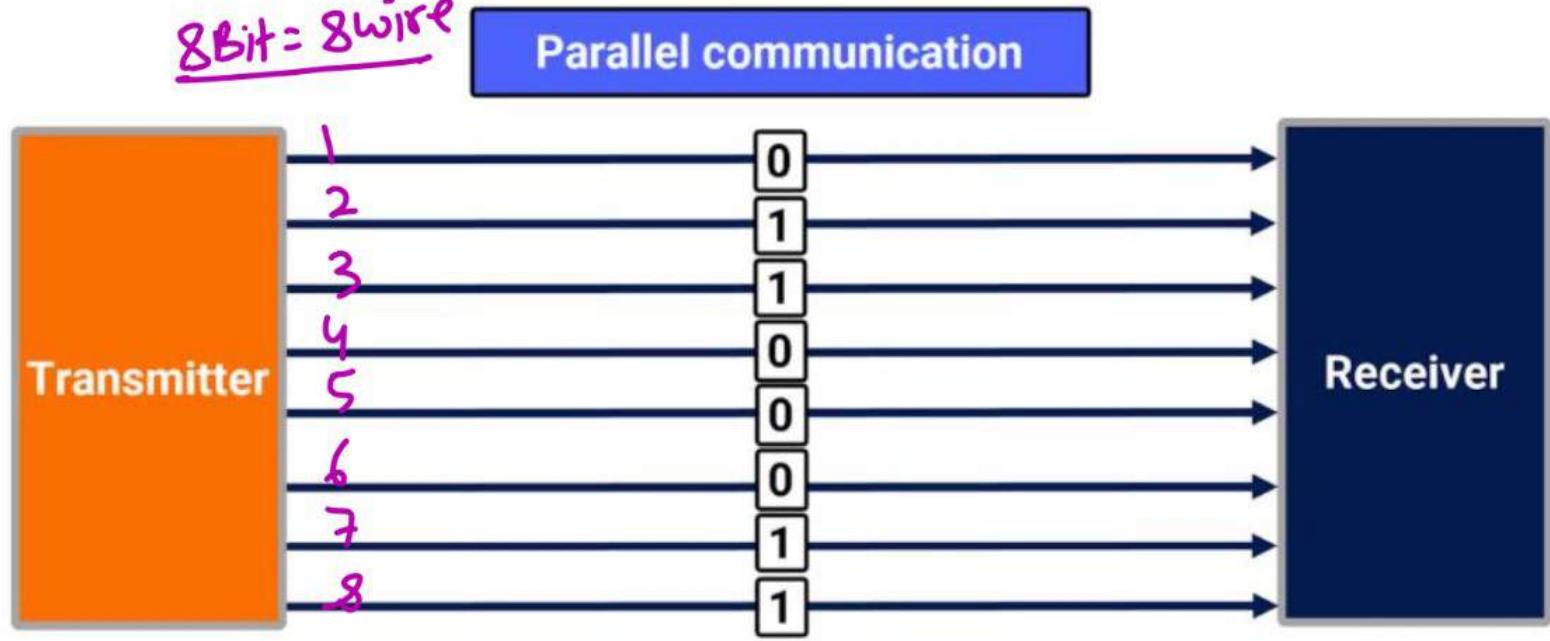
(c) half-duplex

4. Which transmission model supports **full duplex** communication?

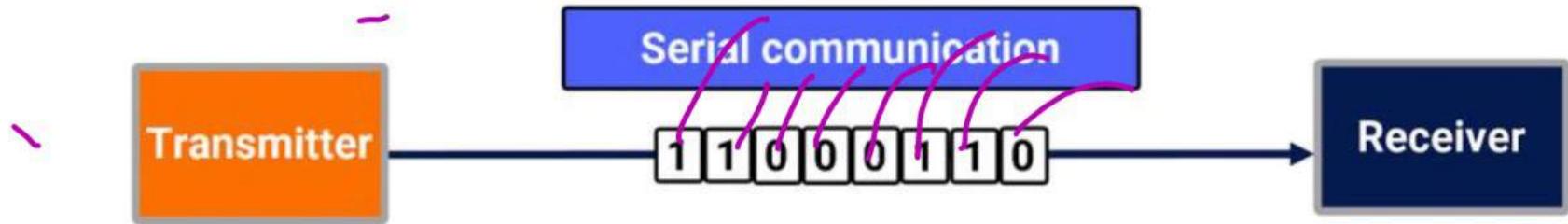
कौन-सा ट्रांसमिशन मॉडल full duplex कम्युनिकेशन को सपोर्ट करता है?

- A. Point-to-point → Direct link
- B. Uni directional → Single direction
- C. Simplex channel → Oneway Comm.
- D. More than one of the above
- E. None of the above

8Bit = 8wire



Serial communication



3. Parallel transmission is preferred over serial transmission when-

low distance
एवं fast data Transfer

पैरेलल ट्रांसमिशन को सीरियल ट्रांसमिशन से ज्यादा पसंद किया जाता है जब-

- A. Distance is very short
- B. Low speed is required
- C. Crosstalk is not manageable
- D. More than one of the above
- E. None of the above

High speed
वें उच्च

High fault Tolerance
↓
✓ Multiple Alternate path available | Reliable

Poor Scalability → Node Add
↓
cost | Complexity increase

2. Which topology provides high fault tolerance but poor scalability?

कौन सी टोपोलॉजी हाई फॉल्ट टॉलरेंस देती है लेकिन स्केलेबिलिटी खराब होती है?

A. Mesh Topology

B. Bus Topology

C. Star Topology → Central device fail

D. More than one of the above

E. None of the above

fault Tolerance
Low

1. Data communication system becomes reliable mainly due to-
- डेटा कम्युनिकेशन सिस्टम मुख्य रूप से इन वजहों से भरोसेमंद रह जाता है-
- A. Noise and attenuation → Data को weak & corrupt
 - B. Distortion and delay
 - C. Interference → External signals से छब्बे
 - D. More than one of the above
 - E. None of the above
- Error
Noise
Interference] X
Data accurately deliver ✓
- Signal की
Shape &
Time विगड़]

Wireless
में
Collision detect करना
Impossible

wifi = Simplex
HD FD → Send + detect
एक साथ नहीं

Interference & Signal fade
में कारण device collisions
detect नहीं कर पाते हैं।

15. Why is CSMA/CD useless in Wi-Fi?

Wi-Fi में CSMA/CD बेकार क्यों है?

• (A) Collision detection impossible

✗ (B) Wireless signals fade → Communication quality को कम करते हैं

✗ (C) Half-duplex nature → not a reason of CSMA/CD failure

(D) More than one of the above

(E) None of the above

IPv-4 = 32 Bit

IPv-6 = 128 Bit

→ Broadcast Remove
→ Unnecessary Traffic ↕

14. *IPv6 does NOT support-*

IPv6 सपोर्ट नहीं करता है-

(A) Broadcast

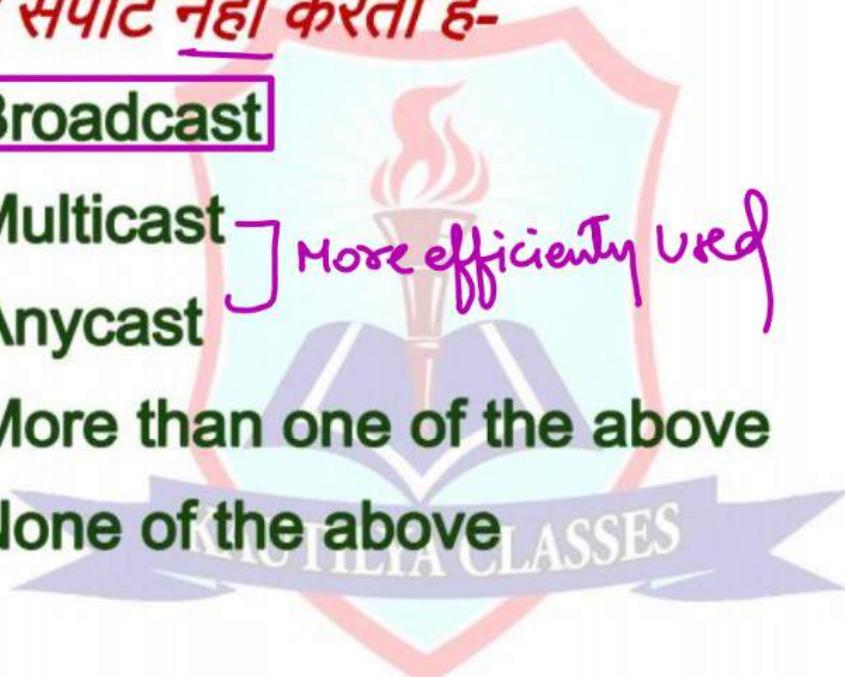
(B) Multicast

(C) Anycast

(D) More than one of the above

(E) None of the above

More efficiently used



JITTER
↓
Delay Continuously ↑

Packet Delay X
वायर

13. Which condition causes jitter?

किस कंडीशन में जिटर होता है?

(A) Variable delay

(B) Loss

X (C) Congestion

(D) More than one of the above

(E) None of the above

KAUTILYA CLASSES

3 Way Handshake
 ↓
 Communication start →
 Both Devices को
sequence No. sync
करने पड़ते हैं।

Secondary
 ✓ Connection के बाद start

12
 A&B
 है-

TCP uses 3-way handshake mainly to-
 TCP मुख्य रूप से 3-वे हैंडशेक का उपयोग करता

- (A) Sequence number sync
- (B) Prevent old duplicate packets
- (C) Start congestion control
- (D) More than one of the above
- (E) None of the above

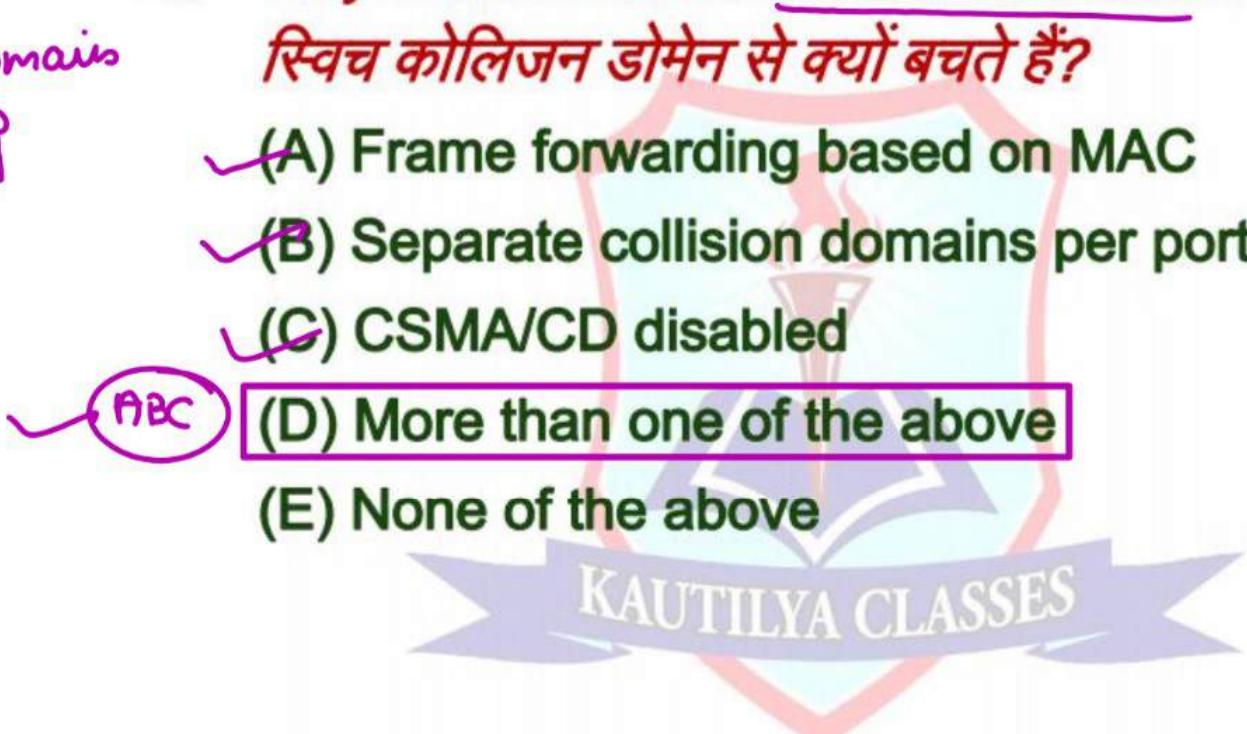
Switch

- Each Port - Collision Domains
- ↳ MAC Based forwarding

11. Why switches avoid collision domains?

स्विच कोलिजन डोमेन से क्यों बचते हैं?

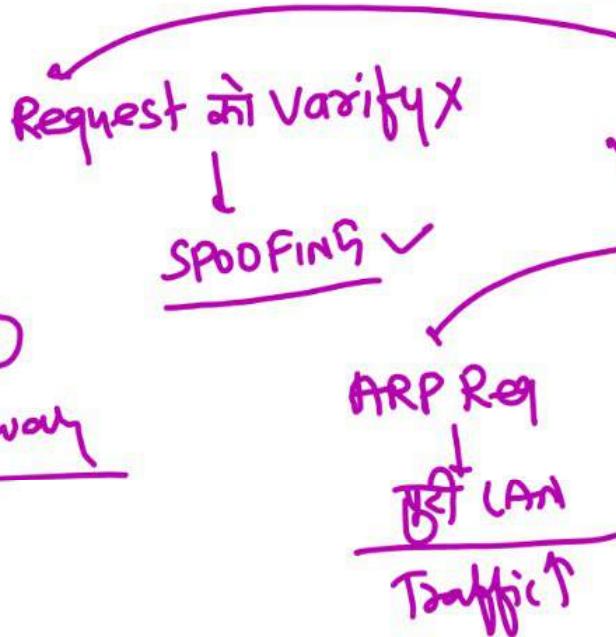
- ✓ (A) Frame forwarding based on MAC
- ✓ (B) Separate collision domains per port
- ✓ (C) CSMA/CD disabled
- ABC (D) More than one of the above
- (E) None of the above



KAUTILYA CLASSES

MITM
↓
Man
In
The
Middle

D+D
Gateway



10. ARP is considered unreliable because-

ARP को भरोसेमंद नहीं माना जाता है क्योंकि-

- (A) No authentication
- (B) Broadcast traffic
- (C) Spoofing possible
- (D) More than one of the above
- (E) None of the above

worst
weakness

KAUTILYA CLASSES

CIDR
↓
/n

Prefix ↑
Host ↓

9.
D

In Classless addressing, prefix determines-
क्लासलेस एड्रेसिंग में, प्रीफिक्स यह तय करता है कि-

(A) Number of networks

(B) Size of each network

(C) Host capacity

(D) More than one of the above

(E) None of the above

KAUTILYA CLASSES

Where to Send = Destinations network choose करना

How to Send = Medium

Routing & addressing

8. Which layer is responsible for "where to send" and NOT "how to send"?

कौन सी लेयर "कहाँ भेजें" के लिए जिम्मेदार है और "कैसे भेजें" के लिए नहीं?

- (A) Data link → local network (LAN)
- (B) Network** → Router = Best path & destination network.
- (C) Transport → end to end communication
- (D) More than one of the above
- (E) None of the above

✓ Network को logical layer में divide करके संग्रहा।

learning & conceptual clarity of network

7. *The OSI model is mainly used for-*
OSI मॉडल मुख्य रूप से किसके लिए इस्तेमाल
किया जाता है-

- ↗ TCP/IP
- ✗ (A) Implementation of protocols
 - ✓ (B) Design & understanding of networks
 - ✗ (C) Hardware testing - Pose Conceptual Model
 - (D) More than one of the above
 - (E) None of the above

KAUTILYA CLASSES

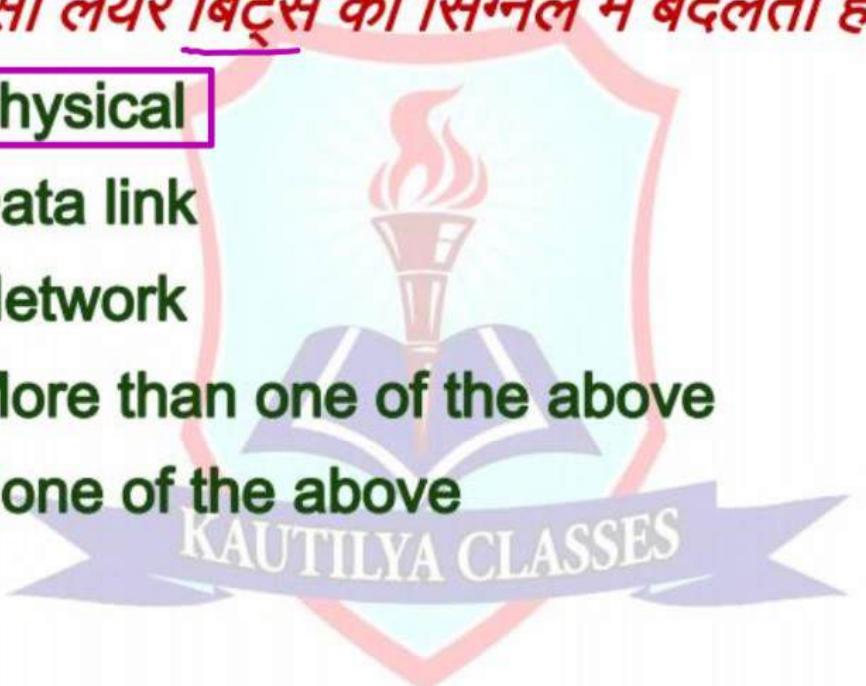
7.

✓ Network को
logical layer में
divide करके समझा।

6. *Which layer converts bits to signals?*

कौन सी लेयर बिट्स को सिग्नल में बदलती है?

- (A) Physical
- (B) Data link
- (C) Network
- (D) More than one of the above
- (E) None of the above



KAUTILYA CLASSES

Impairment = Defect
 ↓
 Signal की quality घटती है
 [Distance ↑
 Signal Weak]

5.

*Which is NOT a transmission impairment?**कौन सी transmission impairment में कमी नहीं है?*

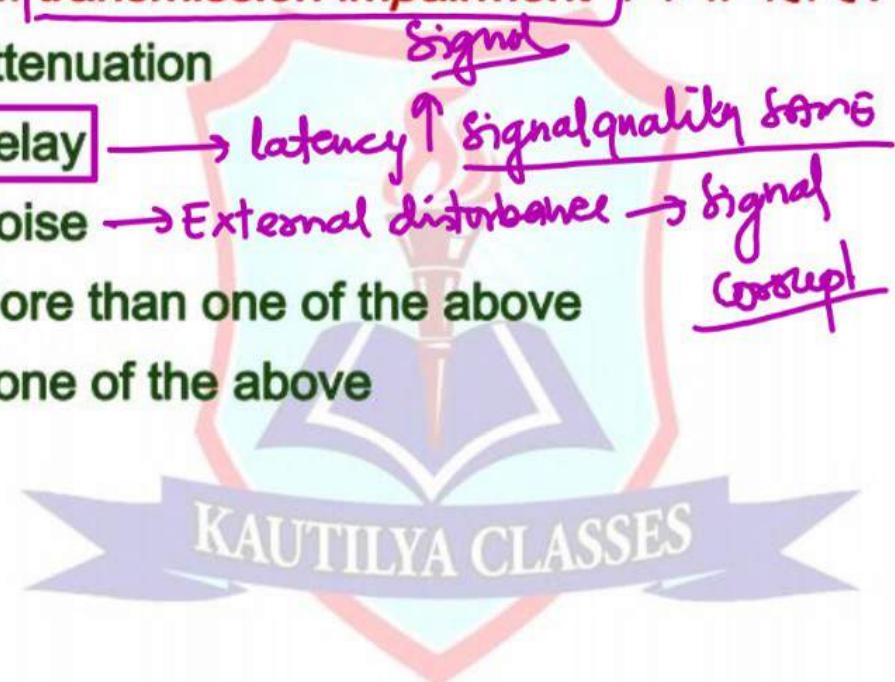
(A) Attenuation

(B) Delay

(C) Noise

(D) More than one of the above

(E) None of the above



Bandwidth x delay

4. Bandwidth x Delay gives what?

बैंडविड्थ x डिले क्या देता है?

- data delivery date
- Max data Rate
- (A) Throughput
 - (B) Channel capacity
 - (C) Bandwidth-Delay product
 - (D) More than one of the above
 - (E) None of the above

Serial = Long distance

Cost कम

Single wire

* SKEW = Timing Mismatch

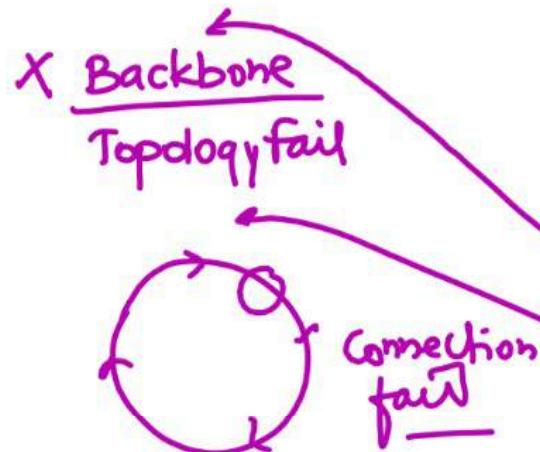
* Parallel = Multiple lines
Timing समान है?

3. *Serial Transmission is preferred over parallel because-*

सीरियल ट्रांसमिशन को पैरेलल से ज्यादा पसंद किया जाता है क्योंकि-

- 1 | ✓ (A) No skew problem
- | ✓ (B) Cheaper wiring
- | ✓ (C) Longer distance support
- | ✓ (D) More than one of the above
- | (E) None of the above

2. In which topology does a single break cause entire network failure?



किस टोपोलॉजी में एक सिंगल ब्रेक पूरे नेटवर्क को
फेल कर देता है?

- (A) Bus
(B) Ring
X (C) Mesh
 (D) More than one of the above
(E) None of the above



Communication
↓
Data + Receiver
का समझने

1. Which of the following actually defines "communication" in Data Communication?

इनमें से कौन सा डेटा कम्युनिकेशन में "कम्युनिकेशन" को असल में डिफाइन करता है?

- (A) Transfer of bits only
- (B) Transfer + Understanding of meaning
- (C) Transfer without errors
- (D) More than one of the above
- (E) None of the above

Data Movement

KAUTILYA CLASSES

20. *Memory relocation is needed for-*

Memory relocation किसलिए जरूरी है-

- (A) Load program anywhere in memory**
- (B) Execute program at different addresses**
- (C) Support multiprogramming**
- (D) More than one of the above**
- (E) None of the above**



19. A semaphore is-

Semaphore क्या है-

- (A) Integer variable**
- (B) Synchronization tool**
- (C) Used for mutual exclusion**
- (D) More than one of the above**
- (E) None of the above**

18. *Kernel is responsible for-*

कर्नेल इसके लिए जिम्मेदार है-

- (A) Low-level resource management**
- (B) System calls handling**
- (C) Scheduling**
- (D) More than one of the above**
- (E) None of the above**

17. *Context switch includes saving-*

कॉन्टेक्स्ट स्विच में सेविंग शामिल है-

- (A) CPU registers
- (B) Program counter
- (C) Process state
- (D) More than one of the above
- (E) None of the above

16. In multi programming, CPU idle occurs when-

मल्टीप्रोग्रामिंग में, CPU आइडल तब होता है जब-

- (A) All processes waiting
- (B) Scheduler sleeping
- (C) I/O overlap ends
- (D) More than one of the above
- (E) None of the above

15. *Optimal page replacement requires-*

इष्टतम पेज रिप्लेसमेंट के लिए आवश्यकता

होती है-

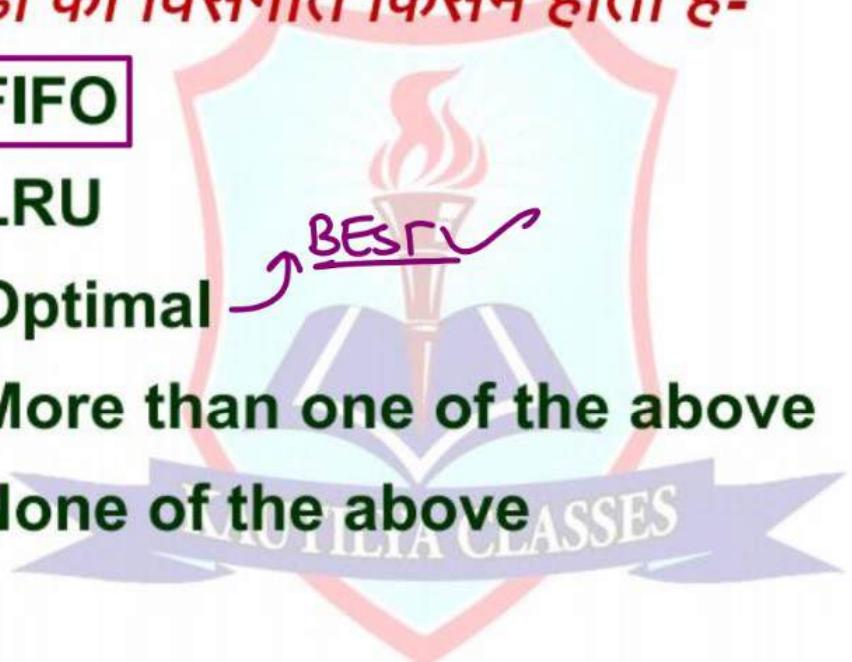
- LRU
- Example
↑ OPR
- (A) Future knowledge
 - (B) Past history only
 - (C) Stack algorithm
 - (D) More than one of the above
 - (E) None of the above

→ PAGE FRAMES ↑
→ PAGE FAULTS ↑

14. *Belady's anomaly occurs in-*

बेलाडी की विसंगति किसमें होती है-

- (A) FIFO
- ✗ (B) LRU
- ✗ (C) Optimal → BEST
- (D) More than one of the above
- (E) None of the above



Synchronization= Result
unpredictable

→ Execution
order change
→ O/p कॉल्ड-

13. When two processes share memory
but use no synchronization, results show-

जब दो प्रोसेस मेमोरी शेयर करते हैं लेकिन कोई

सिंक्रोनाइजेशन इस्तेमाल नहीं करते, तो नतीजे
दिखाते हैं - *Racing*

- ✗ (A) Consistent result
- (B) Nondeterministic behavior**
- ✗ (C) Deadlock
- (D) More than one of the above
- (E) None of the above

12. In demand paging, a page may be loaded even without fault when-

need होने पर
दी Page को RAM
में लाना

डिमांड पेजिंग में, पेज बिना किसी गलती के भी
लोड हो सकता है जब-

(A) Prepaging enabled

(B) Memory full

(C) Dirty bit reset

(D) More than one of the above

(E) None of the above

Page Modification

KAUTILYA CLASSES

11. *Thrashing can occur even if total memory is sufficient when-*

Time = Swapping
Waste
Work = 0

थ्रैशिंग तब भी हो सकती है जब टोटल मेमोरी
काफ़ी हो, जब-

- (A) Locality of reference breaks
- (B) Working set too large
- (C) Degree of multiprogramming high
- (D) More than one of the above
- (E) None of the above

10. PCB must contain all except-

PCB में सभी चीजें होनी चाहिए सिवाय-

(A) Program counter

(B) Accounting info

(C) Page table base register

(D) Shell environment variables

(E) None of the above

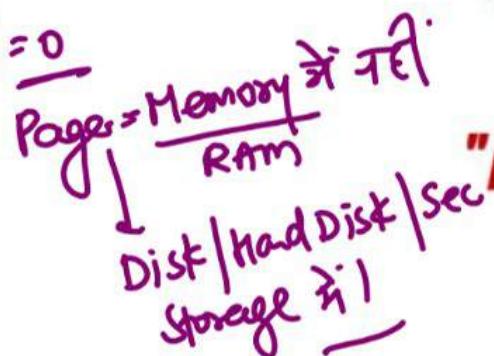
Process Control
Block

userlevel

PAGE TABLE

Valid = 1

Present = 0



9. A page table entry with "valid = 1" but "present = 0" indicates-

एक पेज टेबल एंट्री जिसमें "valid = 1" लेकिन "present = 0" हो, यह बताता है-

(A) Page exists on disk

(B) Page not part of process

(C) Illegal access - Page invalid (Valid=0)

(D) More than one of the above

(E) None of the above

Illegal access

Valid = 0

Running → Blocked
 ↘ Wait करना चाहता है।

→ Time consuming
 → Process → Blocked

8. A process transitions directly from **Running** to **Blocked** when-

एक प्रोसेस सीधे रनिंग से ब्लॉक्ड में तब बदलता

है जब-

✗ (A) Interrupt occurs

(B) I/O request issued

✗ (C) Time quantum expires

(D) More than one of the above

(E) None of the above

→ Running to Ready

→ Running to Ready

Kernel code को टोकनेट
High priority task को भागे
जो देरा

7. Which is true for kernel preemption?

कर्नेल प्रीएम्प्शन के लिए इनमें से कौन सा सच है?

(A) Non preemptive kernels simplify concurrency

decrease high priority task latency

(B) Preemptive kernels increase interrupt

supports

(C) Linux fully prohibits kernel preemption

(D) More than one of the above

(E) None of the above

- ✓ Single large Module
- ✓ functions tightly coupled - CPU

- level 0
- level 1
- ⋮
- * each layer only lower layer के साथ communicate
- * clear structure.

6. *Which system structure organizes OS in levels?*

कौन सा सिस्टम रस्तकचर OS को लेवल्स में ऑर्गनाइज करता है?

(A) Monolithic

(B) Layered

(C) Exokernel

(D) More than one of the above

(E) None of the above

layer 0
layer 1
layer 2

Minimal Kernel
Apps को directly Map Allot

KAUTILYA CLASSES

RTOS

1. Time predictable
2. Response bounded

⇒ Deadline किसमें exist करती है -

- A. SRTOS :
- B. HRTOS ,
- C. Both
- D. None

5. A Real-time OS is required where-
सियल-टाइम OS की ज़रूरत वहाँ होती है जहाँ-
- (A) Predictable response
- (B) Long processing → latency ↑
RTOS X
- (C) No deadlines
- (D) More than one of the above
- (E) None of the above

KAUTILYA CLASSES

4. *The command interpreter of OS is also known as-*

OS के कमांड इंटरप्रेटर को इस नाम से भी जाना जाता है-

(A) Kernel → low level operations

✓ (B) Shell → read, interpret & Systemcall Trigger

(C) Scheduler → CPU Time Allocate

(D) More than one of the above

(E) None of the above

RTOS

1. Hard → Deadline Miss \rightarrow System failure

2. Soft → Deadline Miss \rightarrow System fail नहीं है जब-

Only performance & Utility को

3. **Soft real-time system fails when-**

सॉफ्ट रियल-टाइम सिस्टम तब फेल हो जाता

- (A) Deadline missed
- (B) Data corrupted
- (C) OS crashed - general failure
- (D) More than one of the above
- (E) None of the above

Safe & Unsafe State Check

Deadlock Avoidance

2. *Banker's algorithm incorrectly executes when-*

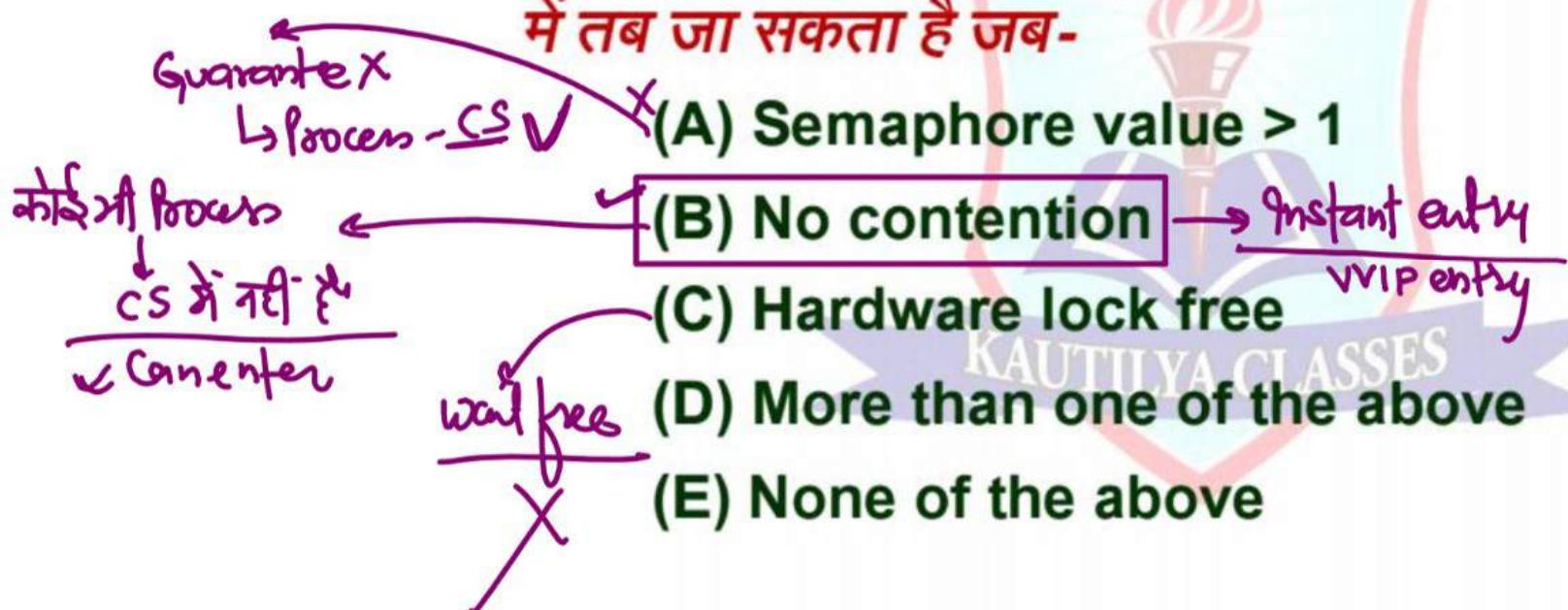
बैंकर एल्गोरिदम गलत तरीके से तब काम करता है

(B) Executions के लिए
real demand

- जब-
- ✓ System strict → (A) Processes overstate max need
 - ✓ demand ↓ than need → (B) Processes understate need
 - ✓ wrong Assumption → (C) Resource not preemptable
 - design → (D) More than one of the above
 - design → (E) None of the above

Critical Section

- ✓ Shared data access
- ✓ Mutual exclusion उल्लंघन



1. A process can enter critical section without waiting when-

एक प्रोसेस बिना इंतजार किए क्रिटिकल सेक्शन

में तब जा सकता है जब-

Active block of code = PROCESS

Passive block of code = PROGRAM

Program

25. A process is-

Process क्या है-

- (A) A program in execution
- (B) A file on disk
- (C) A CPU instruction
- (D) More than one of the above
- (E) None of the above

24. Which algorithm uses a circular ready queue?



कौन-सा एल्गोरिदम *circular ready queue* उपयोग करता है?

- (A) FCFS → Linear queue
 - ✓ (B) Round Robin
 - (C) Priority → Priority queue
 - (D) More than one of the above
 - (E) None of the above

23. *Swapping is used to-*

Swapping का उपयोग किसके लिए होता है-

- (A) Move processes between memory & disk
- (B) Save files
- (C) Allocate CPU
- (D) More than one of the above
- (E) None of the above

22. *Which OS component manages memory?*

OS का कौन-सा भाग मेमोरी प्रबंधन करता है?

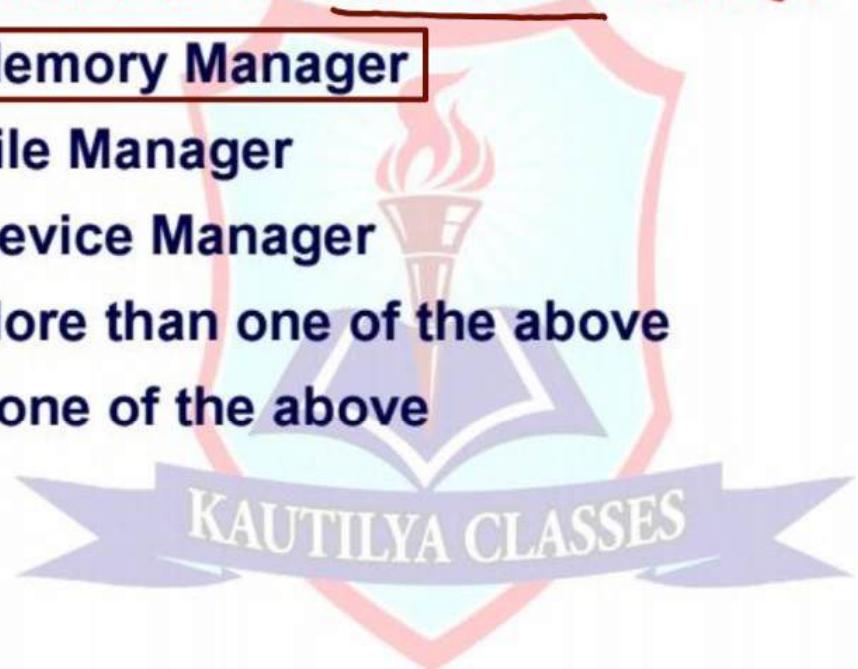
(A) Memory Manager

(B) File Manager

(C) Device Manager

(D) More than one of the above

(E) None of the above



21. Which scheduling algorithm may cause starvation?

Small first
Bigger Jobs
Kept waiting

कौन-सा scheduling algorithm starvation पैदा कर सकता है?

- (A) FCFS → Belady
- (B) Round Robin → Fair
- (C) SJF**
- (D) More than one of the above
- (E) None of the above

20. *In which state does a process wait for CPU allocation?*

Process किस अवस्था में CPU allocation का इंतजार करती है?

(A) Ready → Ready queue

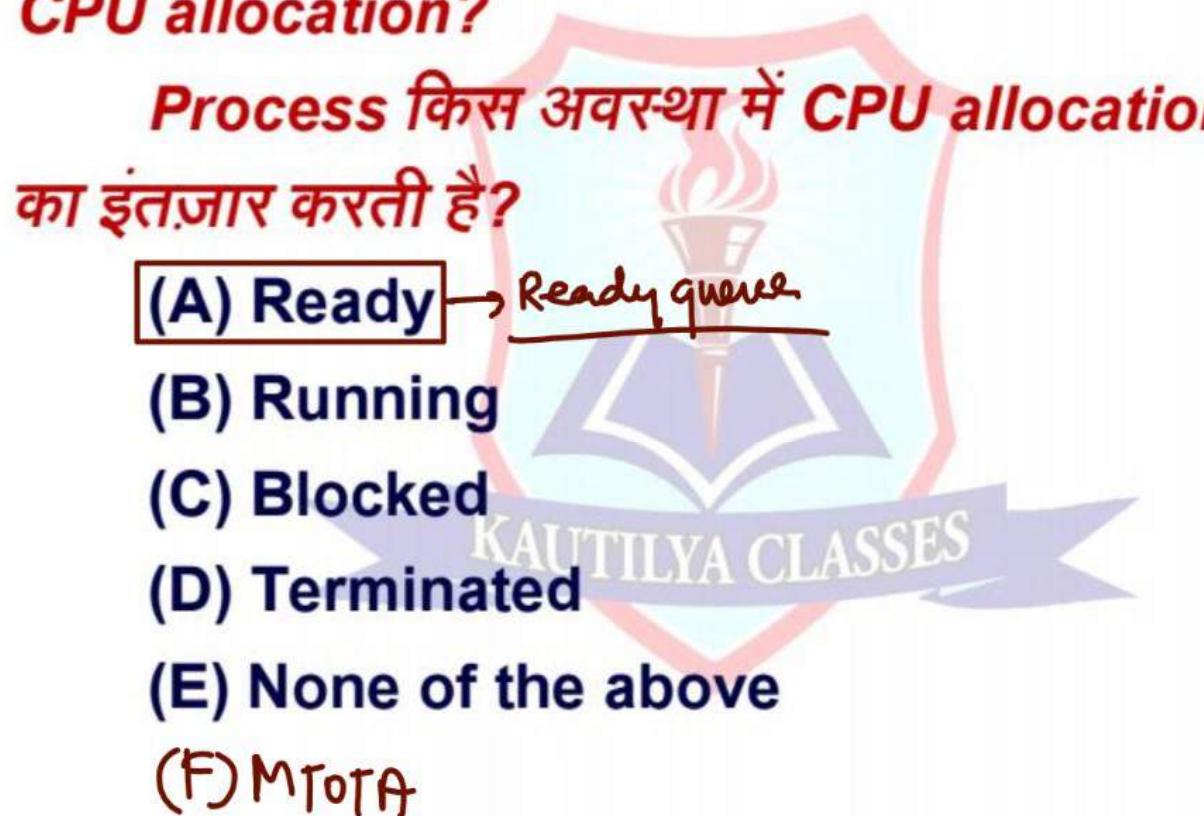
(B) Running

(C) Blocked

(D) Terminated

(E) None of the above

(F) MTOFA



19. *The software that serves as a platform for other software is-*

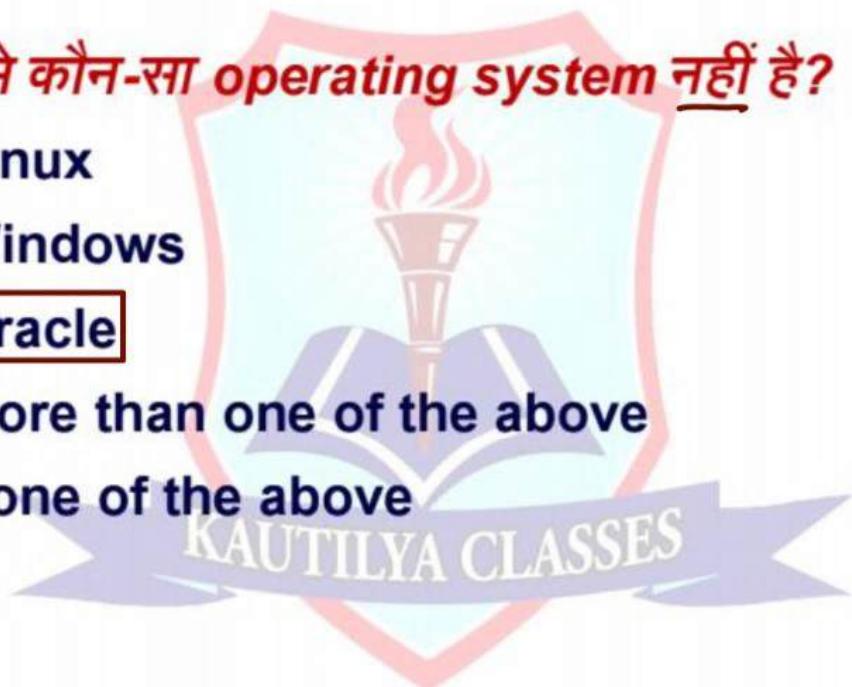
जो सॉफ्टवेयर अन्य सॉफ्टवेयर चलाने का प्लेटफॉर्म देता है वह क्या है-

- ✗ (A) System Software
- (B) Operating System
- ✗ (C) Application Software
- (D) More than one of the above
- (E) None of the above

18. Which of the following is NOT an operating system?

इनमें से कौन-सा **operating system** नहीं है?

- (A) Linux
- (B) Windows
- (C) Oracle**
- (D) More than one of the above
- (E) None of the above



17. What is compaction?

Compaction क्या है?

Free Blocks को
जोड़कर Continuum करता है

- X (A) Removing internal fragmentation
- X (B) Paging technique
- (C) Removing external fragmentation**
- (D) More than one of the above
- (E) None of the above

16. *Who decides which OS loads in a multi-OS system?*

Multi-OS सिस्टम में कौन तय करता है कि कौन-सा OS लोड होगा?

X (A) PCB → Process Control Block

X (B) FCB → File Control Block

✓ (C) Boot Loader

(D) More than one of the above

(E) None of the above

15. Which table does OS maintain to track frame usage?

OS फ्रेम उपयोग ट्रैक करने के लिए कौन-सी टेबल रखता है?

- ✓ (A) Frame table → Status info of each frame
- ✗ (B) Mapping table
- ✗ (C) Page table → Virtual memory
- (D) More than one of the above
- (E) None of the above

14. For real-time OS, *interrupt latency* should be-

Real-time OS में interrupt latency कैसी

होनी चाहिए-

practically impossible

- (A) Zero
- (B) Minimal**
- X(C) Maximum
- (D) More than one of the above
- (E) None of the above

RTOS में delay smallest
होता चाहिए।

KAUTILYA CLASSES

13. *Deadlock avoidance algorithm examines-*

-Deadlock अवॉइडेंस एल्गोरिदम किसकी जाँच करता

है?

Bankers
Algorithm

Resource Allocation
का Safe & Unsafe
State

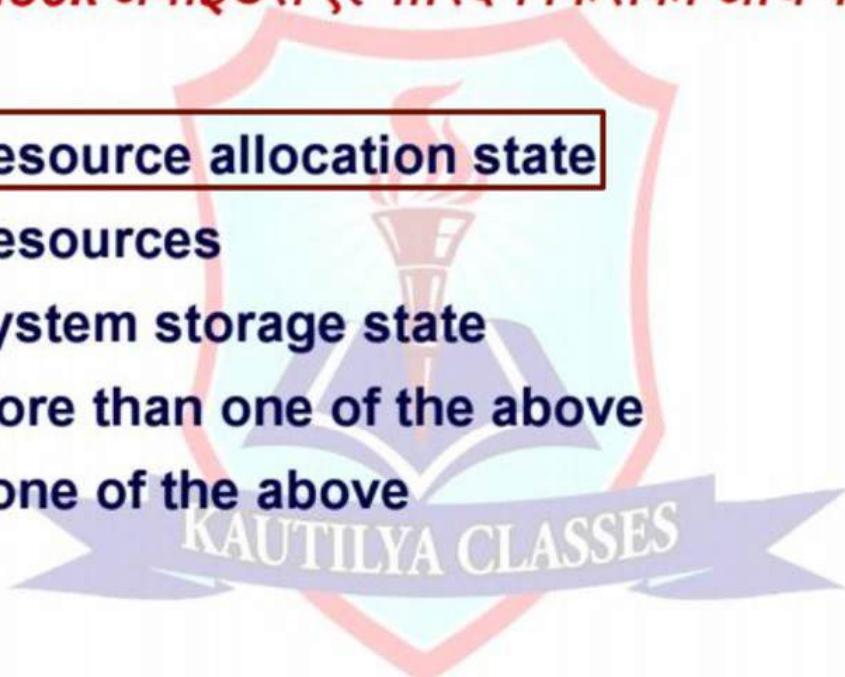
(A) Resource allocation state

✗ (B) Resources

✗ (C) System storage state

(D) More than one of the above

(E) None of the above



12. In time-sharing OS, when time slice ends, process goes to-

टाइम-शेयरिंग OS में टाइम-स्लाइस समाप्त होने पर प्रक्रिया किस अवस्था में जाती है-

- (A) Suspended
- (B) Blocked
- (C) Ready
- (D) More than one of the above
- (E) None of the above

fails to get ticks

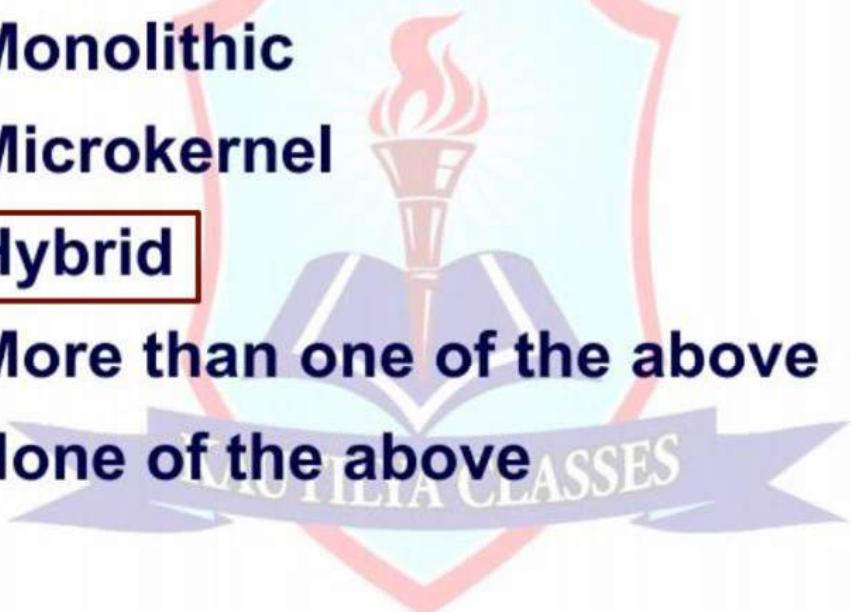
KAUTILYA CLASSES

11. OS X uses which type of kernel?

OS X में किस प्रकार का kernel होता है?



- ✗ (A) Monolithic
- ✗ (B) Microkernel
- (C) Hybrid**
- (D) More than one of the above
- (E) None of the above



10. Which of the following is NOT a real-time OS?

इनमें से कौन-सा रियल-टाइम OS नहीं है?

RTOS
RealTime Linux

(A) RT Linux

(B) Palm OS

(C) VxWorks

(D) More than one of the above

(E) None of the above

~~Singhania~~

9. *Which statement about kernel is NOT true?*

Kernel के बारे में कौन-सा कथन सही नहीं है?

✓
Linux में
dynamically

- (A) Kernel remains in memory
- (B) Kernel modules cannot be loaded in running OS
- (C) Kernel loads first during booting
- (D) More than one of the above
- (E) None of the above

8. What causes thrashing?

Thrashing किस वजह से होता है?



System के बाल
Page swap में
Busy

(A) Excessive paging

(B) Insufficient disk space

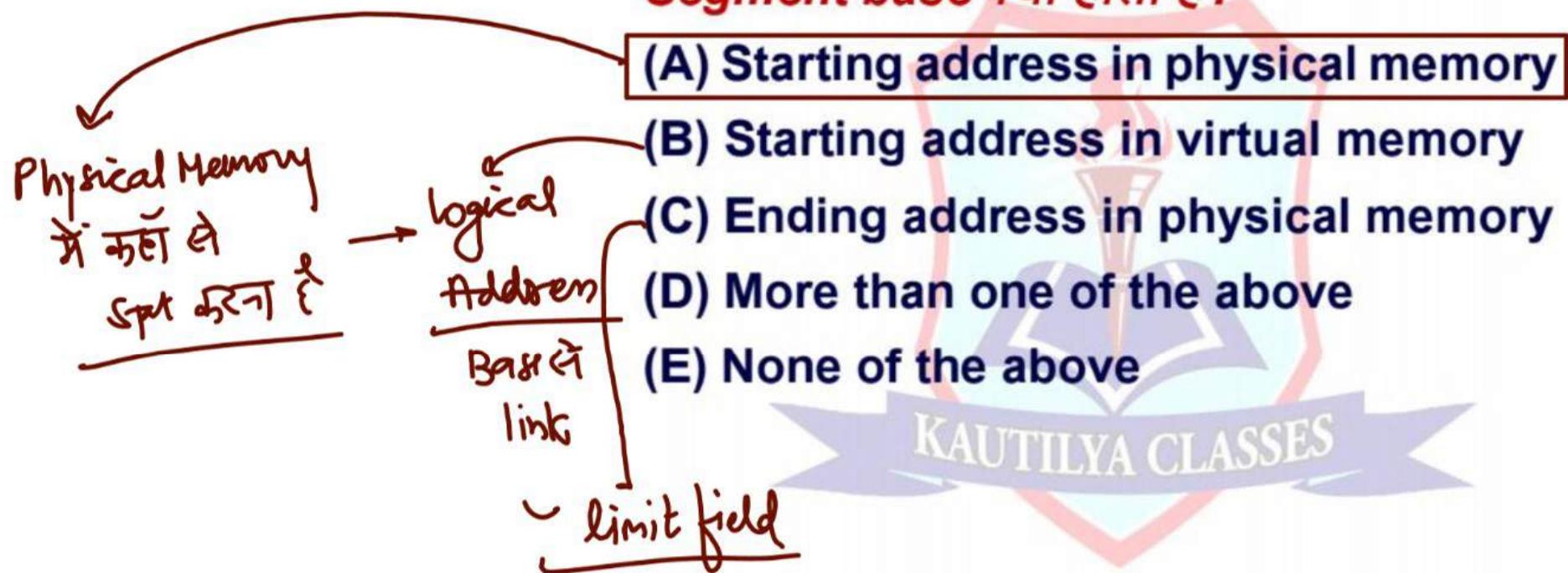
(C) Hardware failure

(D) More than one of the above

(E) None of the above

7. *What is a segment base?*

Segment base क्या होता है?



$$1 \text{ KB} = 1024 \text{ Bytes}$$

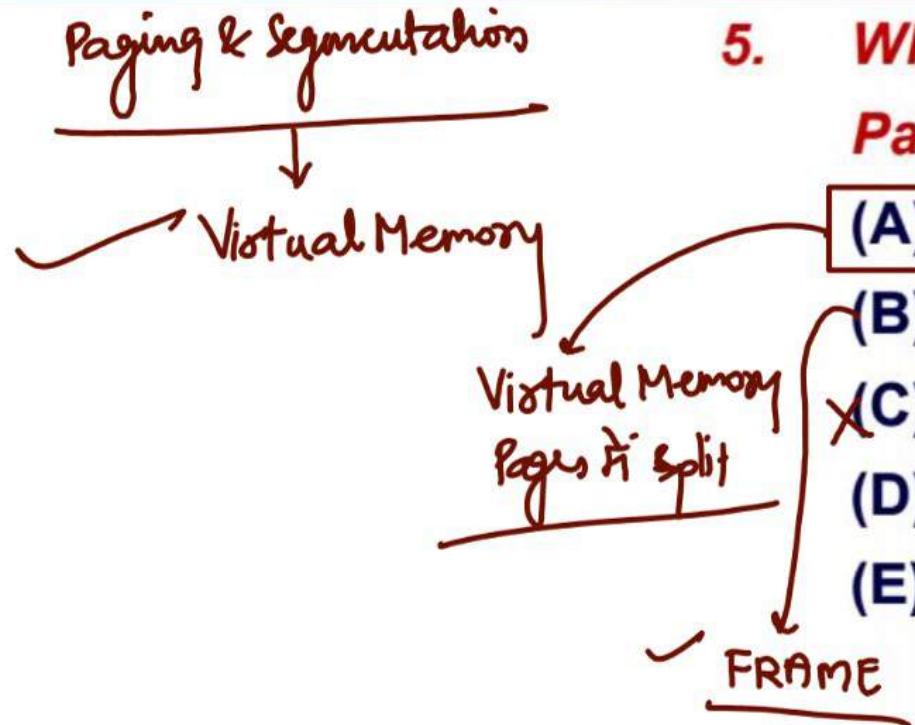
↓ $\times 4$ ↓ $\times 4$
 4 KB 4096 Bytes

$2^{10} = 1024$
 $2^{11} = 2048$
 ~~$2^{12} = 4096$~~

6. *Page size = 4 KB, Physical memory = 64 GB. Page offset bits?*

यदि पेज साइज़ 4 KB और फिजिकल मेमोरी 64 GB है, तो पेज ऑफसेट बिट्स कितने होंगे?

- (A) 10
- (B) 12
- (C) 14
- (D) More than one of the above
- (E) None of the above



5. *What is a page in paging?*

Paging में page क्या होता है?

- (A) Fixed-size block of virtual memory
- (B) Fixed-size block of physical memory
- (C) Type of memory allocation
- (D) More than one of the above
- (E) None of the above

KAUTILYA CLASSES

4. *Which of the following is NOT a type of interrupt?*

इनमें से कौन-सा इंटरप्ट का प्रकार नहीं है?

- ✓ Devices
KB, Mouse
 - ✓ Memory error
interrupt
 - ✓ System call
- (A) Hardware interrupt
- (B) Memory interrupt**
- (C) Software interrupt
- (D) More than one of the above
- (E) None of the above

File System -

FAT
NTFS
ExFAT
HFS
MFS
HFS+
ZFS
AFS

3. *Which of the following is a commonly used file system?*

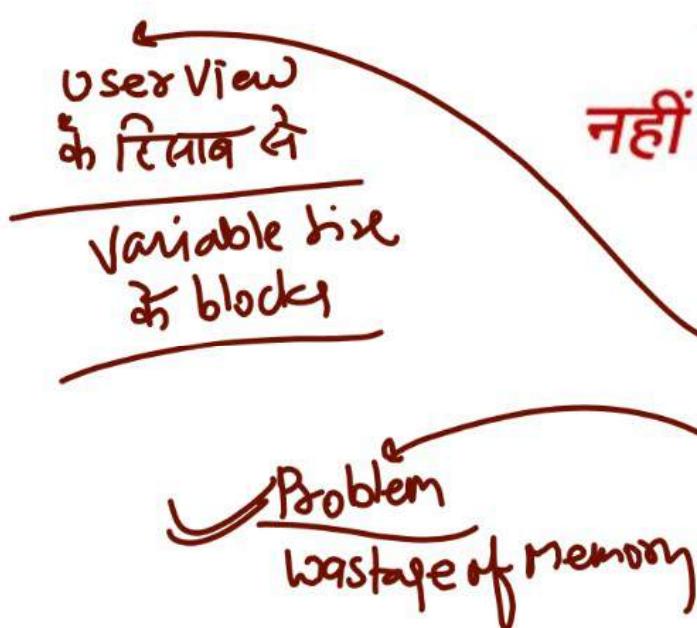
इनमें से कौन-सी फाइल सिस्टम सामान्यतः
उपयोग की जाती है?

- ✓ [(A) NTFS → Windows का default
(B) FAT32 → Widely Supported System
(C) HFS+ → Apple
(D) More than one of the above
(E) None of the above]

2. Which of the following is NOT a memory management technique?

इनमें से कौन-सी मेमोरी मैनेजमेंट तकनीक नहीं है?

- (A) Paging → Fixed size के blocks
- (B) Segmentation
- (C) Fragmentation**
- (D) More than one of the above
- (E) None of the above



Types = 1. Single User Interface
2. Multi User Interface

Android
MS DOS
MS Windows
ios
Macintosh

Linux
Unix

8. Network
9. Embedded

Techniques
1. Batch
2. MultiTasking
3. Multiproq.
4. Multi proc.
5. RTOS
6. Time Sharing
7. Distributed

1. Which of the following is a type of operating system?

इनमें से कौन-सा ऑपरेटिंग सिस्टम का प्रकार

है?

- (A) Real-time OS
- (B) Embedded OS
- (C) Network OS
- (D) More than one of the above
- (E) None of the above

Microwave ovens
washing Machine
AC
wi-fi

Network Resources
Manage

Term	Short Meaning (Hindi + English)	Very Brief Example
Dirty Read	Uncommitted data पढ़ लेना. <u>Reading uncommitted data.</u>	T1 ने <u>value</u> बदली (commit नहीं), T2 ने वही पढ़ लिया।
Dirty Write	Uncommitted data पर <u>overwrite</u> करना. <u>Writing over uncommitted data.</u>	T1 <u>value</u> बदल रहा था, T2 ने उसे <u>overwrite</u> कर दिया।
Lost Update	दोनों <u>update</u> करते हैं पर एक <u>update</u> खो जाता है. <u>One update overwrites another.</u>	T1 = 11 कर रहा, T2 भी = 11; पहले वाला <u>update</u> खो गया।
Non-Repeatable Read	एक ही <u>row</u> दो बार पढ़ी → <u>value</u> बदल गई. <u>Same row read twice</u> → <u>different values.</u>	T1 <u>price</u> पढ़ता है =100; T2 <u>बदलता है</u> =120; T1 दोबारा पढ़ता है=120।
Inconsistent Read ✓	Half-old + half-new data पढ़ लिया. <u>Reading inconsistent snapshot.</u>	T1 <u>sum calculate</u> कर रहा, T2 बीच में <u>rows</u> बदल देता है।
Phantom Read ✓	Same query दो बार → नई <u>rows</u> दिखीं. <u>New rows appear in second read.</u>	T1 <u>marks>80</u> पढ़ता है; T2 नई <u>row insert</u> करता है; T1 को नई <u>row</u> दिखती है।

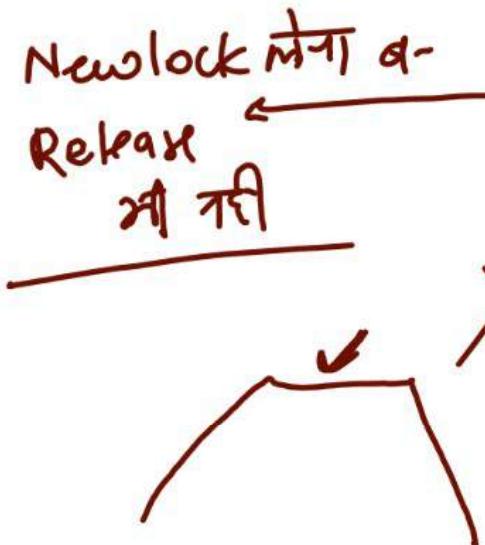
21. *Phantom problem is solved using-*

Phantom problem कैसे solve होता है-

- ✓ A. Predicate locks
- ✓ B. Range locks – new rows prevent
- ✓ C. Index locking
- ✗ D. More than one of the above
- E. None of the above

20. A lock is released in 2PL only when-

2PL में lock कब release होता है-



- A. Growing phase ends—
- B. Shrinking phase begins**
- C. Transaction commits
- D. More than one of the above
- E. None of the above



19. A *foreign key must reference-*
Foreign key किसे *reference* करती है-

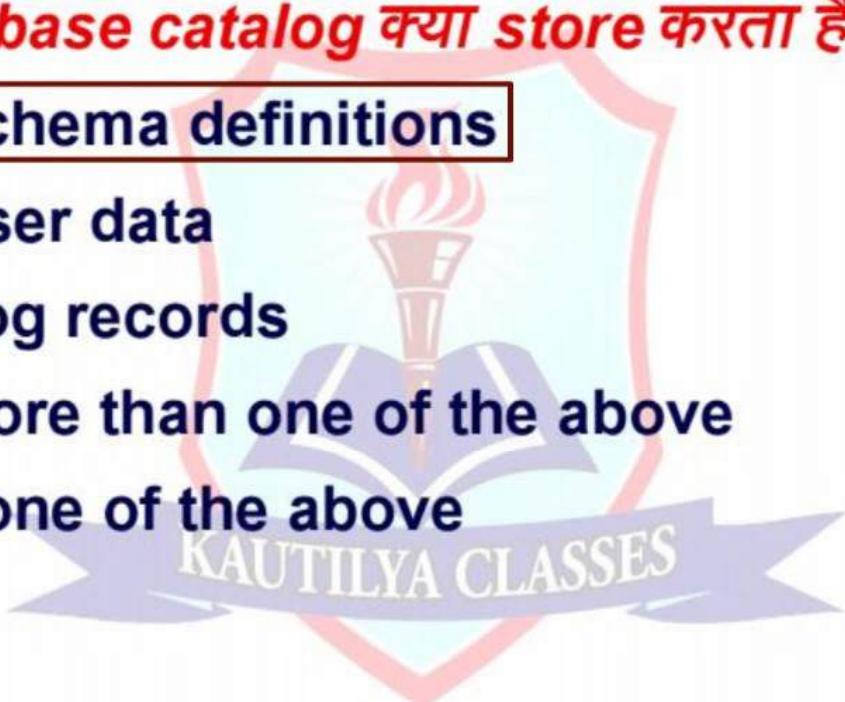
- ✓ A. Candidate key
- ✓ B. Primary key – Most Common
- ✓ C. Superkey – Technically Allowed
- D. More than one of the above**
- E. None of the above

18. Database catalog stores-**Database catalog क्या store करता है?**

Catalog
↓
METADATA

✓ Tables
✓ Log File

- A. Schema definitions
- B. User data
- C. Log records
- D. More than one of the above
- E. None of the above

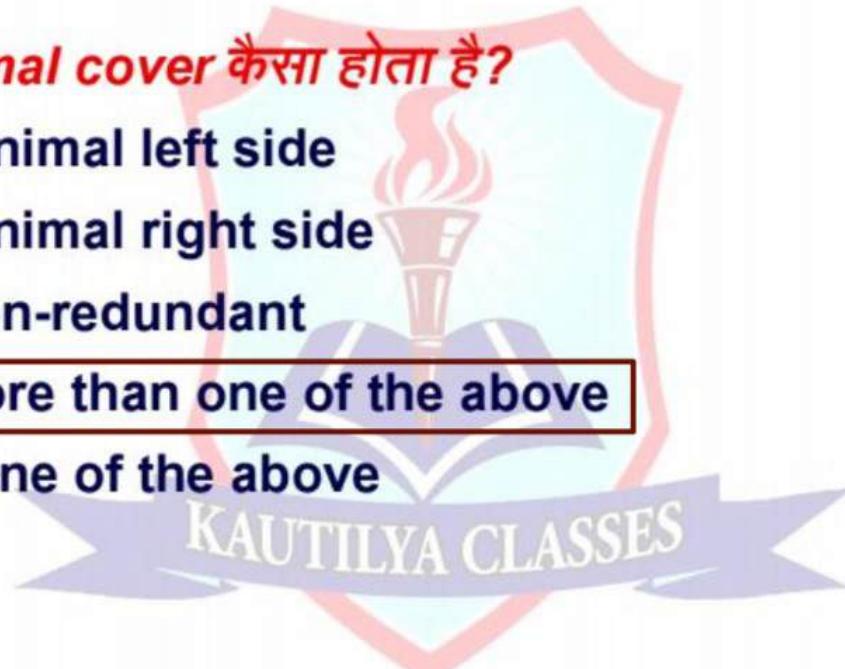


KAUTILYA CLASSES

17. *A minimal cover of functional dependencies must be-*

Minimal cover कैसा होता है?

- A. Minimal left side
- B. Minimal right side
- C. Non-redundant
- D. More than one of the above
- E. None of the above



KAUTILYA CLASSES

16. A transaction performing read and write operations is called-

जो transaction read और write दोनों करती है, उसे क्या कहते हैं-

A. Active transaction

B. Compensating transaction

C. Unisystem transaction

D. More than one of the above

E. None of the above

Undo
operation

15. *What is the result of decomposing a table incorrectly?*

गलत decomposition का परिणाम?

- A. Loss of data
- B. Lossless join failure
- C. Anomalies increase
- D. More than one of the above
- E. None of the above

14. What causes update anomaly?

Update anomaly किससे होती है?

Same Data
at multiple
places

A. Redundant data

B. Missing foreign key

C. Weak entity

D. More than one of the above

E. None of the above

Normal
Structure
Not Anomaly

Referential
Integrity
issue

KAUTILYA CLASSES

13. Entity type defines-

Entity type क्या define करता है-

*Attribute define
not values*

- A. A group of objects

- X B. Attribute values

- X C. Relationship type

- D. More than one of the above

- E. None of the above

→ Same attributes
करने entity sets

12. A relation schema is also known as-
Relation schema को और क्या कहते हैं-

A. Table structure

B. Table instance

C. Data dictionary

D. More than one of the above

E. None of the above

→ Schema / Structure

↓
Columns &
Constraints

factual Data
Schema X
Data Store

KAUTILYA CLASSES

11. A fully functional dependency is removed in-

Full functional dependency किस NF में handle होती है-

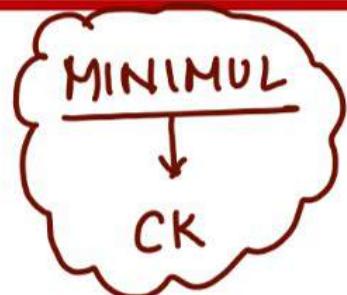
x A. 1NF → Only Atomicity

✓ B. 2NF → Remove Partial Dependency

x C. 3NF → Handles Transitive Dependency

D. More than one of the above

E. None of the above



10. *The minimal set of attributes that uniquely identifies tuples is-*

वह minimal attribute set जो tuples को uniquely identify करे-

- A. Superkey — Unique | No Minimal
B. Candidate key

- C. Primary key
D. More than one of the above
E. None of the above

A = Highest locking

2PL

B = No lock

C = $\frac{2PL}{2}$

Max Blocking
&
Deadlock

9. Which concurrency control technique causes least blocking?

कौन सी concurrency control technique सबसे कम blocking करती है?

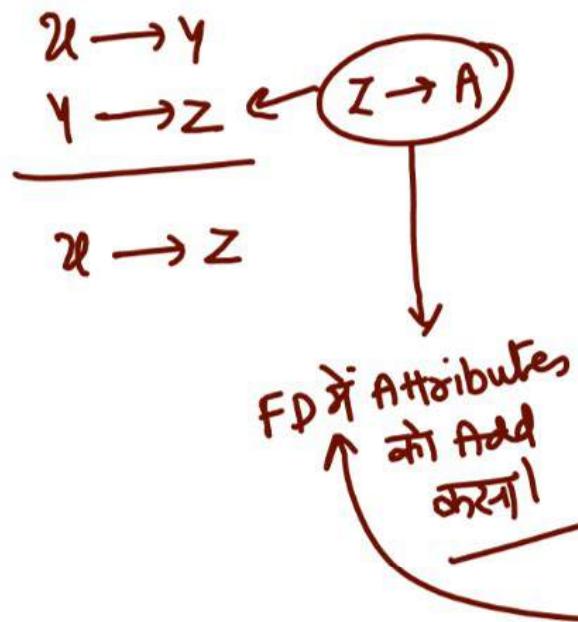
A. Locking

B. Timestamp ordering

C. 2PL

D. More than one of the above

E. None of the above



8. If $X \rightarrow Y$ and $Y \rightarrow Z$, then $X \rightarrow Z$ is known as-

अगर $X \rightarrow Y$ और $Y \rightarrow Z$, तो $X \rightarrow Z$ क्या कहलाता है-

- A. Decomposition
- B. Transitivity — FD Rule
- C. Augmentation
- D. More than one of the above
- E. None of the above

7. *Dirty write occurs when-*

Dirty write कब होता है-

A. Writing over uncommitted data

B. Writing after commit

C. Committed data overwritten

D. More than one of the above

E. None of the above

No
Anomaly ↙

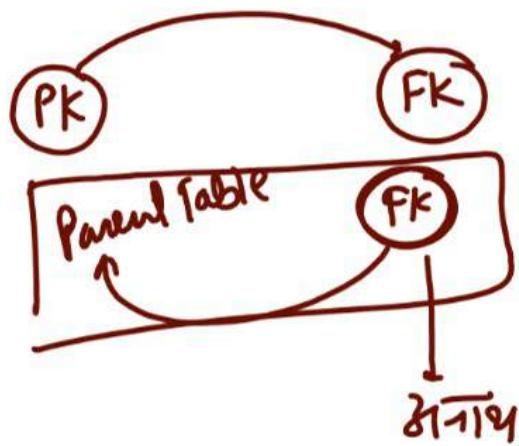
Normal
lost update

$T_1 = X$ $T_2 = X$ \rightarrow interference

Opposite

6. A transaction is isolated if-
Transaction isolated कब होती है-

- A. It runs without interference
- B. It affects other transactions
- C. It shares updates
- D. More than one of the above
- E. None of the above

Referential Integrity

ABC

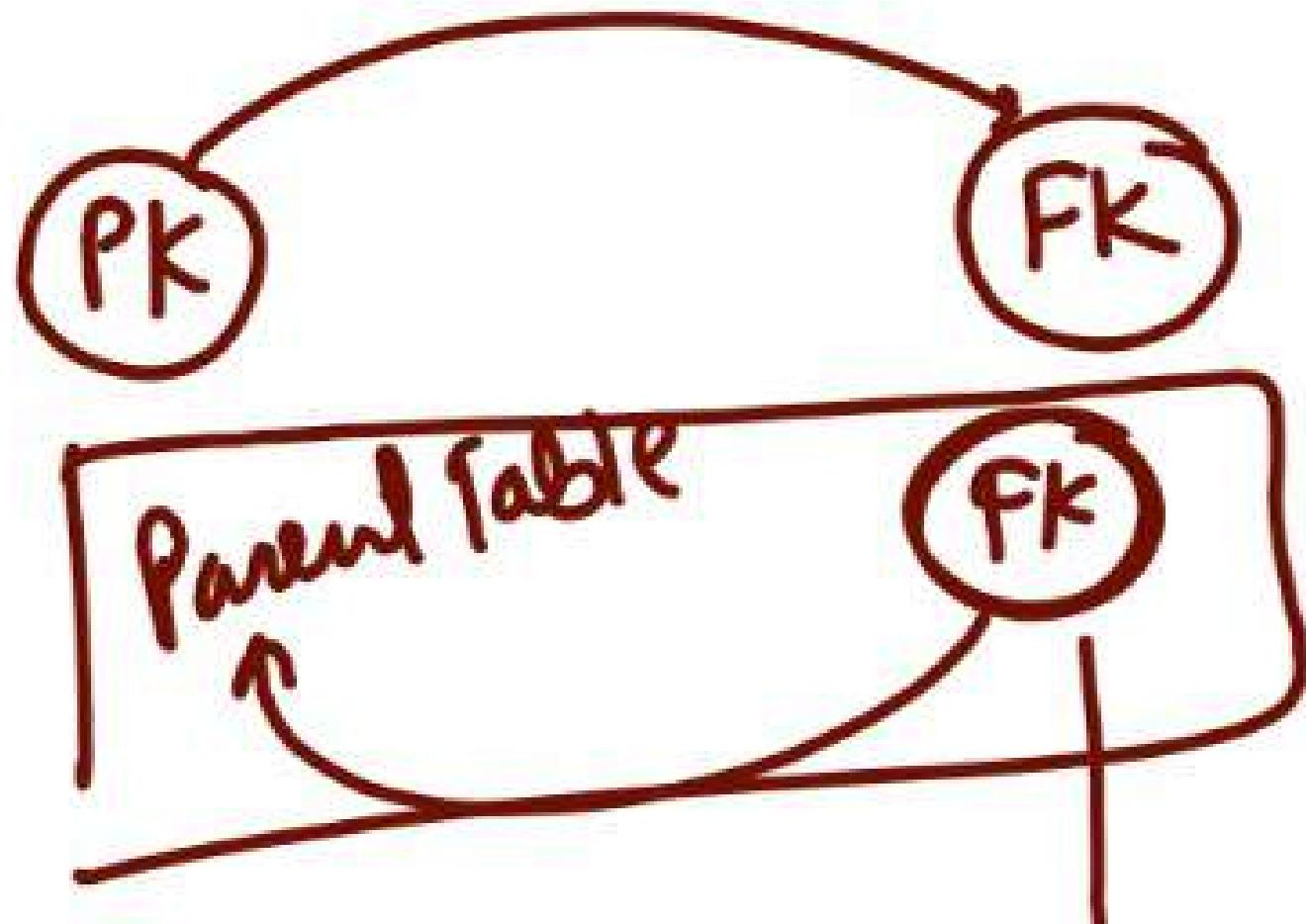
5. **Referential integrity constraint ensures-**
Referential integrity किसे सुनिश्चित करती है?

- A. No orphan records must be in PK
- B. Valid foreign key values
- C. Relationship between tables
- D. More than one of the above
- E. None of the above

KAUTILYA CLASSES

KAUTILYA CLASSES

Referential Integrity



Name Mobile Address

A1	A12	C1	S	P
----	-----	----	---	---

4.

Composite attributes are converted

into-

* Separate Table

✓ Multivalued Attributes

Composite attributes को relational model में कैसे convert करते हैं-

A. Multiple attributes

Subattributes

X B. A single combined attribute

X C. Separate table

D. More than one of the above

E. None of the above

A = Schedule = Serializable

↓
X Conflict Serializable

3. Which schedule always guarantees
serializability?

कौन सा schedule हमेशा serializable
होता है?

Always
Serializable

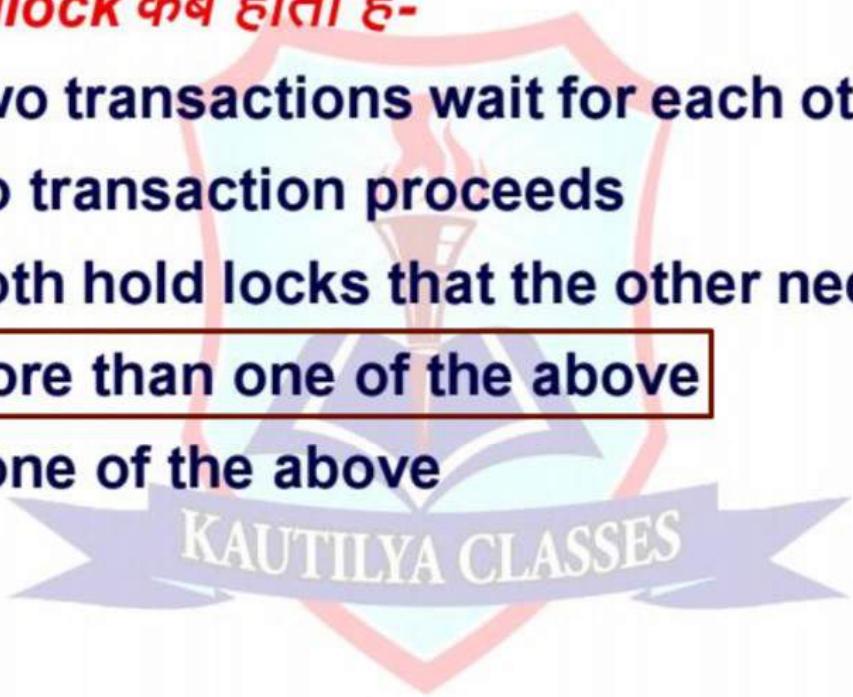
Term
Scheduler

- X A. Conflict-serializable schedule
- B. Serial schedule ✓
- C. Precedence schedule
- D. More than one of the above
- E. None of the above

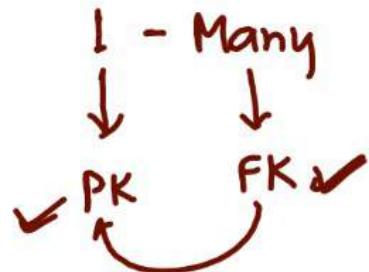
2. *Deadlock occurs when-*

Deadlock कब होता है-

- Main Condition* → A. Two transactions wait for each other
- Both Transactions Halt* → B. No transaction proceeds
- Mutual Hold & wait condition* → C. Both hold locks that the other needs
- D. More than one of the above
- E. None of the above



KAUTILYA CLASSES



1. *The entity on the many side of a 1-M relationship has-*

1-M relationship में many side वाली entity के पास क्या होता है-

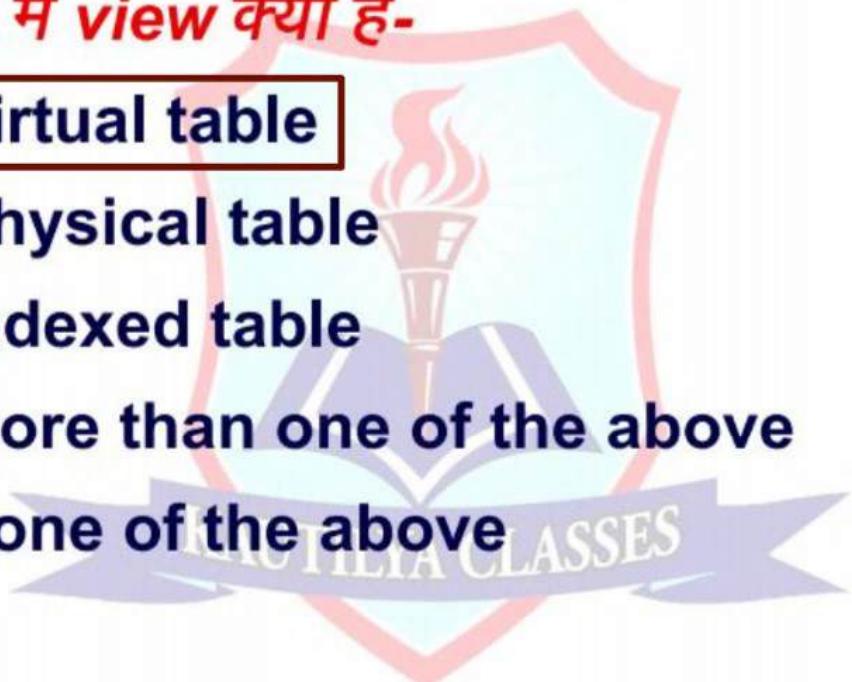
- ✗ A. Primary key
- ✓ B. Foreign key
- ✗ C. Composite key
- D. More than one of the above
- E. None of the above

View
↓
Data physically
store नहीं

21. A view in SQL is-

SQL में view क्या है-

- A. Virtual table**
- B. Physical table**
- C. Indexed table**
- D. More than one of the above**
- E. None of the above**



20. Primary key constraint ensures-

Primary key क्या ensure करता है-

PK → A. Uniqueness

PK → B. Not Null

C. Referential integrity

D. More than one of the above

E. None of the above

foreign
key

A&B

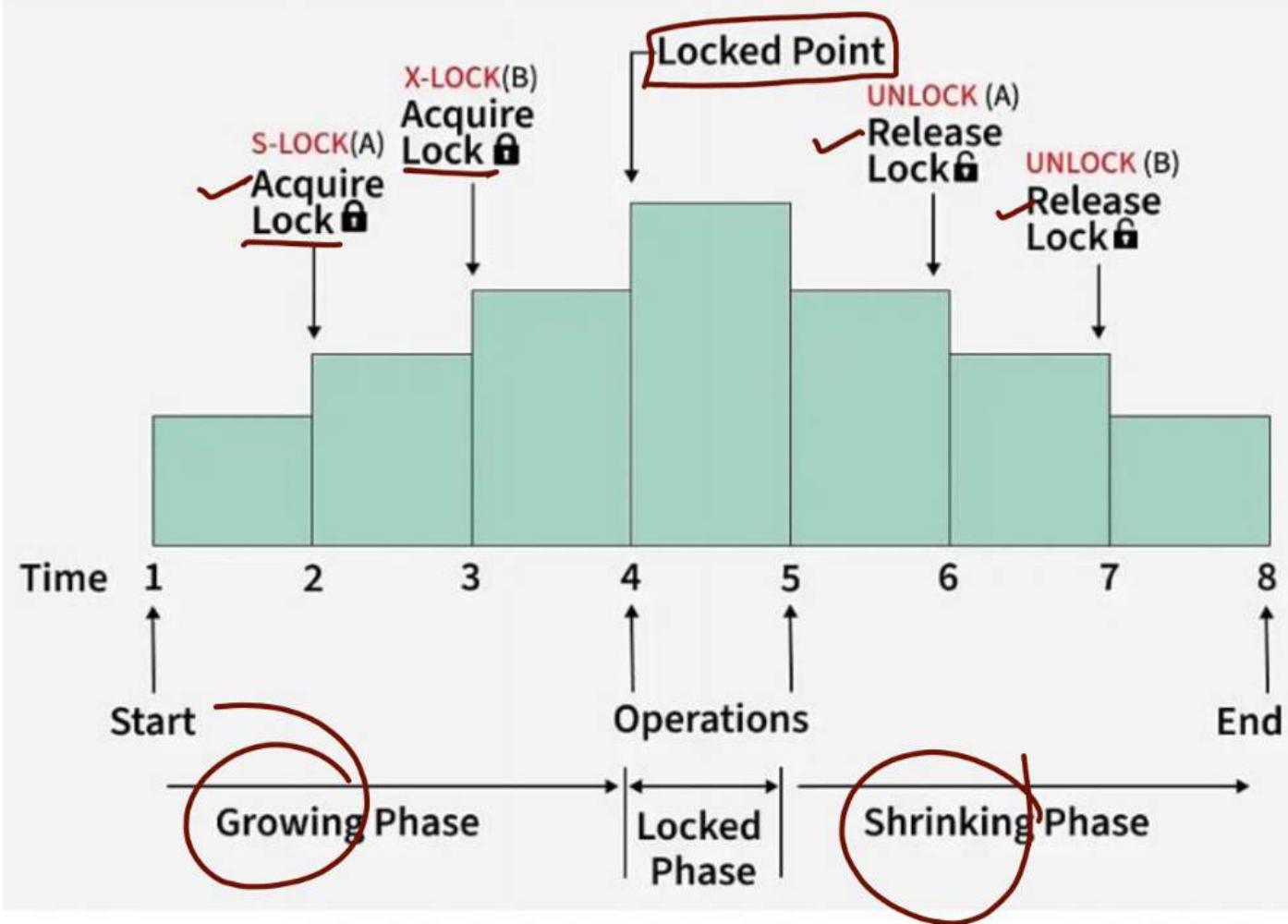
19. Growing phase in 2PL allows-

2PL के growing phase में क्या allow हैं-

- A. Growing phase = Acquire
B. Shrinking phase = Release

Shrinking Phase

- A. Only acquiring locks**
- B. Only releasing locks**
- C. Both acquire and release**
- D. More than one of the above**
- E. None of the above**



18. *Two-phase locking ensures-*

Serializable
Schedule की
Guarantee

2PL क्या ensure करता है-

- A. Serializability
- B. No deadlock
- C. No starvation
- D. More than one of the above
- E. None of the above

17. Which symbol represents multivalued attribute in ER diagram?

ER diagram में multivalued attribute का symbol कौन सा है?

A. Oval → Simple Attribute

B. Double oval

C. Rectangle → Entity

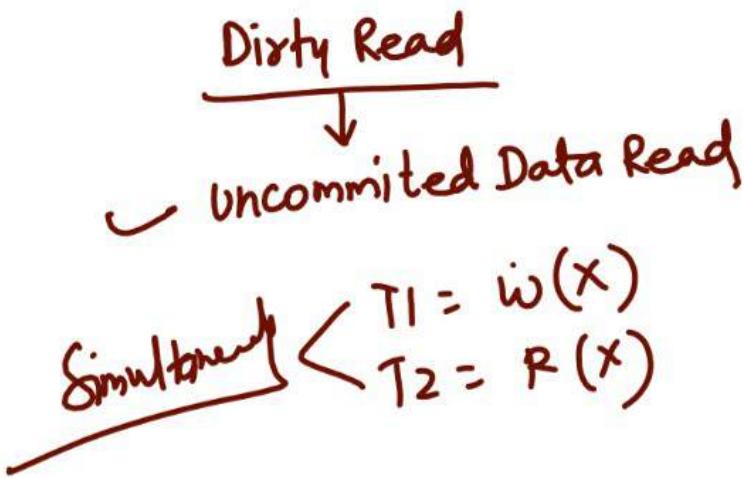
D. More than one of the above

E. None of the above

16. Attribute domain defines-

Attribute domain क्या define करता है-

- ✓ A. Possible values of attribute
- ✗ B. Size of table
- ✗ C. Key constraints
- D. More than one of the above
- E. None of the above



15. *Dirty read occurs when-*

Dirty read कब होता है-

- A. Reading uncommitted data
- B. Reading from committed data
- C. Writing after commit
- D. More than one of the above
- E. None of the above

$T_1 = .R(x)$ $T_2 = .R(x)$ R-R

14. Which conflict occurs when two transactions read the same data?

जब दो transactions एक ही data पढ़ते हैं तो कौन-सा conflict होता है?

- A. Read-write conflict
- B. Write-read conflict
- C. Read-read conflict**
- D. More than one of the above
- E. None of the above

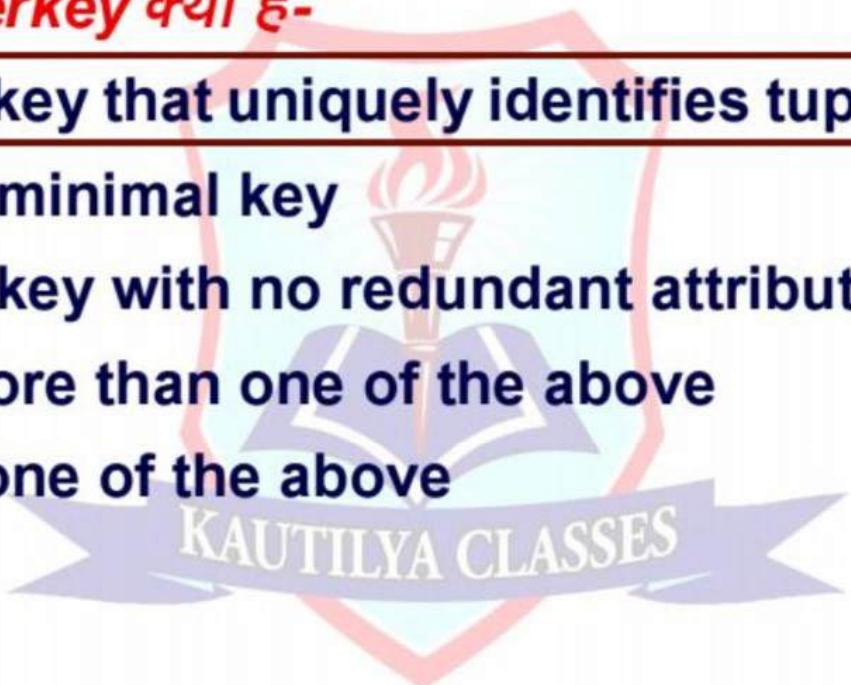
Minimal SK = CK

SK = Redundancy ✓
CK = Redundancy X

13. A superkey is-

Superkey क्या है-

- A. A key that uniquely identifies tuples
- B. A minimal key
- C. A key with no redundant attributes
- D. More than one of the above
- E. None of the above



KAUTILYA CLASSES

Strict 2PL Avoid
Timestamp रद्दी

12. *Timestamp based concurrency control*

avoids-

Timestamp concurrency control किसे
avoid करता है-

- A. Conflicts → detected करता है, Avoid रद्दी
- B. Deadlocks**
- C. Cascading rollback
- D. More than one of the above
- E. None of the above

11. *Two-phase commit protocol is used for-*

Two-phase commit protocol किसके लिए उपयोग होता है-

- A. Distributed transactions
- B. Backup operations
- C. Logging
- D. More than one of the above
- E. None of the above

10. Locking protocol ensures-

Locking protocol क्या सुनिश्चित करता है-

- A. No deadlock
- B. No data loss
- C. Controlled concurrent access
- D. More than one of the above
- E. None of the above

ACID

↓

Atomicity
Consistency
I - Isolation
D - Durability

✓

9. Which is NOT a property of a transaction?

इनमें से कौन transaction का property नहीं है?

- A. Atomicity
- B. Consistency
- C. Recoverability**
- D. More than one of the above
- E. None of the above

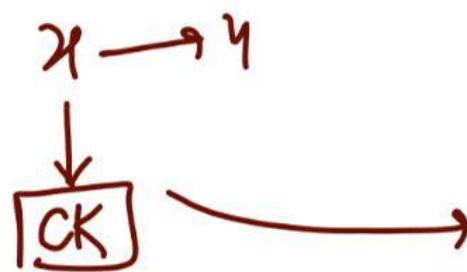
Anomaly
↓
Insert
update
Delete

Norm = Remove

8. Which of the following anomalies
is NOT related to normalization?

इनमें से कौन normalization anomaly
नहीं है?

- A. Insertion anomaly
- B. Selection anomaly
- C. Deletion anomaly
- D. More than one of the above
- E. None of the above



7. *BCNF is stricter than 3NF because-*

BCNF, 3NF से ज्यादा strict क्यों हैं-

- A. Every determinant must be a candidate key
- B. Non-key attributes must depend on key
- C. Partial dependencies are removed
- D. More than one of the above
- E. None of the above

Figures	Symbols	Represents
Rectangle		Entities in ER Model
Ellipse		Attributes in ER Model
Diamond		Relationships among Entities
Line		Attributes to Entities and Entity Sets with Other Relationship Types
✓ Double Ellipse		Multi-Valued Attributes
Double Rectangle		Weak Entity

Rapid
Revision
Minutes

FN + LN
Age/Position

6. *Which type of attribute can take multiple values?*

कौन-सा attribute एक से अधिक value ले सकता है?

- A. Composite attribute
- B. Multivalued attribute**
- C. Derived attribute
- D. More than one of the above
- E. None of the above

5. A candidate key must be:-

Candidate key को क्या होना चाहिए-

- A. Unique → CK = Uniquely Rows identify,
- B. Minimal → no extra attribute in Key.
- C. A superkey → Minimal Superkey
- D. More than one of the above
- E. None of the above

Multiple users can access data simultaneously

DBMS में
Duplication X

DBMS's centralised T

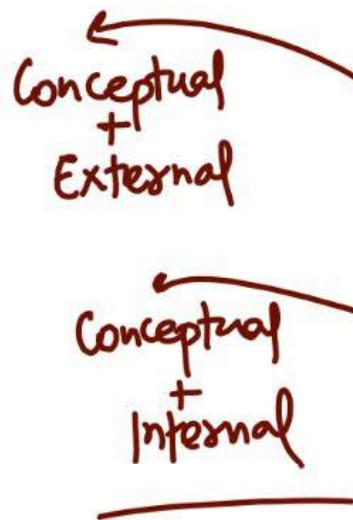
no hack X
no risk X

4. Which among the following is NOT an advantage of DBMS over file system?

इनमें से कौन DBMS का file system पर advantage नहीं है?

- A. Data redundancy control
- B. Concurrent access
- C. Increased system security risks
- D. More than one of the above
- E. None of the above

Drawback



3. *Mapping between conceptual and internal levels is called-*

Conceptual और internal level के mapping को क्या कहते हैं-

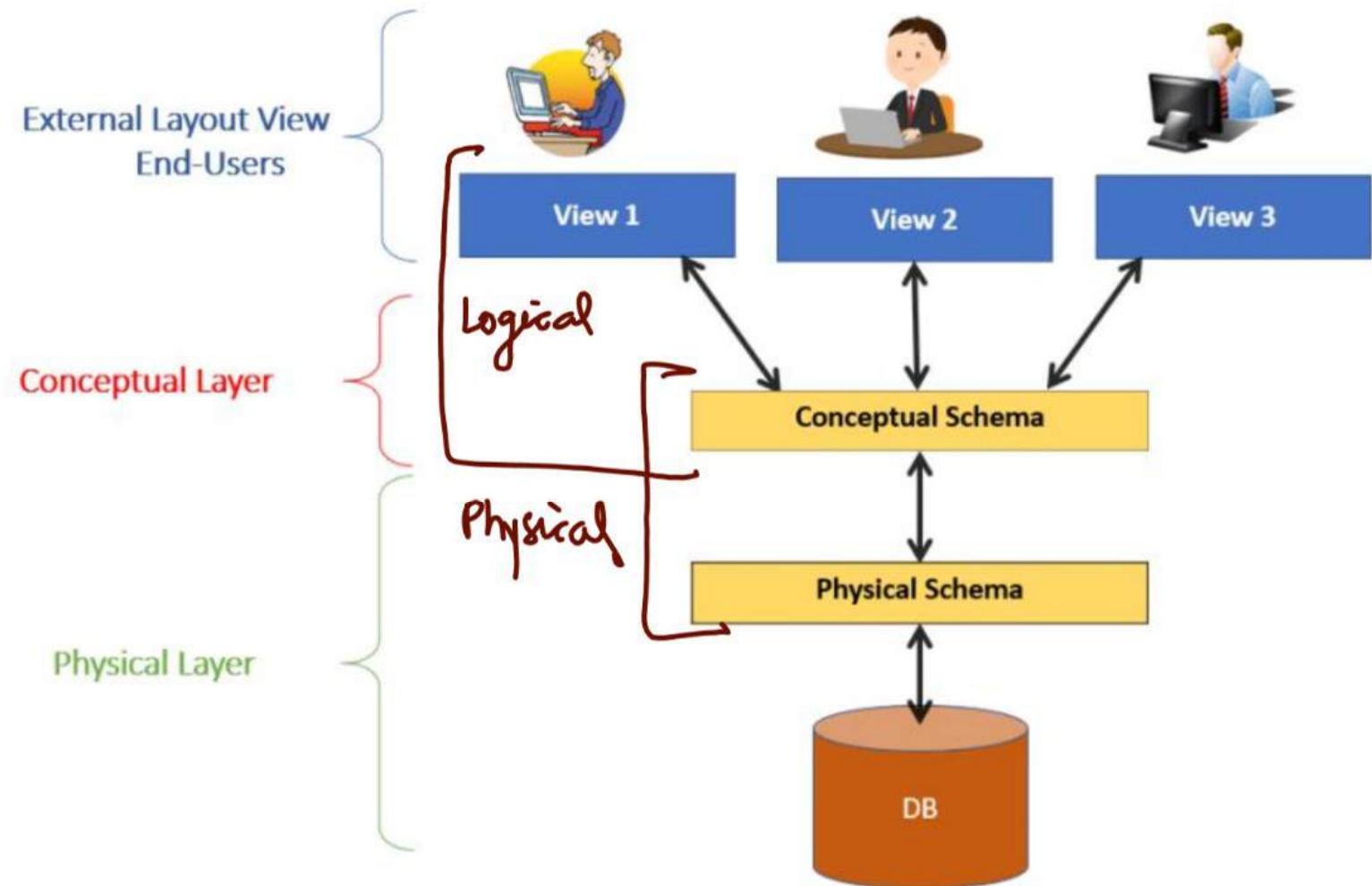
A. Logical mapping

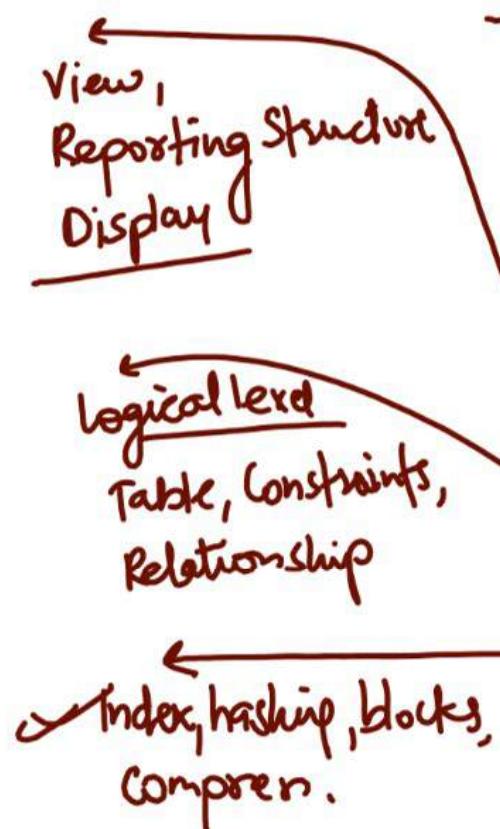
B. Physical mapping

C. Conceptual mapping

D. More than one of the above

E. None of the above





2. In the three-level architecture of DBMS, which level describes how the data is stored physically?

DBMS की three-level architecture में कौन-
सा स्तर बताता है कि data physically कैसे stored है?

- A. External level
- B. Conceptual level
- C. Internal level**
- D. More than one of the above
- E. None of the above

Physical level
Data कैसे stored

A = Data Manipulate

Select, Insert, Update, Delete

B = Data Definition

Create, Alter, Drop, Insert

C = Data Control

Grant, Revoke

1. Which component of DBMS is responsible for defining the logical structure of the database?

कौन-सा DBMS component database की logical structure define करता है?

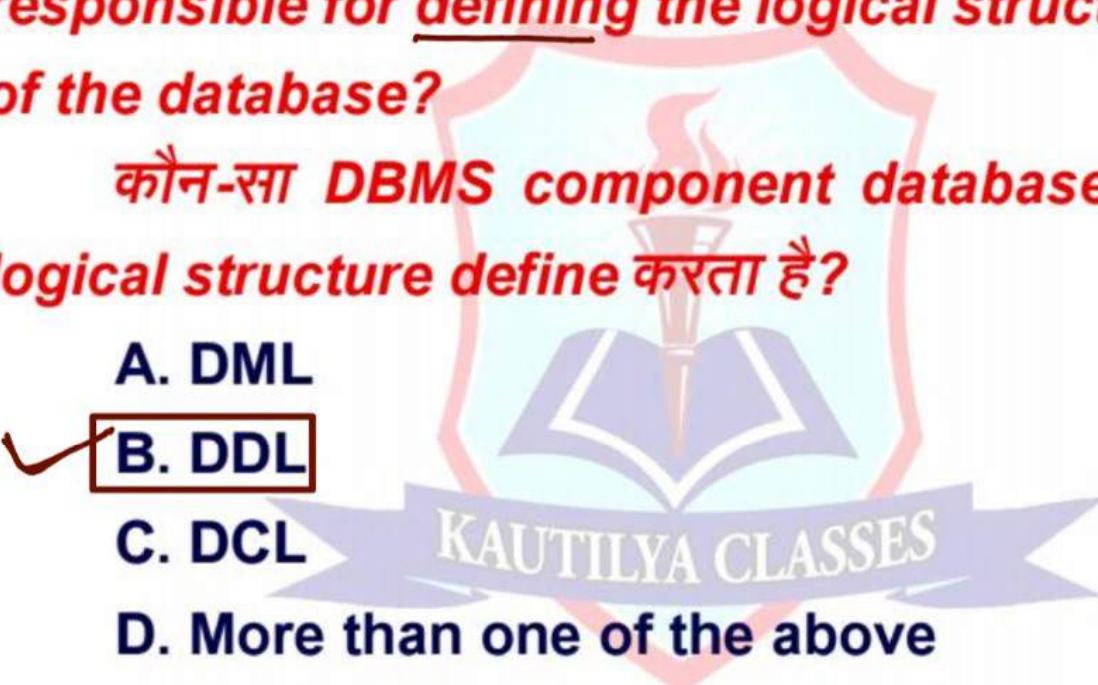
A. DML

B. DDL

C. DCL

D. More than one of the above

E. None of the above



KAUTILYA CLASSES

Algorithm	Stable?	In-Place?	Adaptive?
Bubble Sort	Yes	Yes	Yes
Insertion Sort	Yes	Yes	Yes
Selection Sort	No	Yes	No
Merge Sort	Yes	No	No
Quick Sort	No	Yes	No
Heap Sort	No	Yes	No
Counting Sort	Yes	No	No

20. Which of the following sorting algorithms is not stable?

कौन-सा सॉर्टिंग एल्गोरिद्धि स्थिर नहीं है?

-
- A. Merge Sort
 - B. Insertion Sort
 - C. Heap Sort ✓**
 - D. More than one of the above
 - E. None of the above

19. If there are n nodes in a perfect binary tree, the number of leaf nodes is-

यदि किसी परफेक्ट बाइनरी ट्री में n नोड्स हैं, तो पत्तियों की संख्या-

- A. $(n+1)/2$
- B. $n/2$
- C. $\log_2 n$
- D. More than one of the above
- E. None of the above

18. The time complexity for deleting a node in a singly linked list when a pointer to the node is given is-

यदि हटाए जाने वाले नोड का पॉइंटर दिया गया है, तो सिंगली लिंक्ड लिस्ट में डिलीशन की समय जटिलता-

- A. $O(1)$
- B. $O(n)$
- C. $O(\log n)$
- D. More than one of the above
- E. None of the above

$O(\underline{V}) + O(\underline{E})$
Array
 $\checkmark O(V+E)$

17. For a graph with V vertices & E edges,
adjacency list representation takes-

एक ग्राफ में V वर्टेक्स और E एज हों तो
adjacency list की स्पेस जटिलता-

- A. $O(V^2)$
- B. $O(V + E)$**

- C. $O(E^2)$
- D. More than one of the above
- E. None of the above

16. In recursion, stack overflow occurs when-

रिकर्सन में, स्टैक ओवरफ्लो तब होता है जब-

- Recursion infinite* ← A. Base case never reached
- ↑ nested calls, Space can be ended.* ← B. Too many nested calls
- C. Compiler optimization fails
- D. More than one of the above
- E. None of the above

15. *Huffman coding ensures optimal prefix code because-*

Greedy
Algorithm

हफ्फमैन कोडिंग सबसे अच्छा प्रीफिक्स कोड पक्का करती है क्योंकि-

- A. Uses divide and conquer
- B. Uses greedy choice property**
- C. Uses dynamic programming
- D. More than one of the above
- E. None of the above

14. *The worst-case time complexity of deleting a node in a BST is equal to-*

BST में किसी नोड को डिलीट करने की सबसे खराब टाइम कॉम्प्लेकिसिटी बराबर है-

- A. $O(\log n)$
- B. $O(n)$
- C. $O(n \log n)$
- D. More than one of the above
- E. None of the above

* Comparison Based → Merge, Quick,
Heap, Bubble

* Not Comparison Based → Counting,
Radix

13. Which sorting algorithm is NOT
comparison-based?

इनमें से कौन सा सॉर्टिंग एल्गोरिदम तुलना-
आधारित नहीं है?

- A. Heap sort
- B. Merge sort
- C. Counting sort**
- D. More than one of the above
- E. None of the above

Binary Search

✓ Middle element

गहीं Key हैं

तो Best case = $O(1)$

12. Which case of binary search gives $O(1)$ time?

बाइनरी सर्च का कौन सा केस $O(1)$ टाइम देता है?

A. Always

B. When key is at middle index

C. When array is sorted in reverse

D. More than one of the above

E. None of the above

11. Which of these operations is not possible in O(1) time in a linked list?

Linked list में इनमें से कौन-सा O(1) समय में संभव नहीं है?

- A. Insert at head
- B. Insert at tail (without tail pointer) 0(n)
- C. Delete from head
- D. More than one of the above
- E. None of the above

BTree or B+Tree

↙ Secondary Storage

10. *Where are B-trees primarily used?*

B-tree मुख्य रूप से कहाँ उपयोग होता है?

- A. Main memory searching
- B. Disk-based indexing
- C. Graph processing
- D. More than one of the above
- E. None of the above

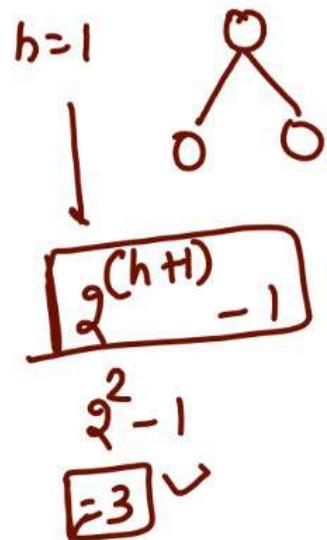
9. How does an AVL tree maintain balance?

AVL tree किसका उपयोग करके balance maintain करता है?



- A. Balance factor
- B. Height difference of nodes
- C. Rotations – Tree unbalanced = Rotations
- D. More than one of the above
- E. None of the above

LL
RR
LR
RL



8. A full binary tree of height h has maximum nodes-

h ऊंचाई वाले एक पूरे बाइनरी ट्री में ज्यादा से ज्यादा नोड्स होते हैं-

A. $2^h - 1$

B. $2^{(h+1)} - 1$

C. h^2

D. More than one of the above

E. None of the above



KAUTILYA CLASSES

7. Which sorting algorithm has worst-case $O(n^2)$?

कौन-सा sorting algorithm worst case में $O(n^2)$ रखता है?

- A. Bubble sort – Worst case = $O(n^2)$
- B. Selection sort – $O(n^2)$
- C. Insertion sort – $O(n^2)$
- D. More than one of the above**
- E. None of the above

* Hashing

↓
2 Keys = Hash Code same
Collision ✓

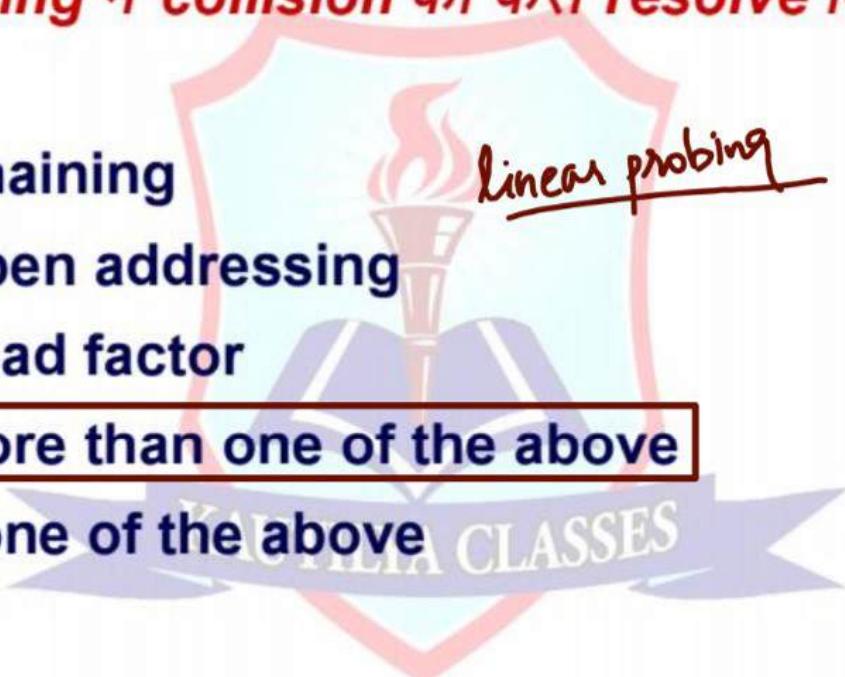
→ next
avl empty
Space

6. *How are collisions resolved in hashing?*

Hashing में collision को कैसे resolve किया जाता है?

- ✓ A. Chaining
- ✓ B. Open addressing
- ✗ C. Load factor
- ✓ D. More than one of the above
- E. None of the above

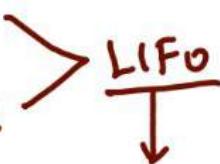
linear probing



*Recursion

मा

Function Call



✓ Runtime Call
Stack

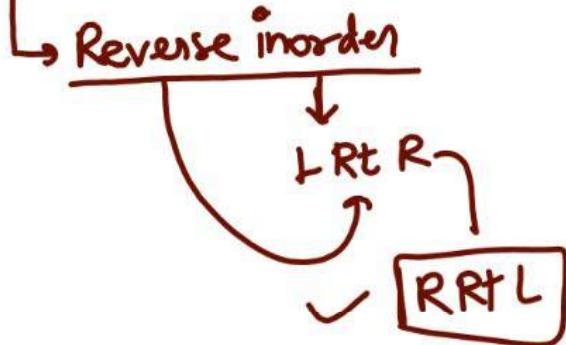
5. Stack uses which memory structure?

Stack किस memory structure का उपयोग

करता है?

- A. Heap → Dynamic Memory Allocation
- B. Recursion tree → Visualizations
not in Memory
- C. Runtime call stack**
- D. More than one of the above
- E. None of the above

Inorder = L Rt R
Preorder = Rt L R
Postorder = L R Rt



4. *Which traversal prints nodes in decreasing order in a BST?*

BST में कौन सा ट्रैवर्सल नोड्स को घटते क्रम में प्रिंट करता है?

- A. Inorder
- B. Reverse inorder
- C. Preorder
- D. More than one of the above
- E. None of the above



3. When inserting in doubly linked list, which pointer(s) must be updated?

Doubly linked list में insertion में किन pointers को update करना जरूरी है?

- A. next
- B. prev
- C. Possibly both neighbors
- D. More than one of the above
- E. None of the above

* Pointer Arithmetic

1. Row Major

2. Column Major

Index का पठा लगाने की formula

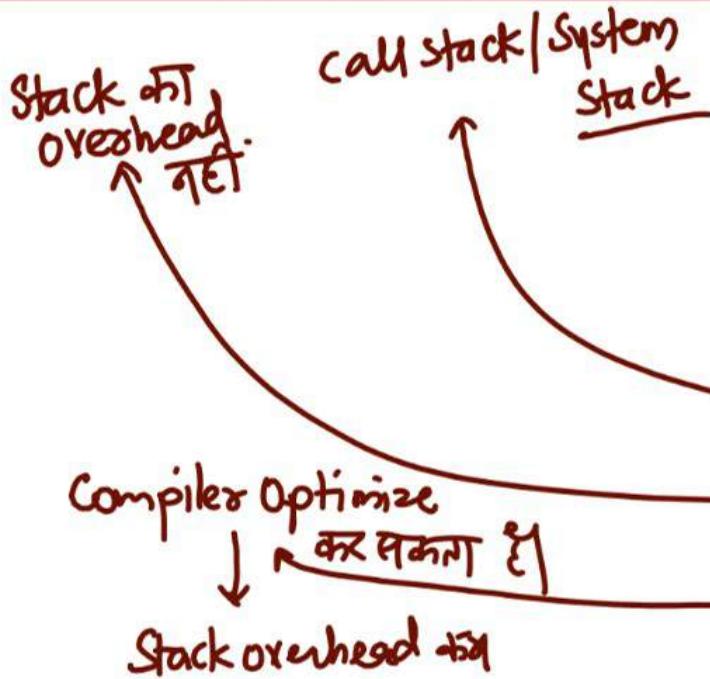
$$(Index-1) \times \text{size} + 0$$

2. *Real reason array index starts from 0 is-*

ऐसे इंडेक्स 0 से शुरू होने का असली कारण है-

- A. Pointer arithmetic becomes efficient
- * B. Offset calculation simpler
- C. Saves one subtraction per access
- D. More than one of the above
- E. None of the above

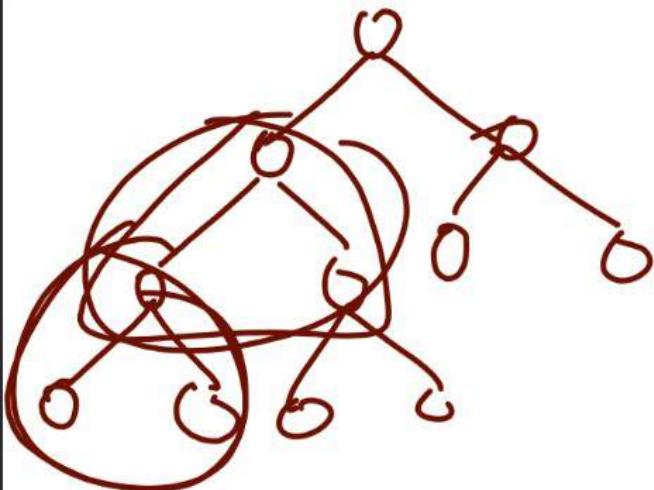
KAUTILYA CLASSES



1. *Practical difference between recursion and iteration is-*

रिकर्सन और इटरेशन के बीच प्रैक्टिकल अंतर यह है-

- A. Recursion uses call stack
- B. Iteration uses loops
- C. Tail recursion reduces overhead
- D. More than one of the above**
- E. None of the above



20. In AVL tree, which rotation is used when left subtree is heavy and its left subtree is also heavy?

AVL ट्री में, जब लेफ्ट सबट्री भारी हो और उसका लेफ्ट सबट्री भी भारी हो, तो कौन सा रोटेशन इस्तेमाल होता है?

- A. Right rotation
- B. Left rotation
- C. Left-right rotation
- D. More than one of the above
- E. None of the above

19. *Actual reason why BFS gives shortest path only in unweighted graphs-*

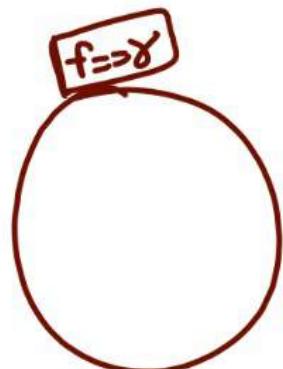
BFS unweighted graph में ही shortest path क्यों देता है-

- A. All edges cost equal
- B. Queue ensures level-wise travel
- C. Weighted edges break level structure
- D. More than one of the above
- E. None of the above

unweighted

`front == rear`

Tag Bit
To remove confusion



18. In circular queue, when does `front == rear` mean EMPTY?

Circular queue में `front == rear` कब EMPTY दर्शाता है?

→ UK = SCHOOL
→ IND = SCHOOL

- ✗ A. Always
- ✓ B. Only when queue initially created
- ✗ C. Only when tag bit used
- D. More than one of the above
- E. None of the above

17. In merge sort, additional space is required because-

Merge sort में extra space क्यों चाहिए?

- ✓ A. New arrays created
- ✓ B. Recursion stack
- ✓ C. Temporary merging buffer
- ✓ D. More than one of the above**
- ✓ E. None of the above

Insert - 1, 2, 3, 4, 5, 6 - -

↓
Each time
Right child

2, 5, 3, 9, 15, 12

Sorted

16. In BST, inserting a sorted set of numbers produces-

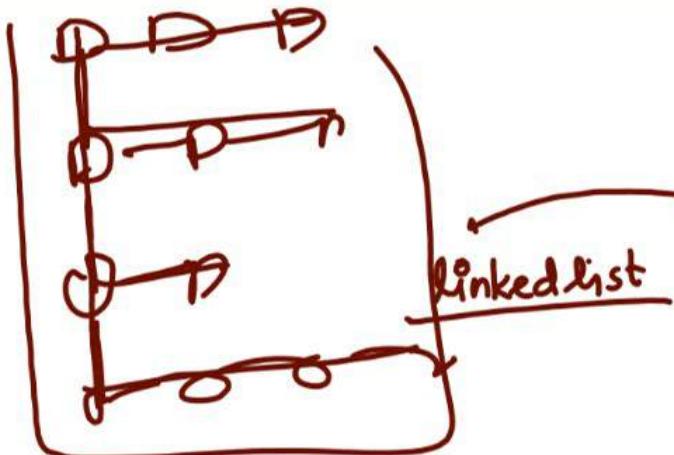
Sorted data BST में insert करने पर क्या बनता है-

- x A. Balanced tree
- B. Skewed linked list structure
- x C. Perfect binary tree
- D. More than one of the above
- E. None of the above

15. In recursion, each function call stores local variables in-

Recursion में हर call के local variables कहाँ store होते हैं-

- A. Heap
- B. Stack frame**
- C. Global segment
- D. More than one of the above
- E. None of the above



14. In adjacency list representation, space required is $O(V + E)$. Why?

एडजेसेंसी लिस्ट रिप्रेजेंटेशन में, जरूरी स्पेस $O(V + E)$ होता है। क्यों?

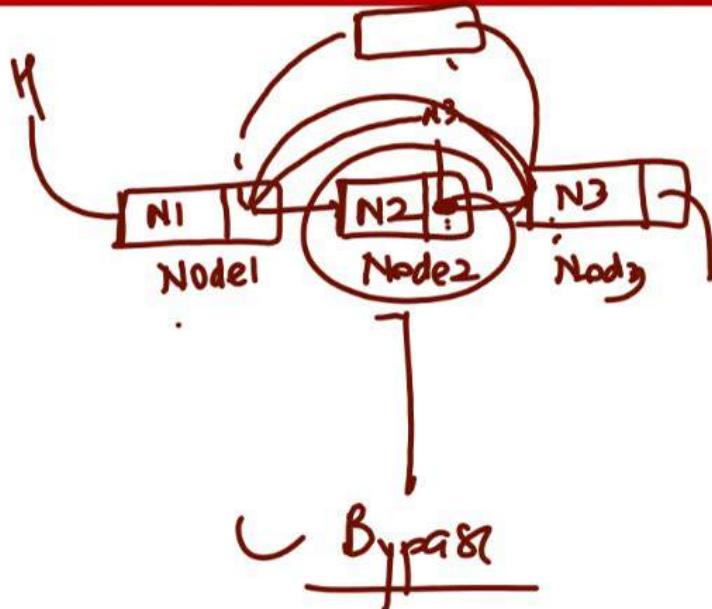
- ✓ A. Each vertex consumes fixed space
- ✓ B. Each edge linked once in list
- ✓ C. Header array + edge nodes
- D. More than one of the above**
- E. None of the above

Independent
clustering

13. Which hash technique guarantees no primary clustering?

कौन-सी hashing technique में primary clustering नहीं होता?

- A. Linear probing → Primary clustering ✓
- B. Quadratic probing → कम, अलग रहीं
- C. Double hashing
- D. More than one of the above
- E. None of the above



12. In a singly linked list, deleting a given pointer node requires-

सिंगल लिंक्ड लिस्ट में, किसी दिए गए पॉइंटर नोड को डिलीट करने के लिए जरूरी है-

- A. Previous pointer
- B. Next pointer**
- C. Head pointer
- D. More than one of the above
- E. None of the above

11. *What happens when we push 6 elements into a stack of size 5?*

जब हम 5 साइज़ के स्टैक में 6 एलिमेंट डालते हैं तो क्या होता है?

- A. Overflow
- B. Last element overwrites data
- C. Program crash
- D. More than one of the above
- E. None of the above

10. *Actual reason binary search fails on a linked list-*

लिंक्ड लिस्ट पर बाइनरी सर्च फेल होने का असली कारण-

- ✓ A. Nodes not contiguous in memory
- ✓ B. No random access
- ✓ C. Next pointer is slow
- ✓ D. More than one of the above**
- E. None of the above

9. Real reason stack is faster than heap-

स्टैक हीप से ज्यादा तेज़ क्यों हैं-

- ✓ Access fast
 - ✓ Push | Pop ↑↓
 - ✗ Heap में fragmentation
- A. Continuous memory
- B. Simple pointer movement
- C. No fragmentation
- D. More than one of the above
- E. None of the above

8. *For graph BFS, what causes infinite loop?*

BFS में infinite loop किससे होगा?

✓ A. No visited array

✗ B. Queue implemented incorrectly

✗ C. Graph disconnected

✗ D. More than one of the above

✗ E. None of the above

→ Bug
→ No infinite loop

7. *Which is the main advantage of threaded binary trees?*

Threaded BST का मुख्य लाभ क्या है?

Traversal
Iterative

- X A. Faster memory allocation
- ✓ B. No recursion needed for traversal
- ✓ C. No NULL pointers wasted
- ✓ D. More than one of the above
- E. None of the above

A = Index का direct
access X

6. In linked lists, why is random access impossible?

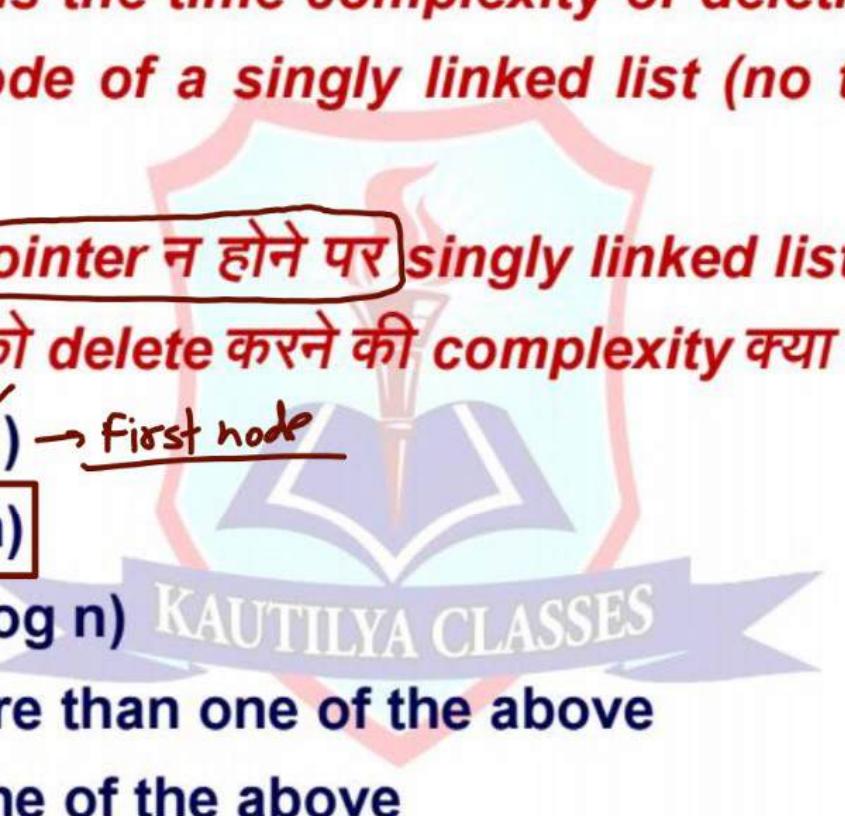
Linked list में random access क्यों संभव

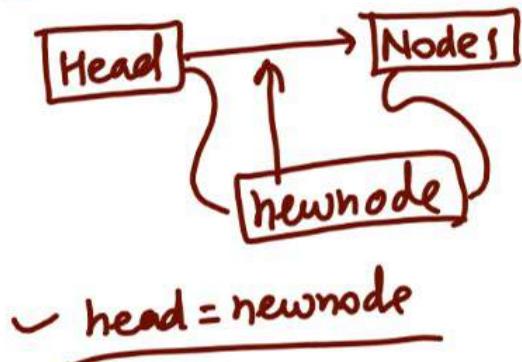
नहीं है?

Regularly pointers
follow ↗

- ✓ A. No contiguous memory
- ✓ B. Need sequential traversal
- ✓ C. Pointer chasing required
- ✓ D. More than one of the above
- E. None of the above

5. *What is the time complexity of deleting the last node of a singly linked list (no tail pointer)?*

-  Tail pointer न होने पर singly linked list के last node को delete करने की complexity क्या है?
- ✓ Whole list must be traversed
 - ✗ A. O(1) → first node
 - ✓ B. O(n)
 - ✗ C. O(log n)
 - D. More than one of the above
 - E. None of the above
- KAUTILYA CLASSES

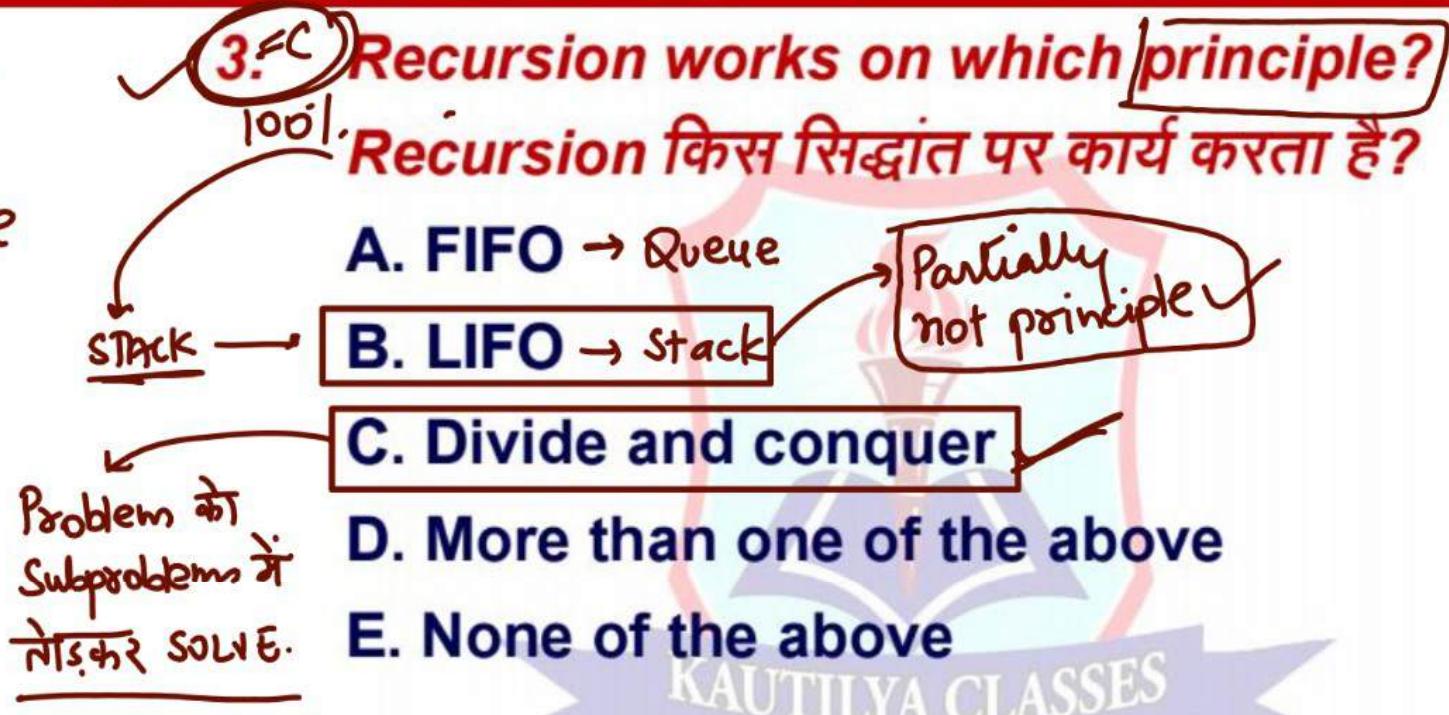
insertion

4. *What happens if you insert a node at the head of a singly linked list?*

अगर आप सिंगली लिंक्ड लिस्ट के हेड पर एक नोड डालते हैं तो क्या होता है?

- ✓ A. New node points to old head
- ✓ B. Head moves to new node
- ✗ C. Tail always changes
- ✓ D. More than one of the above
- E. None of the above

Recursion = Data Structure
 ↓
Stack
 LIFO = not principle
 principle = Divide & Conquer



2D Array representation

- A. Row Major = C, C++
- B. Column Major = Fortran, Matlab.

2. In row-major representation of a 2D array, elements are stored-

2D array के row-major representation में elements कैसे stored होते हैं-

- A. Column by column
- ✓ B. Row by row
- C. Diagonal order
- D. More than one of the above
- E. None of the above

Data = Raw facts & figures
that doesn't anything

↓
Process

✓ Information

→ Name
→ Number

Information

Database

1. Which of the following best defines data in computer science?

कंप्यूटर साइंस में डेटा को इनमें से कौन सबसे
अच्छे से डिफाइन करता है?

- A. Raw facts & figures without context
- B. Processed facts that give meaning
- C. Organized collection of related information
- D. More than one of the above
- E. None of the above

KAUTILYA CLASSES

50. Which of the following are true for parity bit checking?

पैरिटी बिट चेकिंग के लिए इनमें से कौन सा सही है?

- (A) Single parity detects single-bit errors.**
- (B) Cannot correct errors alone.**
- (C) Two-dimensional parity can detect and correct some multiple errors.**
- (D) More than one of the above**
- (E) None of the above**

49. A 3-input majority function outputs 1 when at least two inputs are 1. Which expression equals majority?

एक 3-इनपुट मेजॉरिटी फ़ंक्शन 1 आउटपुट करता है जब कम से कम दो इनपुट 1 होते हैं। कौन सा एक्सप्रेशन मेजॉरिटी के बराबर है?

- (A) $AB + BC + AC$
- (B) $A \oplus B \oplus C$
- (C) $AB + A'B'C$
- (D) More than one of the above
- (E) None of the above

48. Which of the following timing metrics define performance of synchronous pipeline?

इनमें से कौन सा टाइमिंग मेट्रिक्स सिंक्रोनस पाइपलाइन के परफॉर्मेंस को डिफाइन करता है?

- (A) Clock period (determined by slowest stage).
- (B) Pipeline latency (stages \times clock).
- (C) Throughput (inverse of clock period).
- (D) More than one of the above
- (E) None of the above

47. In minimization, use of “don’t care” terms helps by-

In minimization, “don’t care” शब्दों का उपयोग निम्न प्रकार से मदद करता है-

- (A) Allow larger grouping in K-map.
- (B) Reduce number of product terms.
- (C) Possibly increase hazard if misused.
- (D) More than one of the above
- (E) None of the above

46. Which encoding reduces switching noise in address buses?

Address bus switching noise कम करने वाला encoding कौन सा है?

- (A) Binary natural encoding.
- (B) Gray code.
- (C) Excess-3.
- (D) More than one of the above
- (E) None of the above

45. Which of these statements about EEPROM vs EPROM are correct?

EEPROM बनाम EPROM के बारे में इनमें से कौन सा कथन सही है?

- (A) EEPROM erased electrically, EPROM by UV.
- (B) EPROM must be removed to erase by UV.
- (C) EEPROM can be byte erasable in-system.
- (D) More than one of the above
- (E) None of the above

44. In EDA, which minimization technique finds exact minimal SOP for small variable count?

EDA में, कौन सी मिनिमाइज़ेशन तकनीक छोटे वेरिएबल काउंट के लिए एकदम सही मिनिमम SOP ढूँढती है?

- (A) Karnaugh map
- (B) Quine-McCluskey
- (C) Espresso (heuristic)
- (D) More than one of the above
- (E) None of the above

43. Which of the following are causes of dynamic hazards?

इनमें से कौन से डायनामिक खतरों के कारण हैं?

- (A) Multiple path delays.**
- (B) Incomplete logic minimization.**
- (C) Asynchronous input changes.**
- (D) More than one of the above**
- (E) None of the above**

42. Which of the following logic families has CMOS as subfamily?

इनमें से किस लॉजिक फैमिली में CMOS सबफैमिली हैं?

- (A) PMOS
- (B) NMOS
- (C) MOS family
- (D) More than one of the above
- (E) None of the above

41. A minimal 2 level NAND implementation of $F = A \cdot B + C \cdot D$ requires how many NAND gates approximately?

$F = A \cdot B + C \cdot D$ के मिनिमम टू लेवल NAND इम्प्लीमेंटेशन के लिए लगभग कितने NAND गेट्स की ज़रूरत होती है?

- (A) 3
- (B) 4
- (C) 5
- (D) More than one of the above
- (E) None of the above

40. Which of the following comparators in digital design are true?

डिजिटल डिज़ाइन में नीचे दिए गए कम्प्रेटर में से कौन से सही हैं?

- (A) 1-bit comparator can be cascaded for n-bit.
- (B) Equality can be tested by XNOR chain.
- (C) Magnitude compare requires propagate / generate logic similar to adder.
- (D) More than one of the above
- (E) None of the above

39. Which of the following will reduce dynamic power in CMOS?

CMOS में dynamic power कम करने के लिए कौन-सा उपाय प्रभावी है?

- (A) Lowering VDD
- (B) Reducing switching frequency
- (C) Increasing capacitance
- (D) More than one of the above
- (E) None of the above

38. Which of the following slows down TTL gate performance?

TTL gate की performance किससे घटती है?

- (A) Large fan-out
- (B) Long interconnect capacitance
- (C) Heavy loading due to CMOS inputs
- (D) More than one of the above
- (E) None of the above

37. Construct minimal expression:

$F(A,B,C) = \Sigma m(0,1,2,5) + D(7)$. Minimal SOP has how many product terms?

- (A) 1
- (B) 2
- (C) 3
- (D) More than one of the above
- (E) None of the above

36. Which of the following statements about DMA and CPU are true?

DMA & CPU के बारे में कौन सा कथन सही है?

- (A) DMA transfers reduce CPU overhead for bulk transfers.
- (B) During DMA, CPU can execute other instructions but with limited bus access.
- (C) DMA requires device specific controller only for I/O devices.
- (D) More than one of the above
- (E) None of the above

Current leak ↓
Battery life ↑

35. Which two properties make CMOS preferred in battery-powered devices?

CMOS को battery devices में क्यों पसंद करते हैं?

- (A) Low static power consumption.
- (B) High input impedance.
- (C) High speed than ECL.
- (D) More than one of the above
- (E) None of the above

$$\begin{array}{r}
 7 = 0111 \\
 + 8 = \underline{1000} \\
 \hline
 15 = \underline{\underline{1111}}
 \end{array}$$

$$\begin{array}{r}
 (1) \\
 \underline{0111} \\
 0110 \\
 \hline
 \underline{\underline{0101}} \\
 \hline
 1 \quad 5
 \end{array}$$

34. In a BCD adder, if sum > 9 or carry generated, addition of 6 is used. For inputs 7 + 8 what intermediate and final BCD result?

BCD एडर में, अगर sum > 9 है या कैरी जेनरेट होता है, तो 6 का जोड़ इस्तेमाल किया जाता है। इनपुट 7 + 8 के लिए इंटरमीडिएट & फाइनल BCD रिजल्ट क्या होगा?

- (A) 0001 0101 (decimal 15)
- (B) 0001 0101 (1 and 5)
- (C) 0001 0101 both choices same
- (D) More than one of the above
- (E) None of the above

$$\begin{aligned} \text{Min FF} &= \left\lceil \log_2 (10) \right\rceil \\ &= 4 \quad \text{--- } \uparrow \text{ceiling} \end{aligned}$$

33. What is the minimum number of flip-flops required to design a MOD-10 counter?

MOD-10 काउंटर को डिजाइन करने के लिए आवश्यक फिलप-फलॉप की न्यूनतम संख्या क्या है?

- (A) 5
- (B) 3
- (C) 4
- (D) More than one of the above
- (E) None of the above

→ ECL = Fastest



Constant current
Sources

= power drain[↑]

32. Which of the following statements for ECL are correct?

ECL के बारे में कौन-से कथन सही हैं?

- (A) Very fast because transistors never saturate.
- (B) Low noise margin compared to CMOS.
- (C) High static power dissipation.
- (D) More than one of the above
- (E) None of the above

Canonical SOP

1. Each Minterm = पृष्ठ AND Product
2. सभी minterms को OR करके SOP बनाया जाता है।
3. No Simplification

$$\text{minterms} = m_1(1) \\ m_2(3) \\ m_3(7)$$

31. A canonical SOP for function with minterms $m(1,3,7)$ will have how many product terms?

मिनटर्स $m(1,3,7)$ वाले फंक्शन के लिए एक कैनोनिकल SOP में कितने प्रोडक्ट टर्म्स होंगे?

(A) 1

(B) 3

(C) 7

(D) More than one of the above

(E) None of the above

KAUTILYA CLASSES

30. Which of the following are true for NAND gate universal property?

NAND universal होने के बारे में कौन-से सत्य हैं?

- (A) Any gate can be implemented using only NANDs.
- (B) NAND is functionally complete.
- (C) NAND requires pull-up networks in CMOS for implementation.
- (D) More than one of the above
- (E) None of the above



29. Which statements about BCD are correct?

BCD के बारे में कौन-से कथन सही हैं?

- (A) Only decimal digits 0–9 valid.
- (B) Addition of two BCD digits may require correction by adding 6 (0110).
- (C) BCD is weighted code. 8421
- (D) More than one of the above
- (E) None of the above

Static 1 = Output = 1
 Temp = 0 can be

Static 0 = Output = 0
 Temp = 1 can be

Dynamic = $0 \rightarrow 1 \rightarrow 0 \rightarrow 1$
 Multiple Transition ✓

28. Which of the following statements about hazards is correct?

खतरों के बारे में नीचे दिए गए बयानों में से कौन सा सही है?

- ✓ (A) Static-1 hazard: output momentarily becomes 0 when should remain 1.
- ✓ (B) Static-0 hazard: output momentarily becomes 1 when should remain 0.
- ✓ (C) Dynamic hazard: multiple transitions occur due to differing path delays.

✓ (D) MTOTA

(E) NOTA

A = Toggle Feature

B = next step directly
implement

C = T FF naturally toggles
after each clock

✓ Counter वाले में ideal

27. A synchronous 3-bit binary up counter uses which flip-flop commonly and why?

एक सिंक्रोनस 3-बिट बाइनरी अप काउंटर आमतौर पर किस फिलप-फ्लॉप का इस्तेमाल करता है और क्यों?

- (A) JK because it toggles on $J=K=1$.
- (B) D because combinational logic sets next state directly.
- (C) T because it's natural as a divide-by-2 stage.
- (D) More than one of the above**
- (E) None of the above

* Programmable logic array
= Planes AND & OR
Programmable

* ROM = AND Fixed
OR Programmable

* Sparse Graphs: Terms कम
Space ↓

26. Which is true for PLA vs ROM?

PLA और ROM में से कौन सा सही है?

✓ (A) PLA has programmable AND & OR planes. / PLA में प्रोग्रामेबल AND और OR प्लेन होते हैं।

✓ (B) ROM is fixed AND plane, programmable OR via data bits. / ROM फिक्स्ड AND प्लेन है, जो डेटा बिट्स के जरिए प्रोग्रामेबल OR होता है।

✓ (C) PLA is more area-efficient for sparse functions. / PLA स्पर्स फंक्शन के लिए ज्यादा एरिया-एफिशिएंट है।

(D) MTOTA

(E) NOTA

$$PD = 2 \text{ ns}$$

$$= \text{Each Adder} = 2 \text{ Gate}$$

$$= \text{Delay} = 2 \times 2 = 4 \text{ ns}$$

$$= 4 \text{ full adders} = 4 \times 4 \\ = 16 \text{ ns}$$

25. If propagation delay of a gate = 2 ns and a 4-bit ripple adder is built with full adders each having two gate levels in series, rough worst-case delay-

अगर किसी गेट का प्रोपेगेशन डिले = 2 ns है और एक 4-bit रिप्पल एडर फुल एडर के साथ बनाया गया है, जिनमें से हर एक में सीरीज में दो गेट लेवल हैं, तो सबसे खराब स्थिति में डिले-

(A) 8 ns

(B) 16 ns

(C) 24 ns

(D) More than one of the above

(E) None of the above

$12 = 1100$

↓
1010

24. The Gray code for the decimal number 12 is-

दशमलव संख्या 12 के लिए ग्रे कोड है-

- (A) 1000
- (B) 1010
- (C) 1100
- (D) More than one of the above
- (E) None of the above



✓ Two Representations
of zero = Signed Magnitude
= 1's Complement

✓ Addition के बाद
Carry = LSB में मिल

— Signed Magn.

23. Which of the following is true for 1's complement number system?

इनमें से कौन सा 1 के कॉम्प्लीमेंट नंबर सिस्टम के
लिए सही है? AEB = ✓

✓ (A) Two representations of zero exist. /
जीरो के दो रिप्रेजेंटेशन मौजूद हैं।

✓ (B) Addition requires end-around carry.
/ एडिशन के लिए एंड-अराउंड केरी की ज़रूरत होती है।

✗ (C) Sign bit is duplicated in magnitude. /
साइन बिट मैग्नीट्यूड में डुप्लीकेट है।

(D) MTOTA (E) NOTA

Flash ADC



Fastest ADC

$$\begin{aligned}
 * \text{ Comparators} &= 2^h - 1 \\
 &= 2^8 - 1 \\
 &= 256 - 1 \\
 &\boxed{\sqrt{=} 255}
 \end{aligned}$$

22. An 8 bit flash ADC requires how many comparators?

✓ 8 bit Flash ADC में कितने comparators चाहिए?

(A) 256

(B) 255

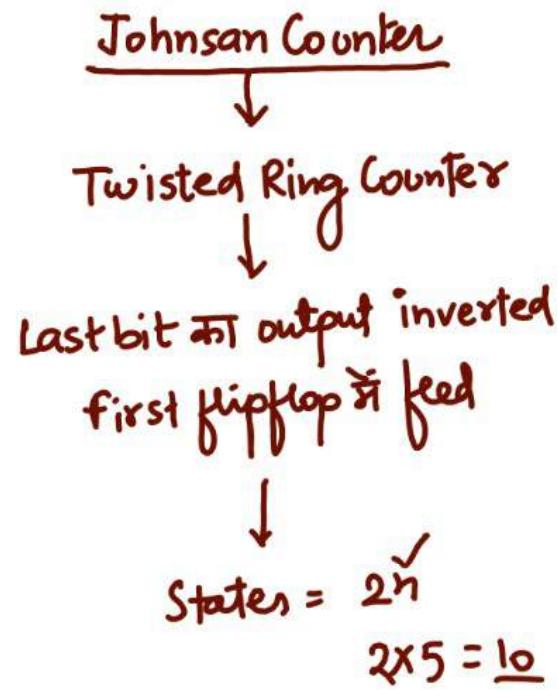
(C) 128

(D) More than one of the above

(E) None of the above



KAUTILYA CLASSES



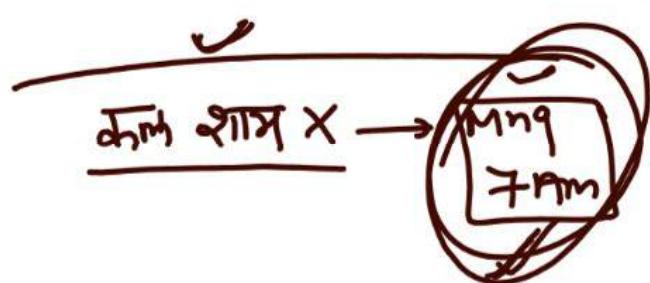
21. A 5 bit Johnson counter cycles through how many distinct states?

5 bit Johnson counter कितने distinct states देता है?

- (A) 5
- ✓ (B) 10
- (C) 16
- (D) More than one of the above
- (E) None of the above



MUX
 Multiple inputs से एक
 को select कर
 sequential output



20. Which of the following circuits is used to convert parallel data into serial data?

निम्न में से किस सर्किट का उपयोग समानांतर डेटा (parallel data) को क्रमिक डेटा (serial data) में बदलने के लिए किया जाता है?

- (A) Multiplexer / मल्टीप्लेक्सर
- (B) Demultiplexer / डीमल्टीप्लेक्सर
- (C) Decoder / डिकोडर
- (D) More than one of the above
- (E) None of the above

$$\text{Sum} = A \oplus B \oplus \text{Cin}$$

$$\text{Cout} = \overline{AB} \underset{\text{AND}}{+} \overline{(A \oplus B)} \underset{\text{OR}}{=} \overline{\text{XOR}}$$

19. Which is true for a full-adder implemented with two half-adders and an OR gate?

दो half-adders + OR से बनाया full-adder के बारे में कौन-सा कथन सही है?

- (A) Sum = A \oplus B \oplus Cin.
- (B) Cout = AB + Cin(A \oplus B).
- (C) Using two half-adders **always** gives minimum delay. KAUTILYA CLASSES X
- (D) More than one of the above
- (E) None of the above

ADC Resolution =

$$= \frac{1}{2^n} \quad (n=12)$$

$$= \frac{1}{2^{12}}$$

$$\checkmark \boxed{= \frac{1}{4096}}$$

18. A 12-bit ADC has resolution-

12-bit ADC की resolution क्या होगी-

(A) 1/1024

(B) 1/2048

(C) 1/4096

(D) More than one of the above

(E) None of the above

KAUTILYA CLASSES

$$(7B9)_{16} = (11)_2$$

↳ Total 1s = 9.

$$\begin{array}{r}
 7 \ B \ 9 \\
 \downarrow \quad \downarrow \quad \downarrow \\
 0111 \quad 11 \quad 1001 \\
 \hline
 1011
 \end{array}$$

17. Convert $(7B9)_{16}$ to Binary and choose correct number of 1s-

$(7B9)_{16}$ को binary में बदलकर 1s की संख्या चुनें-

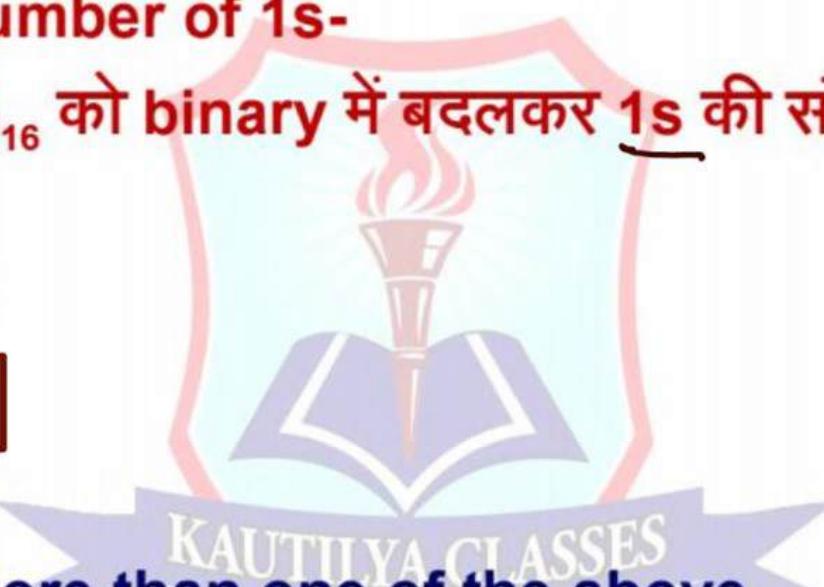
(A) 7

✓ (B) 8

(C) 9

(D) More than one of the above

(E) None of the above



16. Which of following codes guarantees single-bit error change between adjacent values?

इनमें से कौन सा कोड आस-पास की वैल्यू के बीच सिंगल-बिट एरर बदलाव की गारंटी देता है?

- (A) BCD
- (B) Excess-3
- (C) Gray Code
- (D) More than one of the above
- (E) None of the above

$$\begin{array}{l}
 \text{Group} \\
 \downarrow \\
 2^k = \text{eliminates } k \text{ variables}
 \end{array}$$

$$2^2 = 4$$

$$k=2$$

15. In a K-Map, grouping 4 adjacent 1s eliminates how many variables from the term?

K-Map में, ④ आसन्न (adjacent) 1s का समूहन (grouping) शब्द (term) से कितने चर (variables) को समाप्त करता है?

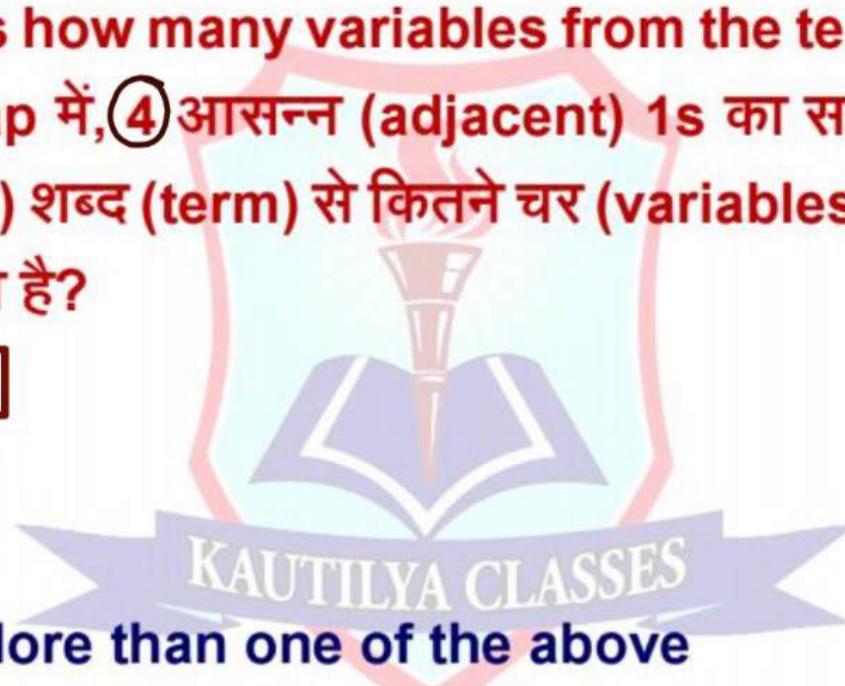
(A) 2

(B) 3

(C) 4

(D) More than one of the above

(E) None of the above



KAUTILYA CLASSES

= Positive max = $+1$
 → overflow
 MSB Flips
 $0 \text{ to } 1$
 = Negative Min = -1
 $1 \text{ to } 0$

14. If a 16-bit 2's complement number is increased by 1, overflow will occur when-

यदि 16-bit 2's complement संख्या में 1 जोड़ें, किस स्थिति में overflow होगा-

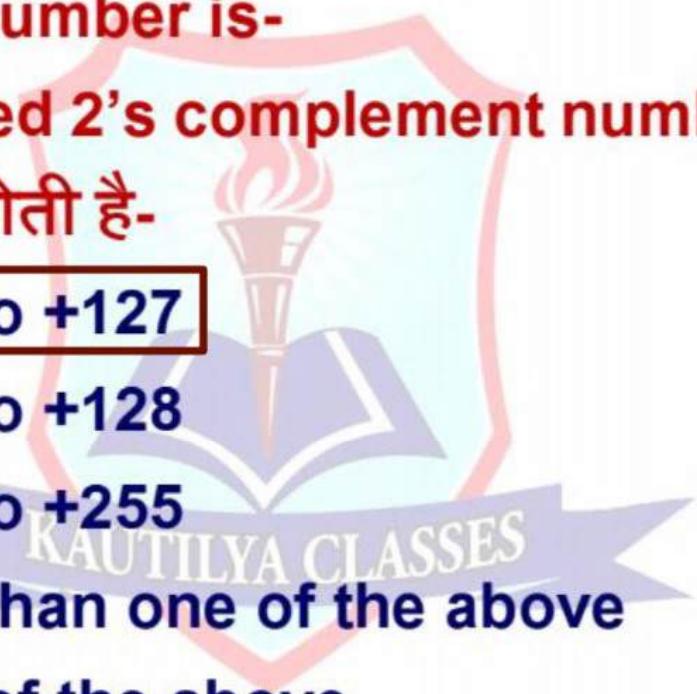
- (A) MSB changes from 0 to 1
- (B) MSB changes from 1 to 0
- (C) Both A and B
- (D) More than one of the above
- (E) None of the above

$$\begin{aligned}
 \text{Range} &= 2^{n-1} - 2^{n-1} - 1 \\
 &= 2^7 - 2^7 - 1 \\
 &= 128 - 128 - 1 \\
 &= \boxed{-127}
 \end{aligned}$$

13. The range of an 8-bit signed 2's complement number is-

8-bit signed 2's complement number
की range क्या होती है-

- ✓ (A) -128 to +127
 (B) -127 to +128
 (C) -255 to +255
 (D) More than one of the above
 (E) None of the above



12. Which of the following codes is self-complementing?

कौन सा कोड self-complementing होता

है?

~~(9-digit) + 3
3 Add ✓~~

(A) Gray

(B) Excess-3

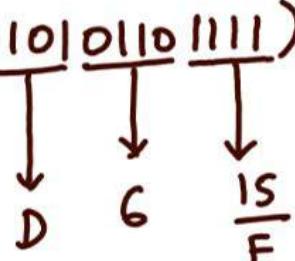
(C) BCD

(D) More than one of the above

(E) None of the above

KAUTILYA CLASSES

$$(110101101111)_2 = (?)_{16}$$



11. The hexadecimal value of-

$$(110101101111)_2$$

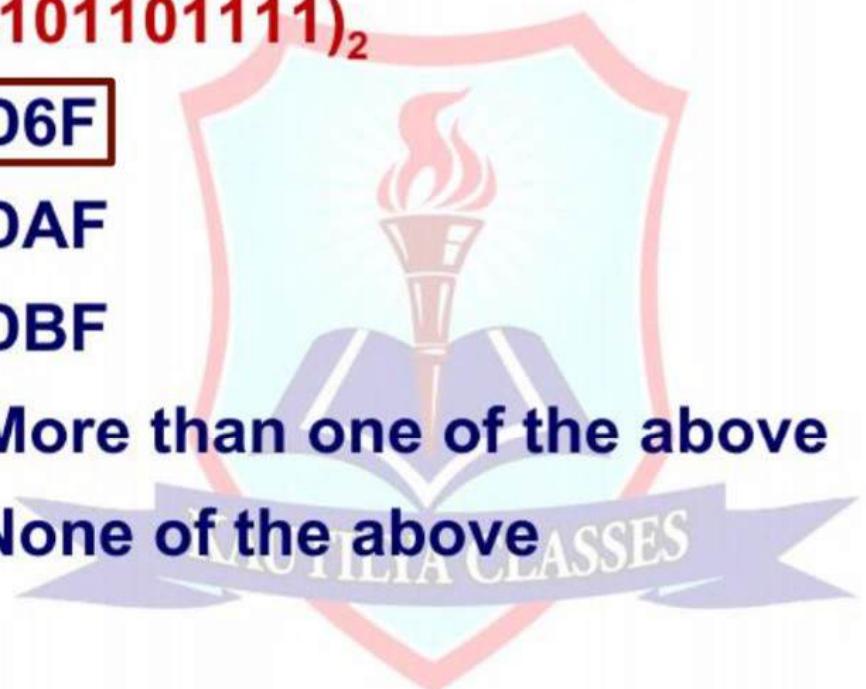
(A) D6F

(B) DAF

(C) DBF

(D) More than one of the above

(E) None of the above



10. What is the main function of encoder?

Encoder का main function क्या है?

- ✓ General Decoder ← (A) Convert binary to decimal
 ← (B) Convert decimal to binary
Actual Definition ← (C) Convert 1-of-N input to binary code
 × (D) More than one of the above
 (E) None of the above

$$\begin{array}{r} A+B+C_{in} \\ \hline \text{Output - } 2 \\ \text{sum carry} \end{array}$$

9. A full adder has how many inputs?

Full adder में कितने inputs होते हैं?

- (A) 2
- (B) 3**
- (C) 4

- (D) More than one of the above
- (E) None of the above



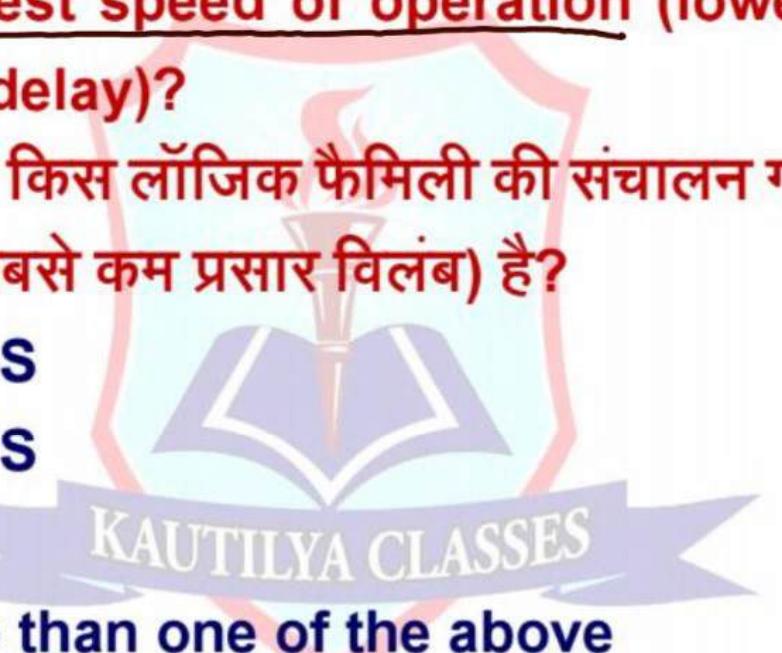
Speed ↑ = Propogation Delay ↓

ECL > TTL > NMOS > CMOS
↓
→ Fastest ↑
→ delay ↓

8. Which of the following logic families has the highest speed of operation (lowest propagation delay)?

निम्न में से किस लॉजिक फैमिली की संचालन गति सबसे अधिक (सबसे कम प्रसार विलंब) है?

- (A) CMOS
- (B) NMOS
- (C) ECL**
- (D) More than one of the above
- (E) None of the above



KAUTILYA CLASSES

$$2^5 = \underline{32}$$

7. How many minterms are possible for a 5-variable function?

5-variable function में कितने minterms होते हैं?

- (A) 16
- (B) 32
- (C) 64
- (D) More than one of the above
- (E) None of the above



$$F = A'B + AB'$$

XOR = Inequality

$A'B + AB'$	$\begin{array}{cc} A & B \\ 0 & 0 \end{array}$	0
$\boxed{\begin{array}{cc} A & B \\ 0 & 1 \end{array}}$	$\begin{array}{cc} A & B \\ 0 & 1 \end{array}$	1
$\boxed{\begin{array}{cc} A & B \\ 1 & 0 \end{array}}$	$\begin{array}{cc} A & B \\ 1 & 0 \end{array}$	1
$\boxed{\begin{array}{cc} A & B \\ 1 & 1 \end{array}}$	$\begin{array}{cc} A & B \\ 1 & 1 \end{array}$	0

$$AB + A'B$$

6. The minimal SOP form of $F = A'B + AB'$ is-

$F = A'B + AB'$ का न्यूनतम SOP रूप है-

- (A) A XOR B
- (B) $(A+B)'$
- (C) A XNOR B
- (D) More than one of the above
- (E) None of the above

Equality

$$\begin{aligned}
 & A + A'B \\
 & \overbrace{(A+A') \cdot (A+B)}^{\text{Distribution law}} \\
 & \boxed{1 \cdot (A+B)} \quad \text{Ans *} \\
 & \text{Intermediate form} \\
 & \overbrace{A+B}^{\text{A already}} \\
 & \boxed{A}
 \end{aligned}$$

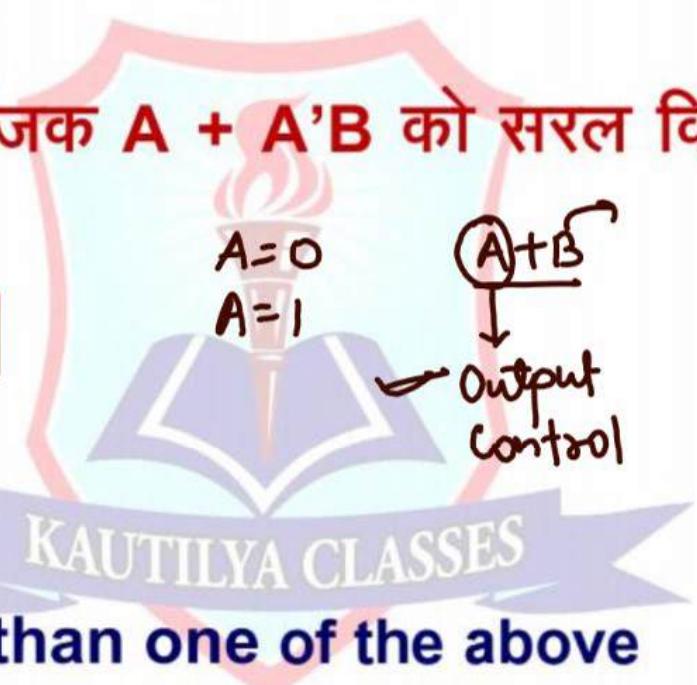
5. The Boolean expression $A + A'B$ simplifies to-

(A) बूलियन व्यंजक $A + A'B$ को सरल किया जाता है-

- (A) $A + B$
- (B) A

(C) B

- (D) More than one of the above
 (E) None



A = 0
A = 1

$\overbrace{A+B}^{\text{Output Control}}$

Two Representations

↓
-0 & +0

एक ही तरीके
से 0 को
Represent करता है

4. Which representation avoids the problem of “two representations of zero”?

कौन सा रिप्रेजेंटेशन “जीरो के दो रिप्रेजेंटेशन” की प्रॉब्लम से बचता है?

- (A) Signed magnitude → -0 & +0 ✓
- (B) 1's complement → -0 & +0 ✓
- (C) 2's complement**
- (D) More than one of the above
- (E) None of the above

Weighted Code = इन Bit का
Weight Fixed.

3. Which code is non-weighted?
कौन सा कोड non-weighted होता है?

Non-
Weighted

✓
B,C

- (A) BCD → 8421 → Weighted
- (B) Excess-3 → Non Weighted
- (C) Gray Code → 1 Bit change on each step
- (D) More than one of the above**
- (E) None of the above

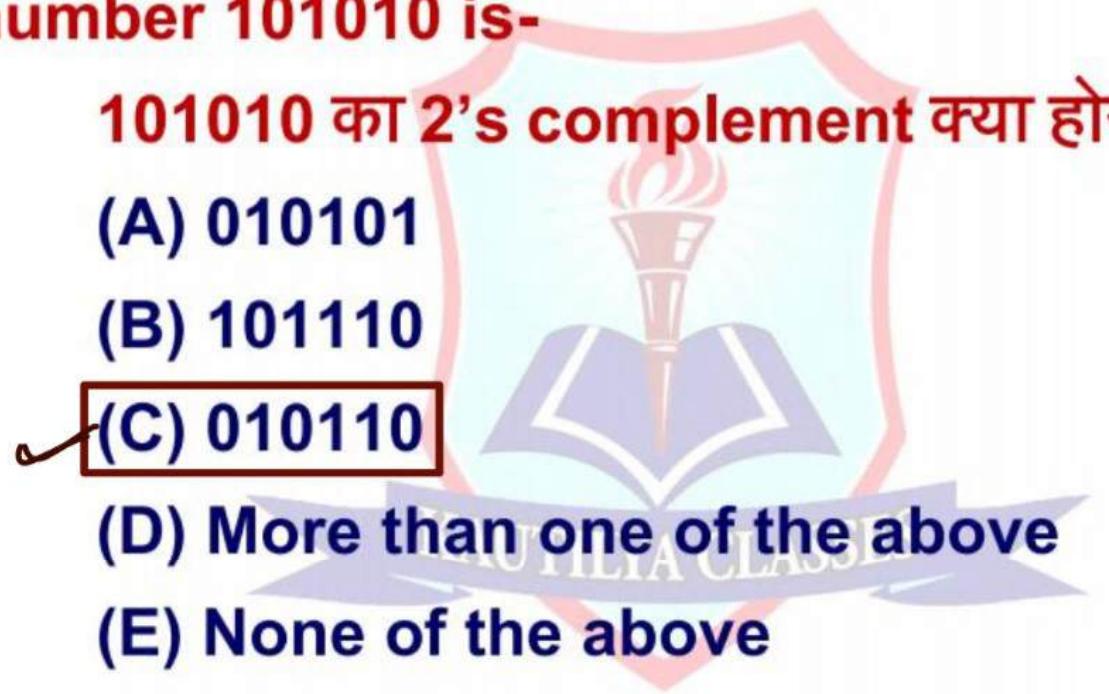
101010
is 010101
+1
2's 010110

2. The 2's complement of binary number 101010 is-

101010 का 2's complement क्या होगा-

- (A) 010101
- (B) 101110
- (C) 010110

- (D) More than one of the above
- (E) None of the above



$Q \rightarrow Q' \rightarrow Q \rightarrow Q' \dots$

Race Condition

$$\begin{array}{l} JK = \\ J = 1 \\ K = 1 \end{array}$$

- ✓ Race Around Condition को stop
- ✓ No Toggle

1. The Race-Around Condition occurs in which type of Flip-Flop?

Race-Around Condition किस प्रकार के फ्लिप-फ्लॉप में होती है?

(A) S-R Flip-Flop \rightarrow No Toggle

(B) J-K Flip-Flop

(C) Master-Slave J-K Flip-Flop

(D) More than one of the above

(E) None of the above