CS Difference Note

TDM is used to transmitting digital signals.

Repeater, Hub- Physical Layer Bridge Switch-Data link layer Router- Network

Email protocols- Application layer

Select id, sum(work_hour) from employee where work_hour>6 group by id;

IP address- Network layer(03)

Project scheduling $\begin{cases} PERT - program\ evalution\ and\ review\ technique \\ CPM - critical\ path\ method \end{cases}$

A derived class inheritance attributes from a super class.

Multiple inheritance in java implemented by- interface

Source code is a(an) source of command.

Real time OS- RT Linus, VRTX, and Linux

RPC-remote procedure call

Previous step calculation in – dynamic programming (Fibonacci Series, Tower Of hanai, Matrix chain multiplication, project scheduling)

Linked list can be implemented – array+pointer

Merge sort is more efficient and work faster than quick sort in case of large array size or dataset. Whereas quick sort is more efficient and work faster than merge sort in case of small array size or dataset.

Merge sort	Quick sort
The array parted into just two halves (n/2)	Splitting of array of element is in any ration. Not divided into halves/half
Worst case -O(nlog n)	$O(n^2)$
Any size of array work well	Work well in small size of array
Sorting method-external	Internal

Most efficient sorting algorithm quick sort. Best & average case O(n log n)

BFS work better when user searches for the vertices that stay closer to given source. DFS work better when the user can find the solutions way from any given source the amount of memory required for BFS is more than that of DFS.

BFS is more suitable for finding the shortest path or closest node to the starting node.

DFS suitable for finding longest path or farthest node for the staring node.

Dynamic memory allocation header fine including-*#include<stdlib.h>*

Microprocessor following sequence-fetch, decode, execute

Android API (14)-34

Hide the internal implementation is called Encapsulation.

RPC-Remote procedure call

Divided & Conquer	Dynamic Programming
It is recursive	It is not recursive
Top down approach	Bottom up approach
Sub problem depend each other	Sub problem are inter dependent
Merge Sort , Binary Search	Matrix Multiplication

Industrial Revelation (IR) 4.0

Element

- Cloud computing
- Internet of things
- Location detection technology
- Big data analysis
- Smart sensor
- Authentication & fraud detection

Advantage of Cloud Computing

- Lower cost of computer user
- Lower IT Infrastructure
- Less maintenance cost
- Low software cost
- Unlimited storage capacity

Disadvantage

- Constant internet connection
- Data might be secure?

Services of cloud computing

- Infrastructure as a services (IaaS)
- Platform as a services (PaaS)
- Software as a services (SaaS)
- Network as a services (NaaS)
- Cloud user as a services (CuaS)

Service Name	Cloud Service
Search engine for a web server	SaaS
Google Docs	SaaS/AssS
Microsoft Azure	IaaS/PaaS/SaaS
Drop Box	IaaS/SaaS
Amazon Web Services(AWS)	IaaS/PaaS/SaaS

Software Development Procedure

Requirement gathering and analysis ⇨ Design ⇨ Implementation ⇨ Testing ⇨ Deployment ⇨ Maintenance

Agile model	Waterfall model
Increment and iterative approach to software design	Software how sequential from start to end point
Considered unstructured compared to the waterfall model	Waterfall model are more secure because plan oriented
Tester and developer work together	Tester work separated from developer
User acceptance is preformed	User acceptance is performed at end of the project
Documentation attends less priority s/w development	Documentation top priority

Combination circuit	Sequential circuit
Easier design and handle	Not easy to design
Clock signal are not required	Required
Depend on present input	Present input and present state
Memory is not required	Memory required (feedback,back state)
Faster logic circuit	Slower than combinational circuit
Fig	Fig

LED	LASER
Light Emitting Diode	Light Amplification by stimulated emission of radiation
Slow response	Fast
Electron luminance	Stimulated emission
Low cost economically	High cost specific application

Broadcast	Multicast
One sender and multiple receiver	One or more sender and multiple receiver
Work start or bus topology	Work star, mesh, tree, hybrid topology
It has one to all mapping	It has one to many mapping
Example-Hub	Example-Switch

Static Routing	Dynamic Routing
Does not use to complex routing algorithm	Complex routing algorithm
More security	Less security
Manual	Automated
Small Network	Large Network
Additional resource not required	Required additional resource

Multitasking	Multithreading
Many task by CPU	Many thread create by process which consume power is increasing
Multitasking involves CPU switching between task	Switch is not often involved between the thread
Processes share separate memory	Process are allocated same memory
Slow compare to multithreading	Fast
Multitasking component involves multi processing	While multithreading component does not involves multiprocessing

Backup Command-

sudo mysqldump –u[user] –p[DatabaseName]>[filename].sql

Restore Command-

mysql –u[user]-p[DatabaseName]<[filename].sql

MIS Management Information System	DSS Decision Support System
Focus on efficiency	Focus effectiveness
Corporate database are used	Special Database needs
Focus on data storage	Focus on manipulation
Depend on computer	Dependent on management juridiction
Focus on information system	Focus on decision making support and analysis

TDM	FDM
Time division multiplexing	Frequency division multiplexing
Digital Signal, Analog Signal	Analog Signal
Low conflict	High conflict
Simple	Complex
Efficient	inefficient
Wifi	WiMax

LAN-Local Area Network	MAN-Metropoliton Area Network
Does not guarantee quality of services	Guaranty of quality of services
100m range	50-90- km range
Short rage technology	Long range technology
Transmit 54 mbps	Transmit up to 70 mbps

Why analog are more accuracy?

Analog computer provided us continuous information but digital computer provided discrete information.

2023 binary- 1111 1100 111

Microprocessor speed

- Number of core
- Cache memory
- Clock speed
- Bus speed
- Word size
- Instruction set processing techniques

The phases of compiler lexical analysis, syntax analysis, type checking -front end

Intermediate code generation

Register allocation, machine code generation, assembly and linking -Backend

Compiler	Interpreter
Takes entities program as input	Single instruction as input
Intermediate code generated	No intermediated code generated
Condition statement executes faster	Condition statement executes slower
Program does not need to compile every time	Every time high level program convert into low level program
C,C++,C#	PHP,Python,Ruby

Procedural oriented programming	Object oriented programming (OOP)
Top down approach	Bottom up approach
No access specifier	Have access specifier (private, protected, public)
Add new data is not easy	Easy
Overriding is not possible	Possible
Function is more than importance of data	Data is imported than function
C, Fortern, pascals	C++,java, python

Overloading	Overriding
Same name but different parameter having different type order	Sub class has method with same name and exactly the same name and parameter
Compile time	Runtime
Inheritance not required	Inheritance required
Must have different signature	Must have same signature

Difference between Graph & Tree

Tree	Graph
Only one path between two vertices	More than one path is allowed
It has exactly one root node	Graph doesn't have a root node
No loops are permitted	Graph can have loop
Less complex	More complex comparatively
Traversal Technique Pre-order, In-order,Post-order	Breadth first search & Depth First Search
Hierarchical	Network
n-1 edges	Not defined

Queue Application

Single share resource like a printer, CPU Scheduling, call center phone system, interrupt in real time system, FIFO services interrupt handled

Stack Application

Reverse of the word, parsing, Expression, conversion (infix- prefix)

Algorithm Expressing Method - Flow chat, Pseudocode, programming language

MAC Address	IP Address
Media access control	Internet protocols address
Identification that is assigned to NIC	Identification in network addresses
MAC defines devices identification	Connected to the network
Separated by colon	Separated by dot
Hardware oriented	Software oriented
Mac address can be used for broadcasting	Broadcasting or multicasting
Identification by local network	Global network

Digital Signature-

Data integraty (message is real?), authentication, non- repudiation

Bit-Binary Digit Byte-Binary Term

HTML5 tag

- <audio> - sound content
- <embed>- container external application
- <source>-text tracks for media element like as audio, video
- <video>- video or movie
- Track
-

Latch	Flip-Flop
Latch is transparent- because input is directly connected to output when enable is high.	Flip-Flop is a pair of latch.
Less area	More area because it's contain two latch
Less power	More power
Fast	Slow
Circuit analysis is complex	Circuit analysis is easy

DFA	NFA
Backtracking is allowed in DFA.	Not allow
DFA can be understand as one machine	NFA can be understood as multiple little machine computing at the same time
DFA can not use empty string transition	NFA can use empty string transition
DFA is more difficult to construct	NFA is easier to construct

Alpha testing	Beta testing
Alpha testing performed at Developer's site	Beta testing is performs at client location or end of the product
Reliability and security testing are not performed in depth	Reliability, security, Robustness are checking
It's involves white box and black box techniques	Typically uses black box testing
Required lab environment	Does not required lab environment.
Long execution cycle	Few week of execution

Verification	Validation
Static practices of verifying document, design, code and program	Dynamic mechanism validating and testing the actual product
Does not involve executing the code	Always involves executing of program
Human based checking document & file	Computer based
Generally come first done by validation	After verification
Verification is to check whether the software conform to specification	Software meet to consumer expectaion and requirement

Compile , debug, execute java program- JDK

Networking framework

Software layer-Application, presentation, session, transport and network layer

Hardware layer- Data link and Physical layer

Media layer- Network, Data link and Physical layer

Host layer- Application, presentation, session, transport

Cloud computing is a stateless system

CPU work fast BitWiseOR

RTOS- Real Time Operating System

Array access method- sequential /ramdom

Asymmetric key- Public Key

Compared to CISC>RISC processor faster
(Complex Instruction Set Computers , Reduced Instruction Set Computers).

Difference between CISC & RISC Architecture

Basic	RISC	CISC
Emphasis on	Software	Hardware
Includes	Single clock	Multi-clock
Instruction-set size	Small	Large
Instruction formats	Fixed(32-bit) format	Varying formats(16-64 bits each instruction)
Addressing mode used	Limited to 3-5	12-24
Memory inferences	Register to register	Memory to memory
Clock rate	50-150 MHz	33-50MHz

Application of Multiplexers

- Communication system: transmission of data, audio, video
- Computer memory
- Telephone network
- Transmission from the computer system of a Satellite

Process: a program in the execution in called a process. Process isn't the same as program.

Race condition: is a undesirable situation two or more operations at the same time.

SIM-subscriber Identification Module

Circuit switch & packet switch which is better? **Packet switch**

Why: more of the bandwidth of all cables are fully utilized reduce congestion than circuit switch.

Primary key	Unique key
Used to uniquely identify a row/record in database table	uniquely identify all row/record in database table
Does not accept NULL value	Accept only one null value
There can be one primary key in a table	A table can multiple unique keys
Primary key declare PRIMARY KEY constraint	Unique key represented using a UNIQUE constraint
Cann't be change or delete	Unique key value can be modified

NoSQL	RDBMS
Support very simple query language	Support as powerful query language
Has no fixed schema	Has fixed schema
Handle data coming in high velocity	Coming data low velocity
Unstructured or Semi-structure data	Only structure data
Data is a very high volume	Moderated volume of data
Decentralized structure	Centralized structure

Table	View
Physical entity that means data is actually stored in the table	The view is a virtual entity
It's used to stored in a data	It's used to extract data from a table
It generated a fast result	Generated a slower result
It is an independent data object	It depend on the table
It is occupies space on the system	It does not occupy space on the system

Public Key Encryption is a Asymmetric Encryption.

Symmetric Key	Asymmetric Key
Private key encryption algorithm	Public key
Single key for both	Two key- Encryption & Decryption
Encryption & Decryption fast	Encryption & Decryption slow

Private key	Public key
Both encryption & decryption	Only used to encrypt data and decrypt data
Faster	Slower
Shared between two parties	Public key can used any one but private key is not shared between two parties
Kept secret	Public key free and private key s kept is secret

Difference between HTTP & HTTPS

HTTP	HTTPS
Default port 80	443
url begin with http://	url begin with https://
Do not need ssl	Required ssl certified
Does not used encryption	Website used data encryption
High speed	Slower than http

Web 2.0	Web 3.0
Document web	Metadata web
Abundance information	Control of information
Social web	Intelligent web
Static	Highly mobile,3D
Lawlessness, anarchic	Rules, standards, protocols- order
Google as catalyst	Semantic web companies as catalyst
Print and digital- unfiltered	Digital, dynamic filter
Second decade 2000-2010	The third decade 2010-2020

Computer Security/Virus

- Trojon Horse-Hijaking Web camera & watching you
- Malicious spyware-Keyloger , Keyboard monitoring (Kid, employee, internet user etc)
- Ransomware- crypto virus, file lock, Encript your file than pay for decript
- Rootkit- Keylogger, bank credentials steals, password stealers, anti virus, disablers and boot for DDoS Attacks.
- Bootkit- Malicious infection which target the master boot record on physical motherboard of the computer.
- DoS-Denial-of-service attack
- DDos-Distribute Denial-of-service attack

Whitelisting- defensive measure. process of identifying & permitting safe content.
Blacklisting- not allow a certain service .Unauthorized access to a system resource.

Anti-Virus Software

- Comodo free antivirus
- Avira
- Avast
- AVG
- Bitdefender
- Microsoft windows defender
- Sophos Home free Anti virus

Ten attack thought internet (computer security)

- Denial of-service(DoS) and Distributed denial-of-service(DDoS) attacks
- Man-in-the-middle(MitM) attack
- Phishing and spear phishing attack
- Drive-by attack
- Password attack
- SQL injection attack
- Cross-site scripting(XSS) attack
- Eavesdropping attack
- Birthday attack
- Malware attack
-

Web Application Attack

- CSRF-Cross-site Request Forgery (website, email, blog, instant, message)
- XSS-cross-site script (client side scripts)
- SQL Injection- data driven application
- Session Hijaking- TCP session hijacking

Rootkit-collection of computer software typically malicious, designed to enable access a computer. Unauthentic access in a user. such as key logger, password stolen, bank credit card

Bookkit- malicious infection which target master boot located in physical mother board of the computer.

Virus	Worm	Trojan horse
Replicate itself	Replicate itself	Does not Replicate itself
Can't control remote	Remote	Remote
Spending rate moderate	Faster	Slower then other
Objective- modify information	Eating system resource	Steal info
Executive file	Weakness this system	Ulitily software

	Hub	Switch	Router
Data transmission	Electrical signal or bits	Frame and packet	Packet
Port	4/12	Multiport 4-48	2/4/5/8
Device type	Non intelligence	Intelligence	Intelligence
Used in	LAN	LAN	LAN MAN WAN
Transmission mode	Half duplex	Half/ full duplex	Full duplex

Cache memory is high speed volatile memory. It's fast speed SRAM.

RAM- volatile memory, ROM-Non-volatile memory

Primary memory-

Secondary Memory-

ML- Machine Learing	DL- Deep Learning
Consist of thousand of data point	Million of data point
Usually perform well relatively small dataset	Large amount of dataset perform better than ML Alg
Less complex	Complex than ML
Structural dataset	Complex neural network, image classification, speech recognization

Basic	Supervised	Unsupervised
Input data	Used known and labeled data as input	Used known data as input
Computational complexity	Very complex	Less computational complexity
Real time	Uses off-line analysis	Uses real time analysis of data
Number of classes	Number of classes are known	Number of classes are not known
Accuracy of result	Accurate and reliable results	Moderate accurate and reliable results

Data warehousing	Data mining
Data is stored periodically	Data is analyzed regularly
A data ware house is database system is designed for analytical analysis instead of transaction work	Data mining is the process of analyzing data pattern
DW is the process of pooling all relevant data together	DM is considered as a process of extracting data from large data set