IT CHAPTER 3

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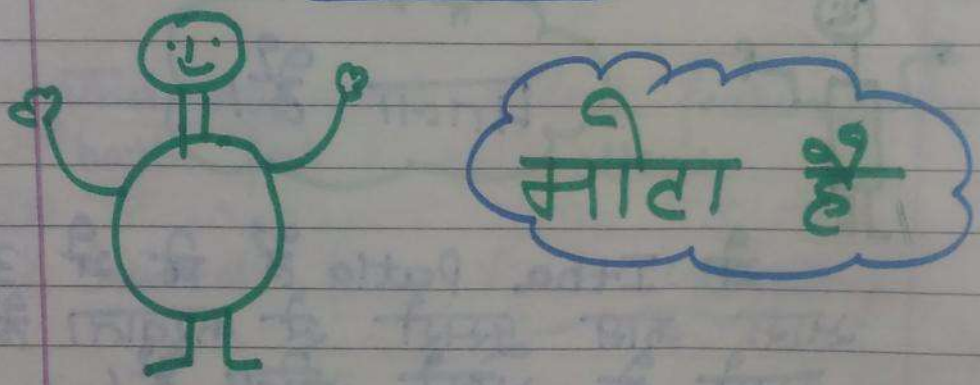
Date :

1. HOW CLIENT COMPUTERS BE CLASSIFIED ?

- Fat Client
- Thin Client
- Hybrid Client

Fat Client



→1. अपना काम खुद करता है।
सरवर पे Depend नहीं रहता।
Performs the bulk of data processing does not necessarily rely on Server.

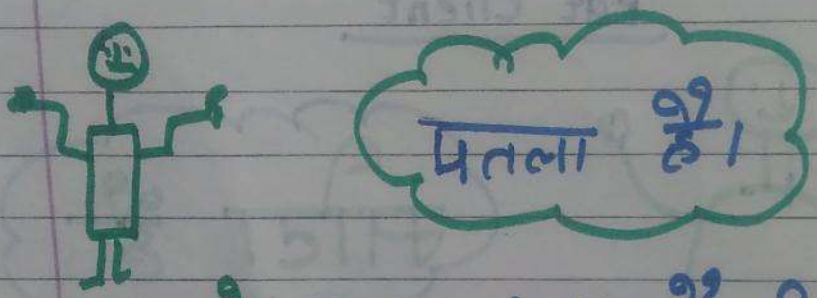
→2. सारा काम खुद करलुंगा। बस तू मेरा समान समभाल ले।
Thick Client not rely on Server because Processing done on user, Server is accessed primarily for Storage Purpose.

→ मोटे लोग आजकल Environment को Suit नहीं करते।

Thick client not well suited for public Environment.

Example - Personal Computer.

Thin Client



ये Itna Patla है कि ये अपना सारा काम दूसरों से करवाता है। दूसरों के सहारे जीता है।

→ Use the resource of host Computer.

जो काम App करती है बस उसे ही आगे fwd कर देता है। ताकी खुद कुछ ना करना पड़े।

→ Presents Processed data by Application Server., which perform the bulk of any data Processing.

→ सारे Server से पूछता रहता है किसी के पास थोड़ा सा Hardware और Software मिलेगा ताकी से तुमसे काम करवा सके।

Going to Communicate Server, there is little hardware & software installed on users machine

Hybrid Client

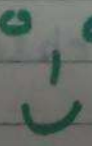
Thick + Thin = Hybrid

Mixture of above two client models.

This approach offers features from both fat & thin client.

Suited for Video Gaiming.

Thank You.



2. Switching Techniques

- Circuit Switching
- Packet Switching
- Message Switching

1 Circuit Switching

जब दो लोग Telephone पे बात करते हैं तो use Circuit Switching कहते हैं।

When two nodes communicate with each other over a communication path.

Iske लिए Pehle Phone होना भी तो चाहिए।

Important property of Circuit Switching is need to set up end to end path before any data can be Sent which can either be permanent or temporary

Teen baate dhyan रखनी पड़ती है
- Phone मिलाओ - Establish Circuit
- Bolo - Transfer data
- Phone काटो - Disconnect Circuit

Page : 2.
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2. Packet Switching

Or Bhai kya hall hai ?

Is type के समज करने वाली के लिए धन्यवाद है Packet Sw.

Process

हर मसज को टुकडो मे बाटेगा

The entire message is broken down into smaller transmission units which is called Packets.

Har message का Alag head बनाके Bhejega. (Matlab हर Message को Alg Message मे भेजेगा)

The information is added in the header of each packet and transmitted indep-endently.

Chota Message Sambhalna asan hoga or jada net bhi use nahi hota.

It is easier for networking devices to store smaller packets and they do not take much resources either on carrier path or switches internal memory.

Dusre के Pahuchne se Pehle hi पहले को भेज दिया जाता है। Taki delay कम हो।

first Packet is forwarded before the second one has fully arrived thus reducing delay.

koi fix Path नही होता, तो सारे Packet अलग रास्ता चुनते है।
Since there is no fixed path, different packets can follow different path.

3. Message Switching

1) पहले से कोई Physical Path नही होता
No physical path is established between sender and receiver in advance.

2) Poora message ek data unit बनता hai Or ek bari me send करदेते है।
The whole data unit and it transferred in its entirety which contains the entire data being delivered from source to destination.

3) Jab tak रास्ता saaf nahi hojata Switch message lelega or buffer करेगा.
A switch working on message switching

first receives the whole message and and buffers it until there are the resources available to transfer it to the next hop.

4) Lekin  Agar Samne Vale के Pas Jada memory nahi hai इस Message Store करने के Lie to hamara pyara Switch Jise dusro ki help karne ka bohot Shok hai Vo wait karega.

If the next hop is not having enough resources to accomodate large size message, the message is stored and Switch waits.

5) Email and Voice mail

Examples 

STORY

A GIRL WANTS TO SAY SOMETHING TO HIS BOYFRIEND AFTER BREAKUP.

HIS BF BLOCKED HER FROM EVERYWHERE

Uske pass koi Path nahi hai (means whatsapp, Text messages, facebook, etc)

1. No Physical Path.

Vo ek jagah apne dil ki baat likhke save kar leti hai। taaki mauka milte hi sara msg ek baar me bhej de।

2. Whole data Send in entirety.

jab tak koi tarika nahi mil jata Vo message Apne Pas Rakhegi or use read (buffer) karegi.

3. Receive whole msg & buffer it.

Jaise hi use tarika mil jata hai (whatsapp) par uska Bf unblock karde By chance. Lekin usko feel hota hai ki uske pass itna bada Mussage Padhne ka time nahi hai। to vo uske free hone ka wait karegi।

4. If next hop not have enough resources, switch waits.

OSI MODEL

Seven Layer OSI Model

LAYER-7 Application Layer

LAYER-6 Presentation Layer

LAYER-5 Session Layer

LAYER-4 Transport Layer

LAYER-3 Network Layer

LAYER-2 Data Link Layer

LAYER-1 Physical Link Layer.

Paisa Dia Nahi To Sali
P D N T S

Police Aagyi
P A.

P-1 T-4 A-7
D-2 S-5
N-3 P-6

LAYER-7 APPLICATION LAYER

- Closest to end user
- Interact with Software application
- provides user Services
- by file transfer, file sharing etc.

At this layer क्या होता है?

- Communication partners identified
- Quality of Service identified
- User authentication & Privacy are considered.

Application Layer is a married Lady.
His husband name is end user.
Or we can say his husband is end user.
His boyfriend is Software application.

STORY ☞ Application Layer (पत्नी / wife) अपने पती (end user) के close hoti है।

Lekin ☞ लेकिन Vo Apne boyfriend (Software application) se bhi milti है। User (पती) को Service देती है। (कभी file (Love) transfer तो कभी share करके।

Since uske or uske boyfriend के Baat (communication) me Problem aati है (Bki uska पती उसका Phone Check करता है) to use apne bf से Bat karne ke lie koi friend Dhundna Padta है। ताकी Inki bat karva Sake.

⇓

In Simple Terms ☞ Communication Partners are identified.

Friend asa dhundegi jo Service acchi de (बाता बिना Risk के karvae) Uske Pati को भी बता दे।

⇓

In Simple language → Quality of Service are identified.

User (पती) ki authentication or Privacy (Private से milna) का Dhyan Rakhti hai.

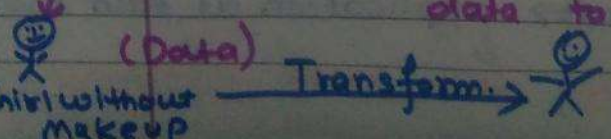
It means → User authentication and Privacy are considered.

LAYER-6 PRESENTATION LAYER

- Also known as Syntax layer
- Part of Operating System
- Convert incoming and outgoing data
- from one presentation format to another
- further Control Onscreen display of data
- transform data to std app interface.

She is a designer. Uski name is Syntax. OS name ki Company me kaam karti hai. Iska kaam hai Jo TV actress aati hai unko standard me lana. Or har aane Jane vali ladki ko present karke Dikhati hai. Or unhe TV Pe accha dikhna hai ye Control karti hai.

Nam Syntax → Also known as Syntax.
OS Company Me kam karti hai → Part of OS
Aane Jane vali ldki → Incoming & Outgoing data
Present karke dikhati → One presentation format to another.
Tv Pe ksa dikna Control karti → Control Onscreen disply
hum kisi ka standard set karti → transform data to standard app.



LAYER-5 SESSION LAYER

- This layer
- Set up, coordinate and terminate
- Conversations, dialogues
- between application at each end.
- Provide full duplex, half duplex, Simplex
- Establishes check pointing, termination and restart procedures.

FIRST READ THE STORY

Ye boht intelligent lady hoti hai. Normally ye hamari family me se hi hoti hai Eg- Bua or Masi.

→ Jab mummy Papa ka Jhagda hota hai tab ye aajati hai.

Case-1 mmy Papa ka Jhagda hua or vo bat nahi kar rahe to unki baat (conversation) Start karvati hai. (Set up)

Case-2 Agr unha Jhagra chalu है तो unhe Chup (terminate) karvati hai.

Case-3 Ldai hone ke bad Jo dialogue baji hoti hai use khatam karvati hai. (Dialogue)

Between ~~convers~~ application at each end
↓
Ek taraf Papa dusri taraf Mummy

Iska result kya hota hai?

Full Duplex - Pehle ki Tarah Poori Normal bat karenge.

Half Duplex - Adhi Adhuri bat karenge.
- Ha, hmm, thik hai etc.

Simplex - Simple bat krenge.

Question mind me ye aata hai ki baat shuru ya khatam kese karvae. (Procedures)

TV Serial - Koi idea dhundegi dono ki bat shuru karvane ka.
for Ex - Bhabhi Jao bhai ko bulake lao.

Establish termination and Restart Procedures.

LAYER-4 TRANSPORT LAYER

- This layer ensures
- reliable and transparent
- transfer of data between user processes
- assemble & disassembles message packets
- provide Error recovery & flow Control.
- Multiplexing and encryption undertaken

Ye ek mediator hai ek Couple ki.

→ It means - Ek ladki ki uske bf se bat karvane me help karti hai. (Love letter)

→ kabhi (Love letter) Chupati hai to kabhi sahi salamat Pahuchati hai. koi Galti hogai (ek letter ghar rah gya) to use Sudharti hai or flow ki Baate Chalti rahe. kabhi kabhi ise apne ghar walo ke Samne code me bat karni pdti hai (Encryp)

Sahi se bat hojae → Reliable transfer of data

kabhi Chupati hai to kabhi dikhati hai → assemble & disassemble message packets.

Galti ho to Sudharti → Error & recovery & flow Cntrl

Code me bat krti → Encryption

LAYER - 3 Network Layer

- Provides functional & procedural
- means of transferring variable length data
- from Source to destination
- via one or more network
- while maintaining quality of Service
- requested by Transport Layer.
- make a choice of physical route of trans.
- establishes, maintain, terminate
- Connection between nodes
- ensure proper routing of data.

♂

Ye transport layer ki friend है।
Transport ke ghar walo Ne use dekhlia
uske Love letter Pahuchate hue.
(Us couple ki aaj Shadi hai Lekin
transport ab ghar se bahar nahi
nikal sakti) to vo network Se bolti
hai tu kese bhi ladke ka message
ladki tak phucha de apne sare network
ki help leni pde, lekin please dhyan se
karna pakdi na jae. [illegible] Aadi Choti का
और लंबा है लेकिन उसे Message
Pahucha de.

1. Aedi Choti ka Jor
Procedural se functional
2. Ldke का Msg ldki tak
Source to destination
3. Sare network ki help
via one or more network
4. Dhyan se koi dekhe na
Quality of Service

☞ Requested by transport layer

STAGE - 1

Transport को Request दी Network ने काम किया

STAGE - 2

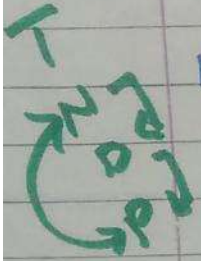
Network ko Sochna hai Message kese pahuchaw.

↓

Choice of Physical route of transmission.

LAYER-2 → Data Link Layer

- Respond to Service Request
- from Network layer
- Issue Service Request
- to Physical layer
- transfer data btw adjacent nodes in WAN
- Also specified channel
- Ensure reliable transfer of data
- Provides functional & procedural means
- trf data between network entities.



Network ko data ki Jarurat hoti hai. We all know. Yaha Pe bhi Network Jo ki transport ki friend hai use Data ki Jarurat padi.

Network.

Transport Ne → Respond to Request of Network.
Request ki

Physical (Ladka) ko Service Di → Issue Service Request to Physical layer

(car) WAN se Network or Physical ko Bat karvata hai taki koi Dekhe na.

↓

Transfer data in a WAN.

Bharosemand Insan hai Ye

↓

Ensure reliable transfer of data
(Ye dhyan रखेगा ki WAN me bat karte waqt koi dekhe na)

Done ki bat karvane ke lie Isne aedi choti ka Jor lga dia.

Aedi → Procedural
choti → functional

Provides Procedural & functional means of transfer data.

LAYER-1 PHYSICAL LAYER

- Hardware Layer
- Specify Mechanical & electromagnetic featu
- of Connection between device & transmission

Tasks ?

- Establishment and termination of Connection
- participation in a process where
- communication resources
- effectively shared
- among multiple users

Ye vo ladka hai Jiski vajah se ye Sab Drama hua.
Name → Physical → Hardware.

Mechanical engineer hai (mechanical)
Iske andar ek asa feature hai
jise ladkia iski trf attract hoti hai
(electromagnetic features)
Ye features hi inke Connection ki
vajah hai (connection b/w devices)

Ab Sari Layers ne Ise message
Dene ke lie papd

Ab ise bhi unki team join krni padegi. Matlab ase process (conference calling / whatsaap Group) me paust lena hoga taki Sab Logo ke bich me asani Se bat ho jay.

In Simple Words → Participation in process where the communication resources are effectively shared among multiple users.

STRATEGIC CAPABILITIES

↓

COST ???? 

C → Overcome Cost Barriers

G → Overcome Geographic Barriers

S → Overcome Structural Barriers

T → Overcome Time Barriers.

OVERCOME COST BARRIER

- Reduce cost of traditional means of communication
- Reduce expensive business trips
- allow Customers, Suppliers to collaborate thus improving the quality of decision
- Example - Desktop Video Conferencing between Company and its business partners using the Internet, Intranet, Extranet.

→ Sbse Jada Paisa Communication me Lagta hai.

→ Business world wide ₹1
Har chote kam ke lie Jana Pdta ₹1

→ Is problem ka Solution Nikal gya hai.

Traditional way se Communication Cost ko kam kardega -
~~कैसे~~ ???

Aane Jane ka Paisa bachega.
(Reduce Cost of expensive business trips) ??
~~कैसे~~ ??

Sare Customer Suppliers ~~को~~ Ikattha karta hai (collaborate) ku?

Video Confrencing karva dega
Vahi bethe bethe.

Company Or Business Partners
ke bich me.

~~यह क्या~~ ??

Internet, Intranet, Extranet.

OVERCOME GEOGRAPHIC BARRIER

- Capture information about business trans. from remote locations.
- Provide better Customer Service
- Reduce delay in filling Orders
- Improves Cash flow by speeding up
- billing of Customers

→ AMAZON.

Jitni bhi Jagah se Order ate hai
(Remote location) (transactions)
Sabki Information Dega.
(Capture Info)

Sirf Amazon ko hi nahi Customer ko bhi Better Service deta hai

↓

Provide Better Customer Service

Order filling ka Time kam karta hai.

Matlab ??

↓

Jab hum amazon Pe Product Search karte hai to har Product ke niche likha hota hai Buy Now.

↓

Ek click Pe Buy karo - Time kam lge

↓

Reduce delay in filling orders

Customer ki billing Pehle karleta hai. (Online Payment)

↓

To improve cash flow

↓

Improve cash flow by speeding up billing of Customers.

OVERCOME STRUCTURAL BARRIER

- Support linkages for
- Competitive advantage
- Fast, Convenient Service lock
- in Customer & Suppliers.

Eg - B_2B e Commerce.

OEERCOME TIME BARRIER

- Provide Infomation to Remote location
- Immediately after it is requested
- Credit enquiries can be
- made and Answered in Seconds.

Sabse Jada time kis Process me lagata hai?
Maine amazon ko Question Pucha Jawab ek hafte Bad aya. Mera mood tb tak change hi hogya.

So It Provide Info to Remote locations IMMEDIATELY after requested.
(5 minutes me jwab agya)

Sare Questions ke Jawab Seconds me mil Jate hai.

(Inquiries can be made and answered in Seconds).

BASIC FUNCTION OF AIS

- **Collect and Store data** - Collect and Store data about Organization's business activities and transactions by capturing transaction data from source documents and posting data from journals to ledgers.

- **Record Transactions** - Record transactions data into Journals. These journals present chronological record of what occurs and provide management with information useful for decision making.

- **Safeguard Organisational assets** - Provide adequate control to ensure that data are recorded and processed accurately by safeguarding organizational assets.

Benefits of BPMs -

- **Automating repetitive business process:-**

Automating Process such as report creation and distribution or monitoring company's key performance indicators reduces manual operational costs and helps employees to concentrate on activities that are important to success of business.

- **Operational Savings:-** BPM focuses on optimization of processes. The processes that are repetitive are optimized and used to reduces expenses which translate to immediate cost savings.
- **Freeing up employees time -** While the euphium "time is money" is often over used, it is very relevant to this topic because in business for each additional hour it takes to complete a manual business process, there is a hard cost associated with employee time as well as soft cost associated with loosing business productivity.

OSI MODEL BRIEF

Paisa Dia Nahi To Sali Police Agyi
P D N T S P A

Layer 1	Physical
2	Data link
3	Network
4	Transport
5	Session
6	Presentation
7	Application.

Application Layer (Dhoke baj wife)

- Pati se close hai
- Bf se milti hai
- Pati ko services deti hai
- Communication partner dhundti hai
- Quality of service
- Privacy maintained

Presentation Layer (Designer)

- Name - Syntax
- Company - OS
- Presentation In. & Out data
- Onscreen display of data
- transform data to std.

Session Layer (Bua or Masi)

- Set up, Coordinate, terminate
- Conversation & dialogues
- Full duplex, half duplex, Simplex
- Establishes, restart & termination procedures.

Transport Layer (Mediator)

- Reliable transfer data
- assemble & disassemble message pck.
- Error recovery, flow control
- Encryption

Network Layer (Tr. kei friend)

I
- Functional & Procedural means
- transfer data
- Source to destination
- via one or more networks
- Quality of Service
- Requested by Transport layer

II
- Choice of Physical Route
- establish, maintain, terminate
- connection between nodes.

Data Link Layer (Network ki friend)

- Respond request → Network Layer
- Issue Service Request → Physical layer
- transfer data in WAN
- Reliable transfer data
- functional & Procedural means transfer data.

Physical Layer (Ladka)

- Hardware
- Mechanical
- Electromagnetic
- Connection b/w devices
- Participation in process
- Communication resources shared
- Among Multiple users.

ELECTRONIC FUND TRANSFER

- Represent the way business can receive direct deposit all payments from financial institution to company bank Account.

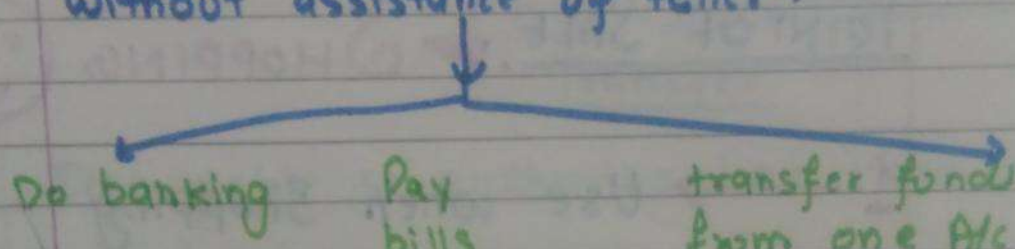
Sign up - Money comes directly & sooner than ever before.

Examples →
- ATM
- Point of Sale transaction
- Preauthorized transfers.
- Telephone transfers

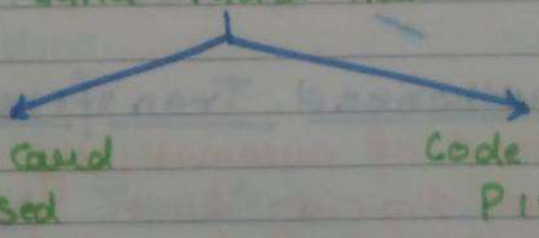
9) Automated Teller Machines (ATMs) :-
Consumer can do their banking without assitance of teller, or to make deposit pay bills, or transfer funds from one account to another electronically. These machines are used with a debit or EFT card and a code which is often called a "PIN".

→ Naam padhke sbko lagta hai ki vaha koi teller (helper) hoga jo hume btaega ki transaction hogi.

→ Without assistance of teller.



→ ATM se jaate h to PIN or Debit Card lekr Jana padta hai.



b) Point-of-Sale (Pos) Transactions -

- Some debit or EFT card can be used when shopping - to allowing the transfer of funds from the consumer account to merchant's.
- To pay for a purchase, the consumer presents an EFT Card instead of cash or Cheque.
-

- Money is taken out of Consumer's account and put into merchant's account electronically.

POINT OF SALE - SHOPPING

1 ⟶ Use when Shopping

2 ⟶ To pay, Customer use EFT

3 ⟶ Amt trf from Consumer A/c to Merchant account.

c) **Unauthorized Transfers -**

- Method of automatically depositing to or drawing funds from an individual's account, when the account holder authorizes the bank to do so.

For ex - Consumers can authorize financial institutions to make regular ongoing payment of insurance or other bills.

Is naam se kuch Smjh aya ?
(Unauthorized transfer)

⇒ Nahi

Dubara Padho → PRE AUTHORISED Transfer

- Jise pehle se authorize kar rkha ho.

Example – Company ne new car li hai lekin installments deni hai.
- Bank ko Authorization de dega ki mere behalf se har mahine installment pay kar dena.

d) Telephone Transfers
Consumer can transfer funds from one account to another through telephone instructions rather than traditional written authorization.

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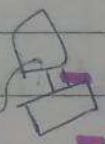
Date:

MOBILE COMMERCE

- M-Commerce is the buying and selling of goods and services through wireless handheld devices such as cellular telephone and PDA known as next generation e-commerce.
- It enables users to access the internet without needing to find a place to plug in.



The industry affected by m-commerce -

- Financial Services which includes mobile banking as well as brokerage services
- Telecommunications in which service changes, bill payment and account reviews can be conducted from the same handheld devices.
- Information Services which include the delivery of financial news, sports, figures and traffic updates to a single mobile device.

Page 10
Date

MOBILE COMMERCE

1— Hum Mobile ka use karte hai ?
Facebook, whatsaap, Phone, musages.

1— Lekin Jab bat ati hai Commerce की।
It means business.
↓
of Buying & Selling
↓
Goods & Services

1— NEXT Generation e-commerce.
↓
Its other name.

1— Unlike Computers, hamesha Jagah nahi dhundni Padti wire Plugin ke lie. (find a place to Plug in)

3 Industries affected by it
FIT

Financial Services	Information Services	Telecommu-nication
1. Mobile Banking	1. ~~Bill Payme~~	1. bill payment
2. Brokerage	1. delivery news	
	2. traffic updates	

Page 10.1
Date

E-COMMERCE

- Process of doing business electronically
- Use of technology to enhance the processing of commercial transactions b/w- Company, Customers, business partners
- Involves automation of a variety of business-to-business and B2C transaction through reliable and Secure Connections

Key aspect in implementing E-commerce

- Successful implementation of e-comerce requires involvement of key stakeholders
- Ideally include representatives from - accounting, finance, internal audit, It security, end users, system analysts.
- Other key aspect to be considered -

1) Implementing appropriate policies, standards and guidelines.
2) Performing cost benefit analysis and risk assessment to ensure value delivery.
3) Implementing right level of Security across all layers and processes.
4) Provide adequate user training.
5) Performing post implementation review.

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Date

Key aspect in implementing e-Comerce.

Online business start karne ke lie sabse pehle konse chije dhyan rakhni padti hai - ?

Sabse Pehle E-Commerce kya hota h?

Jese har successful aadmi ke piche ek aurat ka hath hota hai.

⇓

Vese har successful e-commerce ke piche key stakeholders ka hath hota h.

Lekin ?? kya key stakeholder hi kafi hai e-commerce ke lie.??

Ideally include ⟹ Representative from account, finance, end users, System analysts.

Key aspects

Sbse pehle koi bhi kam shuru karne se pehle policy igaenge, standard set karenge.

↓

Dusra kaam hai Apne Product ki Cost Set karna.

Vese to sab log sbse pehle cost hi decide karte hai.

Vo kese ?

Imagine tum koi online business start karne ka plan karrhe ho to sabse pehle Profit hi dekhoge na?

Lekin as per norms first you have to look standard, guidelines, policies etc.

Sab ⟶ Cost Benefit Analysis.

Third aati hai Security. (User Id, Psword) set karna.

(Uske bad tum sign up karoge) with ur user Id Psword.

Implementing Security.

Khud to karoge nahi kaam — Employees rakhoge → sabse pehle unhe train koo.

↳ Provide user training.

Sab set hogya ☞ Post Implementation Review.

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Date

EXTRANETS

DEFINE
- Extranet are network links
- use the internet technologies
- to interconnect the
- intranet of business with
- intranet of Customers, Suppliers, other Pa

Companies Can use Extranets to perform
- Establish direct private network link
  OR
- Create Secure private internet links b/w them
  Called Virtual Private Network.

क्या है Extra-net ?
- hai to Network link
- Lekin Shahra Internet ka hi lega
  Do intranet to interconnect krne k lie.
  - Intranet of business
  - Intranet of Customers, Suppliers, other Partners.

Business Value of Extranets -

- The technology of extranet make Customer & Supplier access of intranet resources alot easier and faster than previous business methods.

Intranet use ab easier or faster hota hai Pehle se.

- Enable and improve Collaboration by a business with its Customers and other business Partners.

Customer or business partner se Collaboration ko or improve karta hai.

- Extranets facilitate an online, interactive product development, marketing and Customer focused process that can bring better designed products to market faster.

Customer focused Process :-
Jo Quality Customer ko pasand hai vo develop karta hai or better designed product fatafat market me late hai.

Kul Mila ke 3 Benefit Milenge Extranet use karne ke.

→ Internet ka use Pehle se fast karvaega.

→ Customer or business partner se Collaboration improve kraega.

→ Hamari Pasand ki Quality ka Product hame sbse fast dikta hai.

Business Use of Internet

- Providing Customer and Vendor Support.
- Collaboration among business partners
- Buying and Selling products & Services
- Attracting new Customers with Inovative Prod.
- Retaining present Customers with improved Customer Service
- Developing new dist channels for existing Prod.
- Electronic Commerce.

Internet Applications

- Email, browsing the Sites on world wide web, participation in special interest newsgraups are the most popular internet applications.
- The internet provides electronic discussion forums managed by thousands of special interest newsgroups.
- Other applications include downloading software and information files and assessing databases provided by thousand of business, governments and other organizations.
- Allows holding real time Conversations with other internet users. (Jo hum log Sbse joda karte hai) (whatsap chatting)

NETWORK MANAGMENT

- In Computer network
- Network managment refers to
- activities, methods & Procedures (MAP)
- that pertain to → (O-MAP)
- Operation, Administration, Maintenance and Provisioning of network System

Operation - It deals with keeping the network running smoothly. It includes monitoring the network to spot problems as soon as possible, ideally before users are affected.

(Basically network ke operations ko manage karta hai)

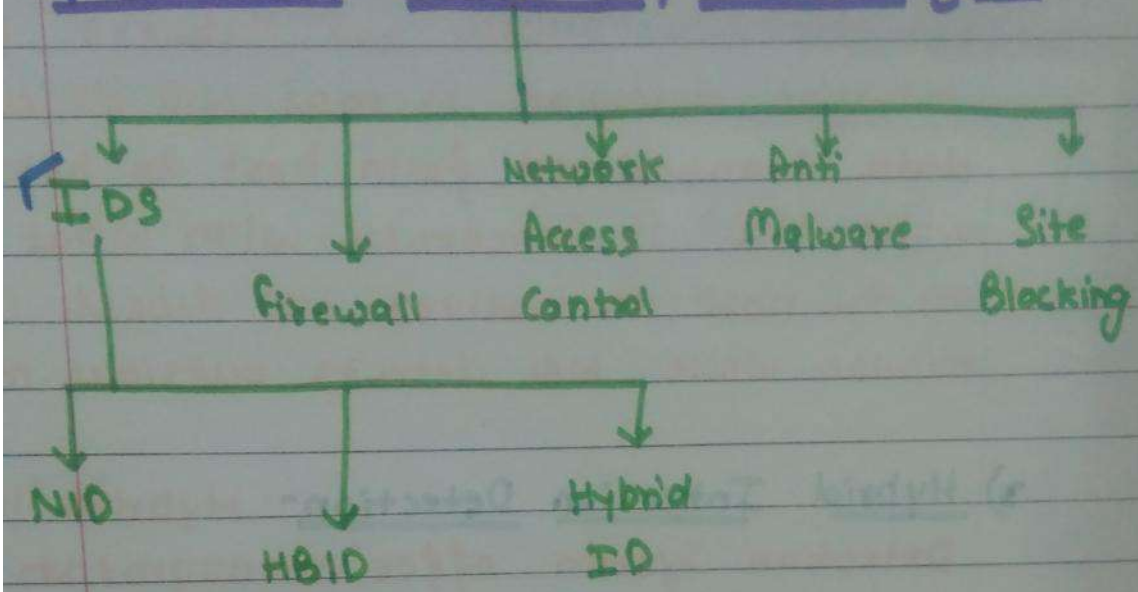
1. ki vo Smoothly chal rha h ya nhi.
2. Problem itni jaldi detect karta hai ki user ko problem ane se pehle Solve kar deta hai)

Administration - It deals with keeping track of resources in the network and how they are assigned. It includes all the "housekeeping" that is necessary to keep the network under control.

- **Maintenance** - It is concerned with performing repairs and upgrades - Example - when equipment must be replaced, when new switch is added to a network. Maintenance also involves Corrective and preventing measures to make the managed network run "better".
(Koi kharab chij ki repair karana ya purana hai to upgrade karna, kab equipment replace karna hai, kab naya switch lagana hai ye iska kaam hai).

- **Provisioning** - It is concerned with configuring resources in the network to support a given Services.
Example - This might include setting up the network so that a new Customer can receive voice Service.

Network Security Technique



Intrusion Detection System (IDS)- An IDS is a device or software that monitor network or system activities for malicious activities ~~or policy violations~~ and produces reports to a management station. Its goal is to monitor network to detect misuse. IDS are of three types.

Network Intrusion Detection (NID)- Network IDS is placed on a network to analyze traffic in search of unwanted or malicious events on the wire between hosts. Typically referred to as "packet sniffers". NNID is a type of NID.

Host based Intrusion Detection (HID)- HID are designed to monitor, detect and respond to user and system activity

and attacks on a given hosts. The diffrence between host based and network based intrusion detection is that NID deals with data transmitted from host to host while HID is concerned with what occurs on the host themselves. HID detects insider misuse while NID detects outsider misuse.

3) **Hybrid Intrusion Detection**- Hybrid Intrusion Detection System offer managment and alert notification from both network and host-based intrusion detection devices Hybrid Solutions provide logical complement to NID and HID.

IDS ☞ Hamari School time pe class ka monitor hota hai.

Vo kese ?

I
D } Ye ek device hai Ya Software application
S

Ye kese yad Rahega ?

IDS → Device, Software application.

Maam ने ही Bola है I am DS (D = Device, S = Software app.)

School monitor: { Jo Monitor करता है Network को और System activities को।

Network → Class

System activities ↓ Has Bacche ki activity

→ for malicious activities
↓
Taki teacher की Absense में कोई shaitani Na करे।

→ और Agr kisi ne asa kia to ye kya Karega?
Managment ko report bnake dega uski

→ Conclusion क्या Nikla ??

Basically Its Goal Is ☞ Monitor assets
↓
To detect misuse.

Network Intrusion Detection -
↓
Naam से samajh aa raha hai ki Network me Intrusion (bad bad) ko detect karta hai.
Ye Police hoti है।
Jo traffic में से (bad bad vale truck) आने की unwanted or malicious events on the wire.
Traffic ko analyze karti hai Taki (Malicious) Truck Pakad me aae.
Truck में kya hoga? Packets of Drugs.
To isko Packet Sniffer bhi bolte hai. Wo ku? Are Police Packet ko smell karke Pata lgati hai na ki Drugs hai ya nahi Isi lie.

Host based Intrusion Detection (HID) -

Ye hamare PC मे Laga Anti Virus है।

Jo Virus (attacks) ko Monitor karta है। fir Detect karta hai ki actually virus kis file me hai Or fir Respond karta है। on a given host (Matlab Jo PC use kia है Bas usi ka) office ke sare PC ka nahi.

Isme और NID me क्या diffrence hai?
Network Poore Network me dekhta hai
Host to host → PC to PC
or Host based only host का
Host मतलब PC

- HID → PC के Inside misuse Dekhta है
- NID → PC के Outside Misuse Dekhega.
- Ab Anti Virus PC के Andar से Dekhega
- Network Sare Network me dekhega.

Hybrid Intrusion Detection -

Ye hame Notification Dega → HID से
→ NID से

2) **Firewall** - Firewall is a device that forms a barrier between a secure and an open environment. When the latter environment is usually considered hostile for example the internet. It acts as a system or combination of systems that enforces a boundary between more than one networks. Access Controls are common form of controls encountered in the boundary subsystem by restricting the use of system resources to authorized users can take with these resources and ensuring that the users obtain only authentic system resources.

3) **Network access Control** - Network access products enforce security policy by granting only security policy compliant devices access to network assets. They handle access authentication and authorization functions and can even control the data that specific users' access based on their ability to recognize users, their devices and their network roles.

Malasia का Software है। Hamara Computer operation di
karne के Lie Bna hai. Hamari Sensitive Info leta है या ह
PC पर ही access करलेता है।
Umbrella है :

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4) Anti-Malware- Malware Short for malicious software, is any software used to disrupt Computer operation, gather Sensitive information or gain access to private Computer Systems. It is an Umbrella term used to refer to a variety of forms of hostile or software, including Computer viruses, e

5) Site Blocking- It is a Softwaubased approach that prohibits access to certain web sites that are dumed inappropriate by managment.
For eg - Site that Contains explicit objechionable material can be blocked to prevent employees from assesing these sites from Company internet Servers.

Site Blocking - क्या है ?

Software Based Approach (Sirf approach है actual Software x है।

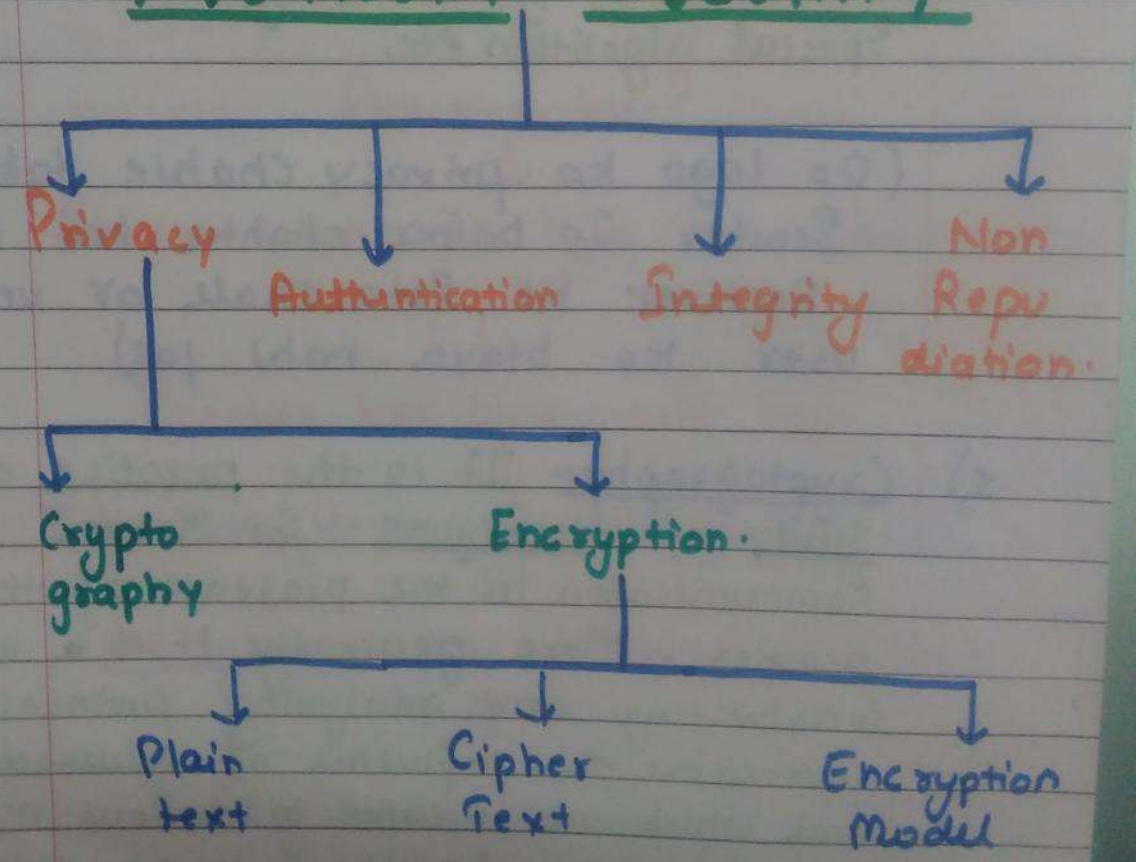
It PROHIBITS XXXXXX

Access to Web Sites

⇓

To Sites Managment ko inappropriate lagti hai.

NETWORK SECURITY



Privacy - This means Sender and the receiver expect confidentiality. The transmitted message should make sense to only the intended receiver and the message and it should be un intelligible to un authorized users. This is achieved by Cryptography, encryption techniques, so that the data is secured and can only be decrypted with a special algorithm etc.

(Do logo ko privacy chahie taki Sender Jo bolna chahta hai vo bs Receiver ko pata chale or unauthorise user ko btaya nahi jae)

1) **Cryptography** - It is the practice and study of techniques for secure communication in the presence of third parties. More generally it is about constructing and analyzing protocols that overcome the influence of adversaries and which are related to various aspects in information security such as data confidentiality, integrity, authentication, and non-repudiation.

Ase Code word Me bat karna ki Tisra banda Samne ho fir bhi use Samajh na aae ki hum kya bat kar rahe hai.

↓

Isi chij ki Study ko Cryptography bolte hai

↓

Khali Study nahi hai Practice bhi hai.

↓

Practice ku ?

↓

Study karne se kya tume bolna ayega Code words?

↓

Practice kre bina nahi hoga.

↓

Iske Sath ye ase Protocol Bnata hai

↓

Adversaries ka influence kam karne ke lie

↓

Jo log hmari bat ka glt mtlb nikalte hai

↓

Galt mtlab kese nikalenge ?

↓

For eg → next Page.

Tum or tumhara friend ek ladke ke Samne normally bat kar rahe ho lekin Code words me **Cryptography** me.

↓

Us ladke ne mann me assume kar lia ki tum kuch or bat karrhe ho.

↓

Isi ko adversary bolte hai

↓

Iske lie ve Protocols bnate hai taki adversary ka influnce kam ho

↓

Protocols → Data confedintiality, Related to integrity, authentication, non-repudiation.

2) **Encryption**- In cryptography, Encryption is the process of encoding messages (or information) in such a way that eaves droppers or hackers cannot read it, but only authorized parties can. Decryption is defined as the recovery of the original message from the encrypted data.

Encryption means mere msage pe Tala (lock) Lagana Taki koi hacker no padh le. Decryption mere Tali ki Chabi (key hai) Jo mere orginal msg padh skti hai.

- **Plaintext** - It is the message that is to be encrypted. It is transformed by a function that is parameterized by a key.

- **Ciphertext** - It is the output of the encryption process that is transmitted often by a messenger or radio.

- **Encryption Model** - The intruder may hear and accurately copies down the complete ciphertext. However unlike the intended recipient, he does not know what the decryption key is and so he cannot decrypt the ciphertext easily. Sometimes the intruder cannot only listen to the communication channel but can also record messages and play them back later, inject his own messages, or modify messages before they get to the receiver.

Intruder (Ye vo log hai Jo kisi ki bhi Awaj ki Copy kar lete hai)

No-1 → Case-1 Vo Sun lega uski bat or exactly Copy karlega.

Sbse Pehli or important bat

↓

Ise ye nahi Pta ki Decryption key nam ki bhi koi chij hoti hai

↓

Jiski vajah se ise bohot dikkat aati hai message ko unlock karne me.

↓

Maine Ye nahi kaha ki Ye message unlock nahi kar paega → Unlock karlega lekin thodi dikkat hogi (not easy)

↓

Case -2 - Kabhi kabhi Vo Sirf Sunta hi nahi hai balki record karlega or use play karega uske bich me Apna msg dal dega (lekin usi iski voice me) or Receiver tak Pahuchne se pehle raste me hi us message ko badal dega.

b) **Authentication** - This means receiver is sure of Sender's identity and that an imposter has not sent the message.

c) **Integrity** - This means that data must arrive at the receiver exactly as it was sent.

d) **Non Repudiation** - This means that receiver must be able to prove that a received msg came from a specific Sender and Sender must not be able to deny sending it.

Two Methods of Encryption / decryption -

- **Secret key** (Meri gmail ka Paswod - Sirf mujhe Pata hai)
- **Public key** (office ki gmail ka paswod ofc ke har staff ko Pta hai)

- **Secret key** - The same key is used by Sender and receiver. The Sender uses this key to encrypt data, the receiver uses the same key to decrypt key data.

- **Public key** - there are two keys, a private key and a public key. The private key is kept by the receiver and public key is announced to the public.

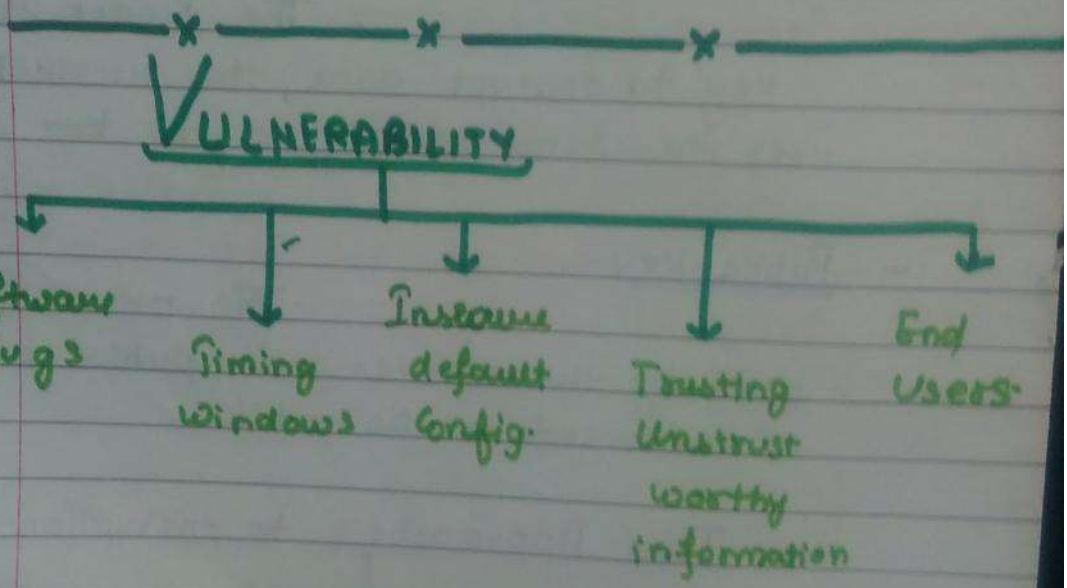
Two Approaches to encryption -

- Hardware Encryption
- Software Encryption.

1) **Hardware Encryption** - Devices are available at a reasonable cost and can support high speed traffic. If the internet is being used to exchange information among branch offices or development Collaborates

Use of all such devices can ensure that all traffic between these offices is secure.

Software encryption - It is typically employed in conjunction with specific applications. Examples provide encryption and decryption for message security.



1. Software Bugs -
2. Timing Windows
3. Insecure Default Configuration
4. Trusting Untrustworthy information
5. End Users

Vulnerability – It is an inherent weakness in the design, Configuration or implementation of a network that renders it susceptible to a threat.

Following facts are responsible for ocurrence of vulnerablities -

→ **Software Bugs**- Software bugs are so common that users have developed techniques to work around the consequence and bugs that make saving work necessary every half an hour or Crash the computer every so often are considered to be a normal part of computing.

→ **Timing windows**- This problem may occur when a temporary file is exploited by an intruder to gain access to the file, overwrite important data, and use the file as a gateway for advancing further into System.

→ **Trusting untrustworthy information**- This is usually a problem that affects routers, Or those Computers that Connect one network to another. When routers are not programmed to verify that they are receiving information from a unique host that can gain access

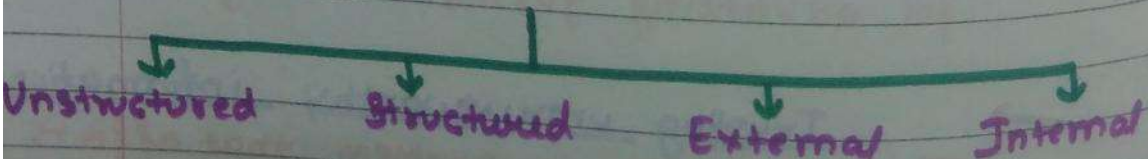
can gain access to systems and do damage.

- End Users- Generally, users of Computer Systems are not professionals and are not always security conscious. For eg. when the number of passwords of an user increases, user may start writing them down, in the worst case to places from where they are easy to find.

THREATS

⇒ Threat मतलब Danger जो disrupt (disrupt) करदे operation, functioning, integrity of network.

A threat is a possible danger that can disrupt the operation, functioning, integrity or availability of a network or system. Network security threats can be categorized into four broad themes.

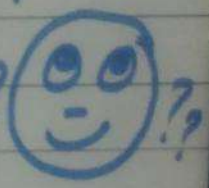


Unstructured Threats - These originates mostly from inexperienced individuals using easily available hacking tools from the internet. Many tools available to

anyone on the internet can be used to discover weakness in company's network. Most of these kinds of probes are done more out of Curiosity than with a malicious intent in mind.

Ye hamare upar hi bna hai.

↓

Hamare upar ????  ??

↓

Ya Haag

↓

Kai bar hum log net par hacking tricks dhundte hai. like for hacking whatsaap, facebook. Or jab bat company ki ati hai to company ki information

↓

Ye Sare kaam hum log bus Curiosity ki Vajah se karte hai Naki hamara Company hack karne ka koi irada nahi hota. Na hi hmara mind me koi galat intension hoti hai.

↓

Basically hum log inexperienced hote hai. Isilie is threat ka nam Unstructured threat hai

↓

Matlab vo threat jisko koi structure nahi hai. (Mtlb Pehle se koi defined Plan ya structure nahi hai)

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STRUCTURED THREATS

These originates from individuals who are highly motivated and technically competent and usually understand network systems design and the vulnerabilities of those systems. An individual who presents a structured threats typically targets a specific destination or group. Usually these hackers are hired by industry competitors.

Ye Vo log karte hai jinhe kisi ne dhoka dia ho. Dhoka kese ??

Happy New Year Movei →.

↓

Is movie में Shah Rukh Khan के Papa ko uski company ने Dhoka dia tha same like.

↓

Ye log Boht Motivated hote हैं

↓

Motivated ku ?

↓

अपना Badla Poora karne ke lie

↓

Lekin khali motivate hone से काम नहीं चलेगा → Technical Competent भी hona Chahie. + Ise us Company की कमजोरी Bhi Pta hoti hai.

↓

(Vulnurability)

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Ye ek specific Destination bhi Set karta hai.

↓

Jese HAPPY NEW YEAR Movei ki Shah Rukh khan Ne Dusri Country ko Destination Set kia tha.

↓

Is typeke hackers ko Competitor Company bhi hire karna chahti hai.

EXTERNAL THREATS

These originate from individuals or organizations which does not have authorized access to organization, ~~which does not have a~~ computer. System or network. They usually work their way into a network from the internet.

INTERNAL THREATS

Typically these threats originate from individuals who have authorized access to the network. These users either have an account on a server or physical access to the network.

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System Security

- There are two types of System Security.

* **Physical Security**- A physical system security is implemented to protect the physical system assets of an organization like the personnel, hardware, documentation.

* **Logical Security**- A logical security is intended protect data and Software. Security administrators tend to have responsibility for Controls over -
  - malicious and non-malicious threats to physical Security.
  - malicious threats to logical Security

INTERNET'S TCP/IP

The internet uses a system of telecommunications protocols that has become so widely used that it is equivalent to network architecture. The internet's protocol suite is called TCP/IP.

TCP/IP consists of five levels of protocols that can be related to seven layers of the OSI architecture. It is used by the internet and by all intranets and extranets. Many companies and other organizations are also converting their client/server networks to TCP/IP.

Five levels of TCP/IP include as shown in below ↓

Application Layer	App. Layer Pres. Layer Sess. Layer
Host to Host Transport Layer	Transport Layer
Internet Protocol	Network Layer

Network Interface	Data Link Layer
Physical Layer	Physical Layer

PROTOCOLS

Protocols are Software that performs a variety of actions necessary for data transmission between Computers. Protocols are a set of rules for inter-Computer Communication that have been agreed upon and implemnted by many venders., users to ensure that information being exchanged between the two parties is received and interpreted correctly. Ideally a protocols standard allows heterogeneous computers to talk to each other

A protocal defines the following three aspect of digital communication:

a) Syntax - The format of data being exchanged, character set used, type of error correction used, type of encoding scheme being used.

b) **Semantics** - Type and order of messages used to ensure reliable and error free information transfer.

c) **Timing** - Defines data rate selection and correct timing for various events during data transfer.

NETWORK ARCHITECTURE

Network architecture refers to layout of the network consisting of hardware and software, connectivity, communication protocols and mode of transmission such as wired or wireless.
Network architecture includes hardware components used for communication.

TRANSMISSION MODE

- Simplex
- Half Duplex
- Full Duplex.

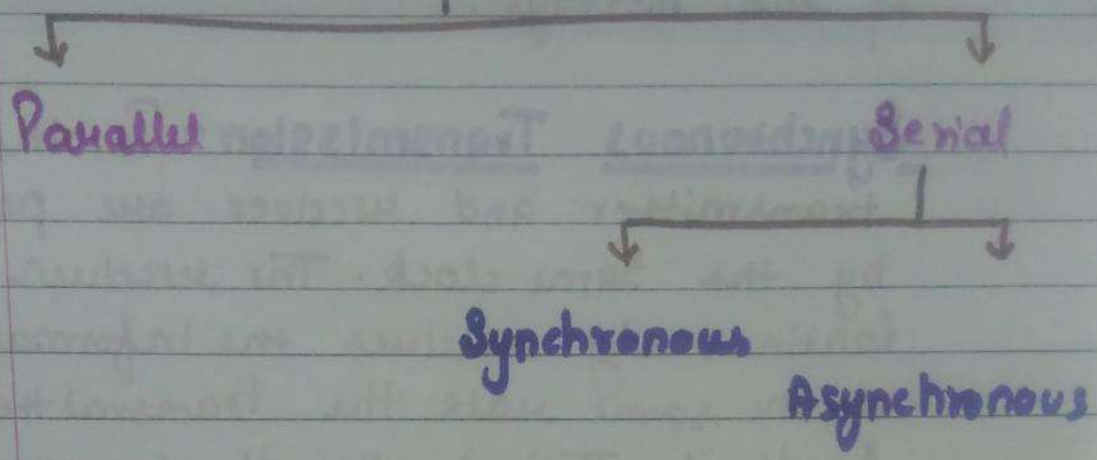
Transmission Mode - Transmission mode is used to define the direction of signal flow between two linked devices. There are three types of transmission mode -

Simplex - In Simplex mode data flows in only one direction from the transmitter to the receiver. This type of connection is useful if the data do not need to flow in both directions.
Example - Keyboard can only introduce input and printer can only receive data.

Half - Duplex - In half Duplex the data flows in one direction or the other, but not both at the same time. This type of connection makes it possible to have bidirectional communications using the full capacity of the line.
Example - Walkie - Talkie.

Full - Duplex - In full duplex the data flows in both directions simultaneously. Each end of the line can thus transmit and receive at the same time.
Example - Mobile Phone

DATA TRANSMISSION



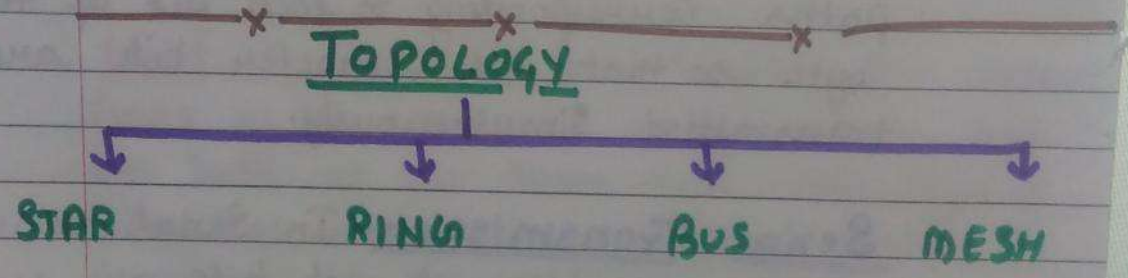
Parallel Transmission- In parallel transmission there are separate parallel paths corresponding to each bit of the byte so that all character bits are transmitted simultaneously.

Serial Transmission- In Serial transmission, the bits of each byte are sent along a single path one after another. As one bit follows another, so only one communication channel is required between two communicating devices.

Asynchronous Transmission- In this each character is sent at irregular intervals in time as in case of characters entered at the keyboard in real time. So the sender provides a synchronization signal to

the receiver before starting the transfer of each message.

Synchronous Transmission - In this the transmitter and receiver are paced by the same clock. The receiver continuously receives the information at the same rate the transmitter sends it. This is why the transmitter and receiver are paced at the same speed.



STAR - Star network involves a central unit that has a number of terminals tied into it. Its characteristics are as follows-

- It ties end user computer to a central computer.
- The central unit in the star network acts as the traffic controller among all the other computers tied to it. The central computer is usually a mainfram

which acts as the file Server.

- A Star network is well suited to Company with one large data processing facility shares by a number of smaller departments.

Bus Network - In a bus network, a single length of wire, cable, optical fiber connects a number of computers. Features of a bus network are -

- All communications travel along this cable which is called a bus.
- Bus networks have a decentralised approach.

Ring Network - A ring network is much like a bus network, except the length of wire, cable or optical fiber connects to form a loop.

The characteristics of ring network -

- A ring network has a decentralized approach.
- When one computer needs data from another computer, the data is passed along the ring.

Mesh Network- In this structure, there is random connection of nodes using communication links. A mesh network may be fully connected or connected with only partial links. The reliability is very high as there are always alternate paths available if direct link between two nodes is down.

NETWORK COMPUTING

- Centralised Computing
- Decentralised Computing

- **Network Computing**- In network computing network computers and other thin clients provide a browser based user interface for processing small application programs called applets.

- **Centralized Computing**- Centralised Computing is Computing done at a central location using terminals that are attached to a central computer. The computer itself may control all the peripherals directly or they may be achieved via a terminal server.

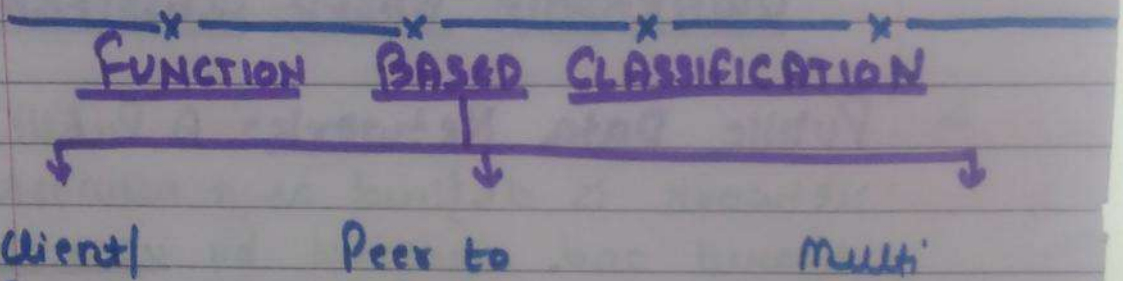
Decentralized Computing - Decentralized computing is the allocation of resources both hardware and software, to each individual. In Contrast, centralized computing exists when the majority of functions are carried out, or obtained from a remote centralized location.

OWNERSHIP BASED CLASSIFICATION

- Public Data Network - A Public data Network is defined as a network shared and accessed by user not belonging to a single Organization. It is a network established and operated by a telecommunications for the specific purpose of providing data transmission services for the Public.
  Example - Internet.

Private Data Network - Private data networks provide businesses, govt agencies and organizations of all sizes as a dedicated network to continuously receive and transmit data to both daily operations and critical needs of an Organization.

Virtual Private Networks - Many companies have offices and plants scattered over many cities, sometimes over multiple countries. In the olden days before Public Data Network it was common for such companies to lease lines from the Telephone Company between some or all pairs of locations.



Client Server Networks - The client/ Server Computing is an environment that satisfies the business need by appropriate allocating the application processing between the client and the Server processors.
Client/ Server network is a computer network in which one centralized powerful computer is connected to many less powerful PCs.
The client runs programs and access data that are stored on the Server.

CLIENT

A client is a single user workstation that provides a presentation services and the appropriate computing, connectivity and the database services relevant to the business need.

SERVER

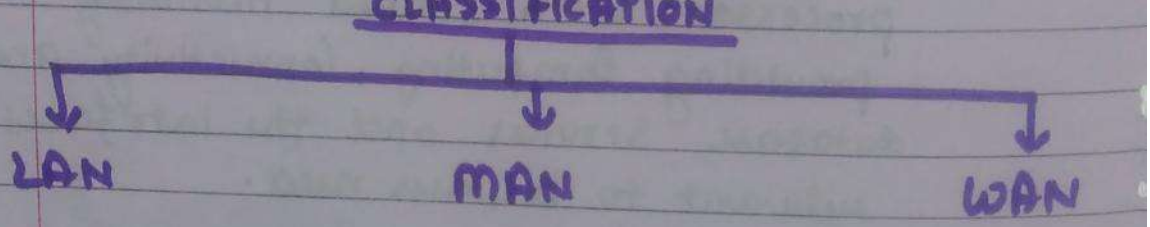
A Server is one or more multi-user processors with shared memory providing computing, connectivity and database services and the interfaces relevant to business need.

WORKING OF CLIENT/SERVER

- Servers are typically powerful computers running advanced network operating systems.
- End user, Personal Computer or Network computer workstations are clients.
- Clients are interconnected by local area networks and share application processing with network servers which also manage the network.
- Client Server can operate on same computers or different computers.

- Either the client platform or Server platform can be upgraded without having to upgrade the other platform.
- The Server is able to Service multiple clients Concurrently, in some client/Server clients can access multiple servers.
- Action is usually initiated at the client end not the Server end.

AREA COVERAGE BASED CLASSIFICATION



LAN — LAN are telecommunication networks that connect information processing devices within a physical limited area. These networks covers areas such as offices, classrooms, Buildings, etc.

Some of characteristics of LAN :-

- LAN use a variety of telecommunication media such as ordinary telephone wiring, Coaxical Cable etc.
- To Communicate over the network, PC usually has a Circuit board Called a network interface card.

Further LAN Provides:-

- **Security** - Security for programs and data can be achieved using servers that are locked through both software and by physical means.

- **Expanded PC usage through inexpensive workstation** - Once a LAN has been set up, it actually costs less to automate additional employees through diskless PCs

- **Distributed Processing** - Many organizations operate as if they had distributed system in place. If numerous PCs are installed around the office.

- **Organizational Benefits** - LAN Provides numerous benefits that include reduced costs in Computer hardware, Software or re-training manpower to use the systems.

MAN

A MAN is somewhere between LAN and a WAN. The term MAN is sometimes used to refer to networks which connect systems or local area networks within a metropolitan area.
A MAN can support both data and voice. Cable Television networks are examples of MANs that distribute television signals.

WAN

WAN are telecommunication networks that cover large geographic areas with various communication facilities such as long distance telephone service, satallite transmission and under-sea cables. These networks cover areas such as -

- Large city or metropolitan area
- Whole country
- Many countries & continents.

TERMINALS

Terminals are Starting and Stopping points in any telecommunication network end. Any output or input device that is used to transmit or receive data can be classified as terminal component. These include video terminals, telephones, office equipment.

TELECOMMUNICATION PROCESSORS

Telecommunications Processors Support data transmission and reception between terminals and computers by providing a variety of control and support functions They include Network Interface Card, Modem, Multiplexer and Inter network processors.

NEED AND SCOPE OF NETWORKS

As the business grows, good communication between employees is needed. The organization can improve efficiency by sharing information such as common files, database etc.

Some of the advantages of Computer network in an organization-

1. **FILE SHARING** - It provides sharing and grouping of data files over the network.

2. **Resource Sharing** - It provides sharing of Computer Resources such as hard disk printers etc.

3. **REMOTE Access** - Network allows user to remotely access the data and information from organization's network via internet in cost effective manner.

4. **Shared Resources** - Network facilitates simultaneous access to the shared database to multiple users at the same time by ensuring integrity of database.

MOBILE COMPUTING CONCERNS

Mobile computing has its four shares of security concerns as any other tech-

- **Dangers of misrepresentation**- Another problem plaguing mobile computing are credential verification.

- **Power Consumption**- When a power outlet or portable generator is not available mobile computers must rely on batter power entirely.

- **Potential health hazards**- Being an ever growing and emerging technology, mobile computing will continue to be a core services in computing information communication & technology.

BUSINESS APPLICATIONS OF MOBILE COMPUTING

Mobile computing enables enterprises to connect with their employees at all times resulting in increased productivity and a better return on investments. Some examples of business applications are as follows-

BD-1C

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- There is increase in workforce productivity as mobile device enables employees to work from anywhere, anytime by accessing and updating information as required for ex- employees can read emails using laptops, PDAs from office, residence and even when on the move.

- Customer Service can be improved by responding to customer queries on site or off site. For ex - Customer complaints can be accessed and respond by accessing latest information of client as required.

- Business processes can be transformed by using mobile devices. Enterprises can reengineer core business processes. The new and reengineered processes can focus on utilizing the key features of location and time independence.

- Enterprise can dynamically modify and update their offerings and offer new products and services altogether.

APPLICATION SOFTWARE

Application Software includes all those Computer Software that cause a computer to perform useful tasks beyond the running of the computer itself. It is a collection of Programs which address a real life problems of its end users which may be business or any other problem.

Types of Application Software

Application Suite - Has multiple applications bundled together. Related functions, features and user interfaces interact with each other. Eg MS office 2010 which has MS word, MS Excel, MS Access etc.

Enterprise Software - Addresses an enterprise's needs and data flow in a huge distributed environment. eg. - ERP applications like SAP.

Enterprise Infrastructure Software - Provides capabilities required to support enterprise Software Systems. Eg - email Servers, Security Softwares.

Content Access Software - Used to access contents and address a desire for published digital content and entertainment. Eg. Media Players, Adobe digital etc.

Educational Software - Holds Contents adopted for use by students. Eg. Examination Test CDs.

Benefits of Application Software.

Addressing user needs - Their single biggest advantage is that it meets the exact needs of the user. Since it is designed specifically with one purpose in mind, the user knows that he has to use specific software to accomplish his task.

Less threat from Virus - The threat of viruses invading custom made applications is very small, since any business that incorporates it can restrict access and can come up with means to protect their network as well.

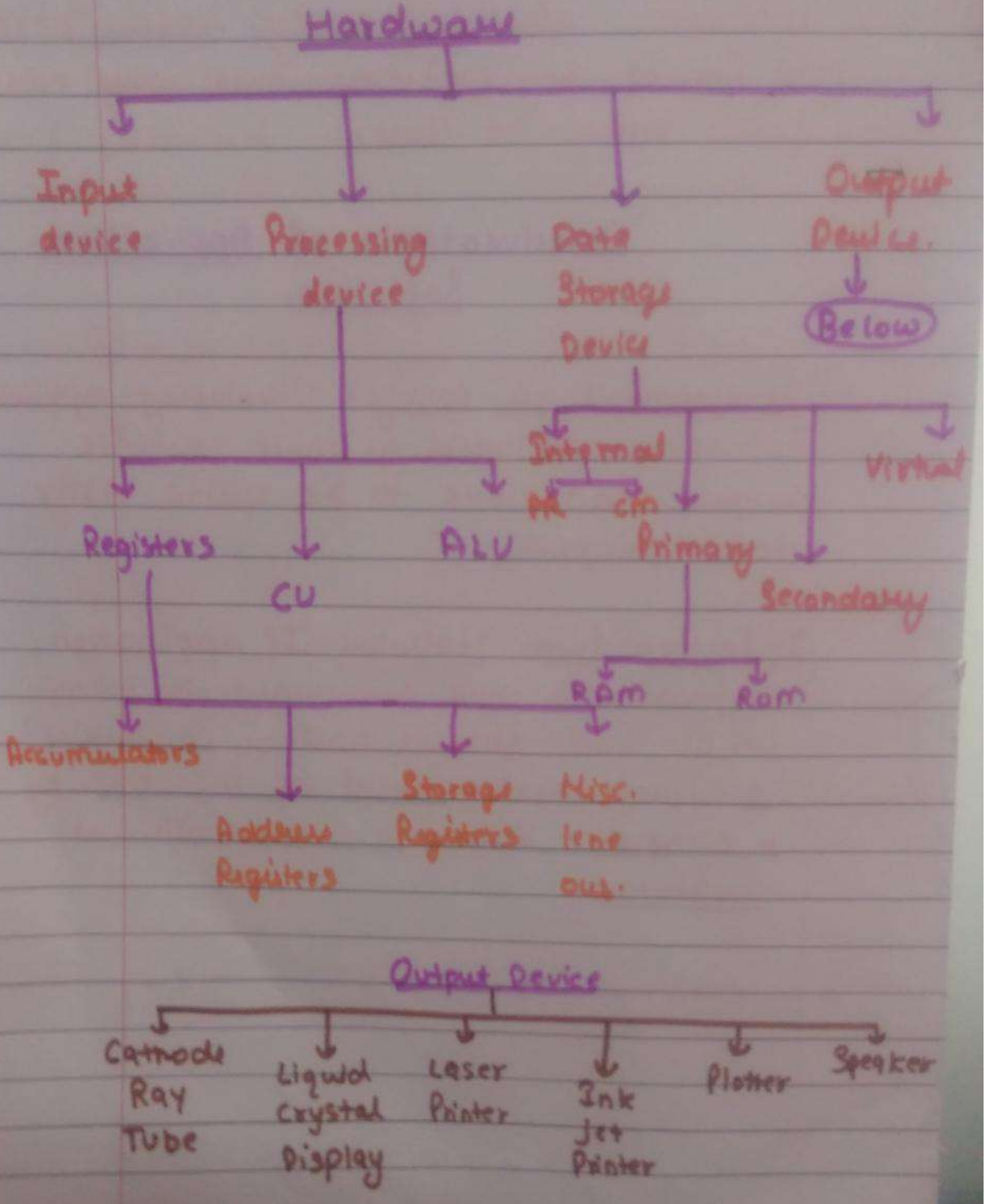
Regular updates - Licensed application software gets regular updates from the

developer also regularly sends personel to correct any problems that may arise from time to time.

Disadvantages of Application Software.

Development is costly - Developing application Software designed to meet specific purpose can prove to be quite costly for developers.

Infection from Malware - If application software is used commonly by many people and shared online, it carries a highly real threat of infection by a computer virus or other malicious programs.


Hardware
Input device
Processing device
Data Storage Device
Output Device.
Below
Internal
Virtual
Registers
CU
ALU
Primary
Secondary
RAM
Rom
Accumulators
Address Registers
Storage Registers
Misc.
Output Device
Cathode Ray Tube
Liquid Crystal Display
Laser Printer
Ink Jet Printer
Plotter
Speaker

Input Device

These are the devices through which we interact with the systems and include devices like keyboard, Mouse, and other pointing devices, Scanners & Bar Code etc. keyboard helps us with text based input, Mouse helps us in position based input, Scanners and webcams help in image based input and Microphone helps us in voice based input.

Processing Device

Processing device include Computer chips that contain the CPU and main memory. The CPU is the actual hardware that interprets and executes the program instructions and coordinates how all the other hardware devices will work together. The CPU is built on a small flacke of Silicon and can contain the equivalent of several million transistors. we can think of transistors as switches which could be "on" or "off" i.e. taking a value of 1 or 0. The CPU is like the brain of the Computer. It consists three functional units -

Control Unit - Control unit controls the flow of data and instructions to and from memory, interprets ~~and~~ instructions and control which tasks to execute and when.

Arithmetic and Logical Unit - (ALU):- Performs arithmetic operations such as addition, subtraction, multiplication and logical comparison of numbers; Equal to, Greater than, less than etc.

Registers - These are high speed memory units within CPU for storing small amount of data. Registers could be:-

- **Accumulators** - They can keep running totals of arithmetic values.
- **Address Registers** - They can store memory addresses which tell the CPU as to where in the memory an instruction is located.
- **Storage Registers** - They can temporarily store data that is being sent to or coming from System memory.
- **Miscellaneous** - These are used for several functions for general purpose.

Data Storage Devices.

DSD refers to the memory where data and programs are stored. Various types of memory techniques are given as follows-

a) **Internal memory** - This includes **Processor Registers** and **Cache Memory**.

b) **Primary Memory** - These are devices in which any **location** can be accessed by the computer's processor in any order. These are primarily of two types:-

- Random Access Memory (RAM) -

- **Volatile** in nature means information is lost as soon as power is turned off.
- This is **Read write** memory.
- Information can be **read** as well as **modified**.

- Read Only Memory (Rom)

- This is **non-volatile** in nature.
- Usually these are used to store **small amount** of information for quick reference by CPU.
- Information can be **read** not modified.

Secondary Memory- CPU refers to the main memory for execution for programs but these main memories are volatile in nature and hence can not be used to store data on a permanent basis in addition to being small in storage capacity. The secondary memory are available in bigger sizes and thus programs and data can be stored on secondary memories. Secondary storage differs from primary memory in that it is not directly accessible by CPU.

Virtual Memory- Virtual memory are imaginary memory. Supported by some operating system in conjunction with ~~RAM~~ hardware. If a computer lacks the RAM needed to run a program, Windows uses virtual memory to compensate. It combines computer's RAM with the temporary space on the hard disk. When RAM runs low, virtual memory moves data from RAM to a space called a paging file. Moving data to and from the paging file frees up RAM to compute its work.

4) Output devices - Output devices are the devices through which system responds. Information shown on a display device is called soft copy because the information exists electronically and is displayed for a temporary period of time. Various type of output devices are :-

- Cathode Ray Tube - A vaccum tube that uses an electron gun to emit a beam of electrons that illuminates phosphors on a screen as the beam sweeps across the screen repeatedly. A monitor is often called a Cathode Ray tube.

- Laser Printer - A printer that forms images using an electrostatic process, the same way a photocopier works.

- Ink-Jet Printer - A printer that makes images ~~using~~ forcing ink droplets through nozzles.

- Plotter - A printer that uses computer directed pens for creating high Quality images.

- Speaker - Gives an audio output.

System Software

System Software is Computer Software that is designed to operate the Computer hardware and to give and maintain a platform for running application Software. One of the most important and widely used system software is Computer Operating System.

COMPUTER NETWORKS

Computer network is a collection of computers and other hardware interconnected by communication channels that allows sharing of resources and information. Where at least one process in one device is able to send/receive data from at least one process residing in a remote device, then the two devices are said to be in a network. A network is a group of devices connected to each other.

Two types of Networks.

- Connection oriented Networks
- Connectionless Networks.

Connection Oriented Networks:- When a connection is first established and then data is exchanged like it happens in case of telephone networks.

Connectionless Networks- When no prior connection is made before data exchange. Data which is being exchanged in fact has a complete contact information of recipient and at each intermediate destination, it is decided how to proceed further like it happens in case of postal networks.

Benefits of Computer Network:

- **Distributed Nature of information**- There would be many situations where information has to be distributed geographically. Eg. In case of Banking company, accounting information of various branches to make consolidated Balance sheet at the year end, it would need networking to access information from all its Branches.

- **Resource Sharing**- Data could be stored at central location and can be shared

across diffrent systems. Even resource sharing could be in terms of sharing peripherals like printers which are normally shared by many systems.

Reliablity - Many critical applications should be available 24x7, if such applications run across diffrent systems which are distributed across network then the reliability of the application would be high.

User Communication - Networks allow users to communicate using email etc.

DBMS

DBMS are softwares that aid in organizing, controlling and using the data needed by the application programs. They provide the facility to create and maintain a well organized database. Applications access the DBMS, which then accesses the data.

LAPTOP

Laptop is a small, portable computer and small enough that it can sit on a lap. The laptop was originally designed to be similar to a desktop. But be small and light enough that it could be used while sitting on our lap. Notebook is an extremely light weight personal computer. Notebook computers typically weigh less than 3kg and are small enough to fit easily in a briefcase.

IPad

Ipad runs a version of ios, ios is designed for finger based use and has none of the tiny features which required a stylus on desktop tablets. Apple introduced responsive multitough gestures, like moving two fingures apart to zoom in. Ios uses less power. And so gives better battery life than the intel devices used by windows tablets.

Ipod

Ipod is a line of portable media players designed and marketed by Apple Inc. The first line was released on 23 Oct 2001. Its most recent redesigns were announced on 12 September 2012.

There are four current versions of Ipod -

- ultra Compact ipod Shuffle
- the Compact ipod Nano
- touchscreen ipod touch
- hard drive based ipod classic.

A UMPC is a small form factor version of a Pen Computer, a class of laptop whose specifications where launched by Microsoft and intel in Spring 2006. UMPCs are smaller than Subnotebooks, have a TFT display measuring about 12.7 to 17.8 cm are operated like tablet PCs using a touch screen or a Stylus and can also have a physical keyboard.

Android

Android is a linux - based operating System designed primarily for touch Screen mobile device such as smart phones and tablet Computers. Android was built to enable developers to Create compelling mobile applications take full advantage of all a handset has to offer. Android powers devices from some of the best handset and tablet manufacturers in the world. like Samsung, HTC, motorola etc.

COMPUTING

The term Computing has a great significance in It related aspects. Computing as any goal-oriented activity requiring benefiting from or Creating Computers. Thus Computing includes designing, and building hardware and Software systems for a wide range of purposes; processing, structuring and managing various kinds of information, doing scientific Studies using Computers making Computer Systems behave intelligently.

It defines five sub-disciplines of the computing field.

Computer Science - It refers to the scientific and practical approach to computation and its applications. It is the systematic study of feasibility, structure that underlies the acquisition representation, processing, storage, access to information whether such information is encoded in bits and bytes in a computer memory.

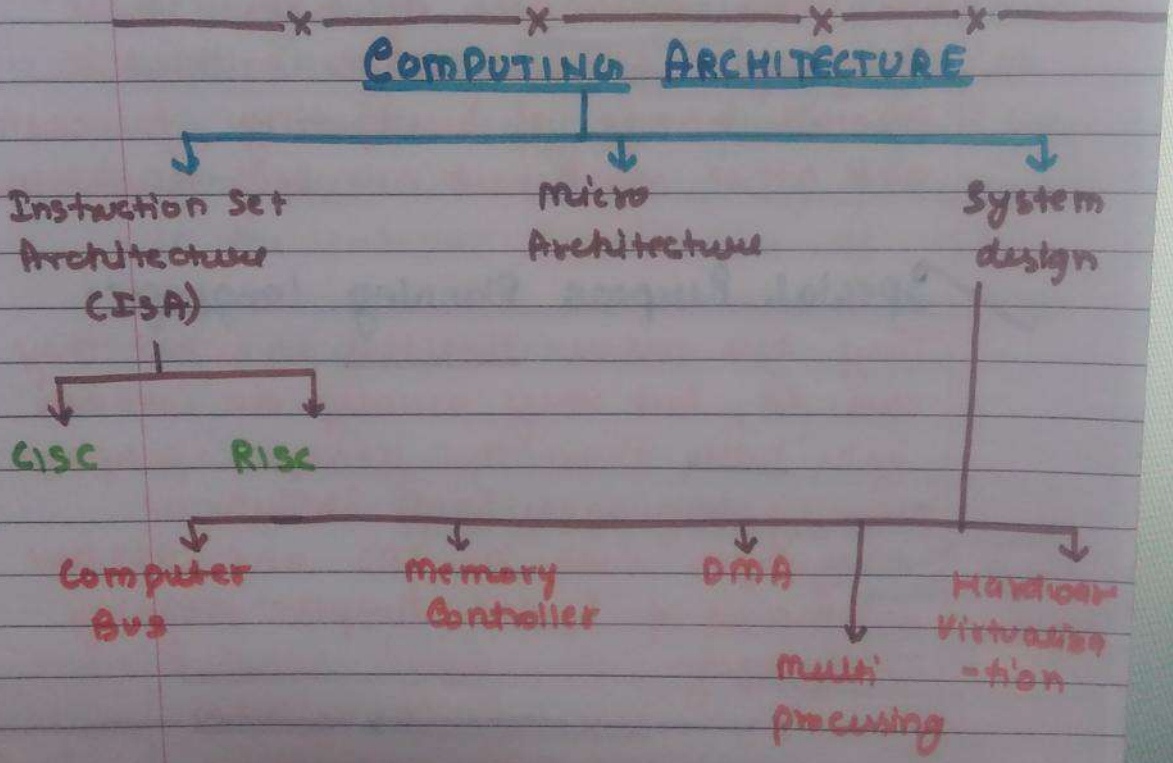
Computer Engineering - It refers to the discipline that integrates several fields of electrical engineering and computer science required to develop computer hardware & software.

Information System - It refers to the study of complementary networks of hardware and software that enterprises, employees or individuals use to collect, process, create, store and distribute data.

Information Technology - It refers to the application of computers and telecommunication to store, retrieve, transmit and manipulate data for

Processing of information in enterprises

Software Engineering- It refers to the application of a systematic, disciplined, quantifiable approach to the design, development, operation and maintenance of Software.



Types of Planning language in DSS

General Purpose Planning language-

It allows the users to perform many routine tasks, for example retrieving various data from a database or performing statistical analyses. The languages in most electronic spreadsheets are good examples of GPPL. These languages enables user to tackle abroad range of budgeting, forecasting and other worksheet oriented problems.

Special Purpose Planning language.

They are more limited in what they can do, but they usually do certain jobs better than the general-purpose planning languages. Some statistical languages such as SAS and SPSS are examples of special purpose planning languages.

ERP → IAR

ERP Systems integrate integrate internal and external management information across an entire organization - taking on finance/accounting, manufacturing, sales and service, customer relationship management. ERP system automate this activity with an integrated software application. The rationale of ERP is to make easy the flow of information between all business functions in the interior boundaries of the organization and control the connections to exterior stakeholders.

Benefits of CRM → GMI ↳ Good Mrng Image.

CRM establishes the benefits of generating Customer loyalty, raising a market intelligence enterprise and an integrated relationship. Preserving existing customers and providing enhanced services to accomplish the loyalty is expressed as CRM. The underlying standard that business exists is their customers

GMI - PP

Developing connection and affiliation with customer and supervising it professionally and effectively so that it is advantageous to both the customer and the business is a noteworthy objective.

Applications of Artificial Intelligence.

ROBOT

a) **Decision Support.** Intelligent work entt that will help you capture capture the "why" as well the "what" of engineered design and decision making.
Intelligent human computer interface systems that can understand spoken language and gestures and facilitate problem solving by supporting organization wide collaborations to solve particular problems.

b) **Information Retrieval.** AI based internet and internet systems that distill tidal waves of information into simple presentations.
Natural language technology to retrieve any sort of online information, from text to pictures, videos, maps etc.

Virtual Reality - X-ray- like vision enabled by enhanced reality visualization that allows brain surgeons to "see through" intervening tissue to operate, monitor and evaluate disease progression

→ **Robotics** - Machine-vision Inspections Systems for gauging, guiding, identifying and inspecting products and providing the competitive advantage in manufacturing.

FFGG

Types of Expert System

- **Example based** - In this developers enters the case facts and results. Through induction the ES converts the example to a decision tree that is used to match the case at hand with those previously entered in the knowledge base.

- **Rule based** - These are created by storing data and decision rules as if-then rules. The system ask the user question and applied the if-then rules to the answers to draw conclusions & make recommendations.

- **Frame based** - It organize all the inform

- mation about a topic into logical units called frames, which are similar to linked records in data files. Rules are then established about how to assemble or inter-relate the frames to meet the user's needs.

News reporter

BUSINESS INTELLIGENCE

Business Intelligence refers to process of collecting and refining information from many sources, analysing & presenting the information in useful ways so that users can make better business decisions. It enables managers to see things with more clarity, and empowers them the peek into powerful future.

BUSINESS INTELIGENCE TOOLS

BI Tools are a type of Software that is designed to retrieve, analyze and report data. Some of key BI tools are :-

Simple Reporting and Querying- This involves using the data warehouse to get response to the query: "Tell me what happened" The objective of BI implementation is to turn operational data into meaningful knowledge.

Business Analysis- This involves using the data to get response to the query "Tell me what happened and why". Business analysis refers to presenting visualizing data in a multidimensional manner.

Dashboards- This involves using the information gathered from the data warehouse and making it available to users as snapshot of many things with the objective of getting response to the query: "Tell me a lot of things, but without too much effort".

Interesting

Scorecards:- This involves providing a visual representation of the enterprise strategy by taking Critical KPIs metrics & mapping them to strategic goals throughout the enterprise.

Approaches to access control

- RBAC
- ABAC

Principle of least Privilage - This is a fundamental principle of information security, which refers to give only those privilages to a user account, which are essential to that user's work.

For eg - a backup user does not need to install software, hence the backup user has rights only to run backup & backup related applications. Any other privileges, such as installing new software should be blocked. The principle applies to personal computer user, who usually does work in a normal user account and opens a privileged, password protected account only when the situation absolutely demands it.

ELECTRONIC CHEQUE

Credit card payments will undoubtedly be popular for commerce on the internet. However following two systems have been developed to let customers use electronic cheques to pay web merchants directly.

By Financial Services Technology Corporation (FSTC) - The FSTC is a consortium of Banks and clearing houses that has designed an electronic cheque. Modeled on traditional paper cheque, this new cheque is initiated electronically and uses a digital signature for signing and endorsing.

By CyberCash - An electronic cheque has all the same features as a paper cheque. It functions as a message to the sender's bank to transfer funds and like a paper cheque, the message is given initially to the receiver who in turn endorse the cheque & presents it to the bank to endorse funds.

SMART CARDS

Smart Cards have an embedded micro-chip instead of magnetic strip. The chip contains all the information a magnetic strip contains but offers the possibility of manipulating the data and executing applications on the card. Three types of Smart Cards are as follow:-

Contact Cards- Smart cards that needs to insert into a reader in order to work, such as a smart card reader or automatic teller machines.

Contactless Cards- Contactless smart Cards dont need to be inserted into a reader Just waiving them near a reader is just sufficient for the card to exchange data. This type of cards is used for opening doors. (Metro Entry Exit)

Combi/Hybrid Cards- Combi Cards contain both technologies and allow a wider range of applications.

Typical On-line transaction.

Advertising :- The company communicates its products and services.

offering :- The company offers specific goods and services.

Selling :- The Company agrees with the customer on the content of a specific order.

Billing :- The Company produces the invoice.

Paying :- The buyer pays the seller by giving a payment instruction.

Matching :- The Seller matches the payment information with the order & feeds the result into back-office.

Delivering - The seller delivers to the buyer

Resolving - The seller and buyer try to resolve delivery or payment issues related purchase.

BATCH PROCESSING

It is defined as a processing of large set of data in a specific way, automatically without needing any user intervention. The data is first collected during a work day for example and then batch processed in one go. This could happen at the end of the work day, for ex when computing capabilities are not needed for other tasks.

Why there is need for BPA?

- **Reducing the impact of Human Error** - BPA removes human participation in the process which is the source of many errors.

- **Transforming data into information** - BPA can't apart from collecting and storing data also analyze data and make it available in a form that is useful for decision making.

- **Improving performance and process effectiveness**. In many cases, tasks must be done manually are the bottleneck in the process. Automating those manual tasks speeds up the effective throughput of the application.

Making users more effective and efficient. People can focus their energies on the tasks they do best, allowing the computers to handle those that machines are best suited for.

Making the business more responsive. Enterprises can easily automate new applications and processes as they are introduced that provide greater control over business and it process.

Vehicle Tracking System

A lot of applications have been developed that allowed entity to track their goods while in transit. Few applications are high end, allowing owner of goods to check the temperature of cold stored goods while in transit. It has features such as GPS based location. GPRS connection based real time online data logging and reporting, route accuracy on the fly while device is moving, real time vehicle tracking to store location inputs during times when GPRS is not available.

Travel management System- Many business processes specific to this industry have been automated including ticket booking for air bus, train, hotel etc. It has features such as streamlined foreign travel approval process, configurable to match enterprise's foreign travel policy compliance 'Safe return' process for people tracking traveller portal for up to date information

VIRTUALISATION

In Computing, Virtualization means to create a virtual version of a device or resource, such as a server, storage device network or even an operating system where the framework divides the resource into one or more execution environment Virtualization refers to technologies designed to provide a layer of abstraction between computer hardware systems & the software running on them.

APPLICATIONS OF VIRTUALIZATION

Major applications of the concepts of the virtualization are given as follows:-

- **Server Consolidation**- Virtual machines are used to consolidate many physical servers into fewer servers, which in turn host virtual machines. This is also known as "Physical - to - Virtual" or "P2V" transformation.

- **Disaster Recovery**- Virtual machines can be used as "hot standby" environments for physical production servers. This changes the classical "backup and restore" philosophy, by providing backup images that can "boot" into live virtual machines.

Testing and Training- Virtualization can give root access to a virtual machine. This can be very useful such as in kernel development and operating system courses.

Portable Applications:- Portable applications are needed when running an applications.

from a removable drive, without installing it on the system's main disk drive.

Portable workspaces - Recent technologies have used Virtualization to create portable workspaces on devices like iPod and USB memory sticks.

Benefits of Grid Computing

Making use of underutilized Resources - In most organizations, there are large amount of underutilized computing resources. In some organizations, even the server machines can often be relatively idle.

Resource Balancing - For application that are grid-enabled, the grid can offer a resource balancing effect by scheduling grid jobs on machines with low utilization. This feature of grid computing handles occasional peak loads of activity in parts of larger organizations.

Parallel CPU Capacity - The potential for usage of massive parallel CPU capacity is one of the most common visions and attractive features of a grid. A CPU intensive grid application can be thought of as many smaller sub-jobs, each executing on a different machine in the grid.

Access to additional Resources - In addition to CPU and Storage resources a grid can provide access to other resources as well. For example - if a user needs to increase their total bandwidth to the internet to implement a data mining search engine, the work can be split among grid machines that have independent connections to internet

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GRID COMPUTING SECURITY

Grid Systems and applications require standard security functions which are authentication, Access Control, Integrity, Privacy. Authentication and access control issues are:-

- To provide authentication to verify the users, process which have user's

computation and resources used by the processes to authenticate.
- To allow local access control mechanisms to be used with without change.

Advantages of Cloud Computing -

Cost Efficient - Cloud Computing is probably the most cost efficient method to use, maintain and upgrade.

Almost unlimited Storage - Storing information in the cloud gives us almost unlimited storage capacity.

Backup and Recovery - Since all the data is stored in the cloud, backing it up and restoring the same is relatively much easier than storing the same on a physical device.

Easy Access to Information - In the cloud, ~~software integration is usually something~~ once we register ourselves in the cloud we can access the information from anywhere, where there is an Internet connection.

Disadvantages of Cloud Computing.

In spite of its many benefits, as mentioned above, cloud computing also has its disadvantages :-

Technical Issues- This technology is always prone to outages and other technical issues. Even the best cloud service providers run into this kind of trouble inspite of keeping up high standards of maintenance.

Security in the cloud- Surrendering all the company's sensitive information to a third-party cloud service provider could potentially put the company to great risk.

Prone to Attack- Storing information in the cloud could make the company vulnerable to external hack attacks and threats. Nothing on the internet is completely secure.

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Process - A process is defined as a sequence of events that uses inputs to produce outputs. This is a broad definition and can include sequences as mechanical as reading a file and transforming the file to a desired output format, to take a customer order, filling that order and issuing the customer invoice.

Diff b/w Functional and Process org".

	Functional org.	Process org
Work unit	Department	Team
key fig.	Functional Executive	Process owner
Benefits	- Focus on functional excellence. - Easier to implement work balancing because workers have similar skills. - Clear management direction on how work should be performed.	- Responsive to market requirements. Improved communication between different functional tasks. Performance measurement aligned with process goals.

eakness	Barrier to Communication between different functions.	Duplication of functional expertise.
	Lack of end to end focus to optimize organizational performance.	Inconsistency of functional performance between process.
	Poor handover b/w functions that affects Customer Service.	Increased operational Complexity.

BUSINESS PROCESS MANAGEMENT

BPM is the methodology used by the enterprise to improve end-to-end business process in various stages. An ERP application divides BPM into the phase - Analyse - Design, Implementation, Run & Monitor and optimize. BPM makes existing process more efficient not only at enterprise level but even for desktop users.

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BPM Principles May 17

Processes are Assets- BPM first principle is PAA that creati Value for Customers. They are to be managed and continuously improved. Because core processes and processes that generati that most value to Customers should be Carefully managed.

Value to Customers- A managed process produces Consistent value to Customers and has the foundation for the process to be improved. Management of process entails the tasks of measuring, monitoring, Controlling and analyzing business processes.

Continuous Improvement- The third principle is Continuous improvement of processes. This is a natural result of process management. Process management is facilitated by availability of process information.

BPM Lgane ke lie कुछ kayde kanoon मानने Padte hai → Process ko Asset manunga, Customer ki Value (Respect) kanunga. Continuous Improvement kanunga.

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Date

Key Success factors of BPR

BPR implies not just change but dramatic change in the way a business functions. It would potentially impact many aspect of business. Research has identified some key factors for BPR projects to succeed - Some of these factors -

Organization wide Commitment - changes to business process would have a direct impact on process, organisational structures, work culture, information flows, infrastructure & technologies and job competencies.

Business need analysis - It is important to identify exactly what current process need redesigning. This would help determine the strategy and goals for BPR. A series of sessions are held with the process owners and all ideas would be evaluated.

Adequate IT infrastructure - Adequate investment in IT infrastructure is done is of vital importance to successful BPR implementation. An IT infrastructure is a set of hardware, software, network in order to develop, test or support IT services.

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Key factors in BPM Implementation

Factors	Key Consideration
Scope	A single process, department, entire Com
Goals	Process understanding, improvement, auto-mation, reengineering.
Methods	Six Sigma, BPM Life Cycle, TQM
Tools	Consultants, Trained Employees, formal Certification, etc.
Skills Required	White Board, Sticky notes, Software for mapping, Documentation.
Investment to make	Training, Tools, Time

BPA Benefits

BPA is a Strategy that is used to optimize and Streamline essential business processes. Some of the Benefits of BPA are as follows:-

Saving on Costs- Automation leads to Saving in time and labour costs.

Staying ahead in Competition- Today in order to survive, business need to adopt automation.

Fast Service to Customers- This was not the initial reason for adoption of BPA but gradually business managers realised that automation could help them to serve their Customers faster & better.

BPA Risks

Risk to Jobs- Jobs that were earlier performed manually by several employees would post automation would be mechanized, thus by posing a threat to Jobs.

False Sense of Security - Automating poor process will not gain better business practice

CHALLENGES IN IMPLEMENTING BPA

Organization rely on a complex, inter-related information systems infrastructure to effectively thrive in the ever increasing competitive digital world. Product, Service price, Competition etc, have increased the complexity of business. Some of the challenges in implementing BPA are as -

1. The number of interface with Customers is growing
2. The product, Service and price options have increased the complexity of business.
3. Most organizations have a whole suite of "build and buy" systems each with its own data format.
4. Budgets are being cut.

VALUE CHAIN AUTOMATION

Value chain refers to separate activities which are necessary to strengthen an organization's strategies and can link together both inside and outside the organization. It is defined as a chain of activities that a firm operating ~~in a specific industry performs~~ [in order to deliver a valuable product or service for the market.

BUSINESS functions of Value chain.

Research & Development
Design of products
Production
Marketing
Distribution
Customer Service.

CREDIT CARD

How a Credit Card is Processed ?

1) Step 1 Authorization - This is the first step in processing a Credit Card. After a merchant swipes the card, the data is submitted to merchant's bank, called an acquirer, to request authorization for the sale.

Step-2 **Batching** This is the second step in processing a Credit Card. At the end of the day, the merchant reviews the all day's sales to ensure that they were authorized and signed by the Cardholder

Step-3 **Clearing**- This is the third step in processing a Credit Card. After the acquirer receives the batch, it sends it through the Card network, where each Sale is routed to the appropriate issuing Bank.

Step-4 **Funding**- This is the fourth step & final step in processing a Credit Card. After receiving payment from the issuer, minus interchange fees, the acquirer subtracts its discount fees and sends the remainder to merchant.

Trends in Telecommunication

a) **Industry Trends** - Towards more competitive vendors, Carriers, alliances and network Services, accelerated by deregulation & the growth of Internet and www.

b) **Technology Trends** - Towards extensive use of Internet, digital fiber-optic, and wireless technologies to create high speed local and global internetworks for voice data, images, audio and video-communications

c) **Business Application Trends** - Towards the pervasive use of the Internet, enterprise Intranets and inter organizational extranets to support electronic business and commerce enterprise Collaboration, and Strategic advantage in local and global markets.

Need and Scope of Networks

- **File Sharing** - It provides sharing and grouping of data files over the network.

- **Resource sharing** - It provides sharing of Computer resources such as hard disk, Printers etc. by multiple users simultaneously to reduce the cost of installing and maintaining multiple resources in organization.

Remote Access - Network allows users to remotely access the data and information from organization network internet in cost effective manner.

Shared Database - Network facilitates simultaneous access the database to multiple users at the same time by ensuring the integrity of database.

Internet access & Security It provide access to internet for transferring the document and to access the resources available on world wide web by maintaining data security.

Issues in client / Server

- When the server goes down, all the computers connected to it become unavailable to use.
- Simultaneous access to data and services by the user takes little more time for server to process the task

Radical Redesign.

Redesign means that BPR is reinventing and not enhancing or improving. In other words, BPR is based on the understanding that the products and services a company offers to the markets and is provided through business processes, and a radical redesign of these processes is road to success.

Failure of BPMS

- Superficial or deficient executive involvement
- Deficient project management
- Breakdown in gap analysis
- Limited options for customization of BPM software is required
- failure to identify future business needs
- Technological obsolescence
- Software fails to meet business needs

Approaches to Mapping

Some of the reasons why documentation is important to Information System-

Depicting how System work- In Computerised System, the processing is electronic and invisible. Therefore documentation is required to help employees understand how a system works.

Training users- Documentation also includes user guides, manuals and similar operating instructions that help people learn how an Information System operates

Designing new Systems - Documentation help System designers develop new systems in much the same way that blueprints help architects design building.

Controlling System development and maint-enance costs- Personal Computer applica-tions typically employ prewritten, off the shelf Software that is relatively reliable and inexpensive

Process oriented Organization Banao
↓
Har Process का owner Appoint करो
↓
IT Systems (PC लगाओ)
↓
Employees को Train करो
↓
Process continuously improve करो
↓
Jo Sbse अच्छा काम करे
Use bonus or reward do

BPM Practices (BPM ko effect में Lane ke Lie kya karna pdta है)

- Strive for process-oriented organizational structure
- Appoint process owners
- Put in place information technology systems to monitor, control, analyze and improve processes
- Continuously train the workforce and
- Continuously improve business processes.
- Align employee bonuses and rewards to business process performance.

Aspects in Network Security

Based on increase demand and expectations the network security involves four aspects-

- Privacy - This means that the sender and the receiver expect confidentiality. The transmitted message should make sense to only the intended receiver and the message should be unintengible to unauthorised users.

- Message Authentication - This means that the receiver is sure of the sender's identify and that an imposter has not sent the message.

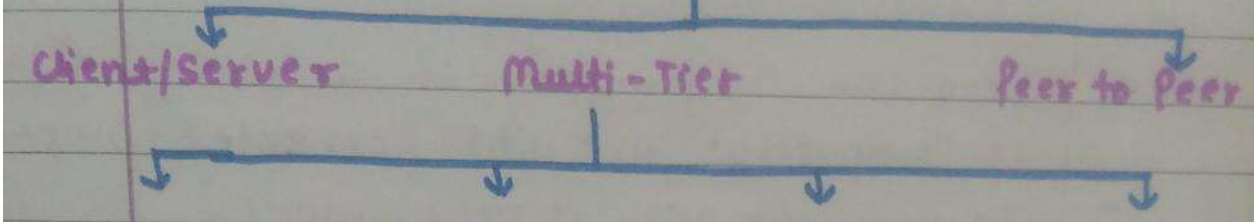
Message Integrity - This means that the data must arrive at the receiver exactly as it was sent.

Non - Repudiation - This means that the ~~data must arrive~~ receiver must be able to prove that a received message came from a specific sender and the sender must not be able to deny sending it.

Specialised Systems

Specialised systems provide comprehensive end to end IT solutions and services including systems integration, implementation, engineering, services, software application customization and maintenance to various corporations. These systems offer comprehensive solutions to various sectors to confront challenges and convert every challenge into an opportunity.

Functional Based Classification:



CAP

Peer to Peer Networking

- Peer to Peer network is created with two or more PCs connected together and share resources without going through a separate server computer.
- A P2P network can be and adhoc connection - a couple of computers connected via a universal serial bus to transfer files.
- A peer to peer network also can be a permanent infrastructure that links half dozen computers in a small office over copper wires.

Advantages

- Easy and Simple to set up
- Only Require a switch or hub to connect all the Computers together.
- It is very Simple and cost effective.

Disadvantages

- There can be problem in accessing files if computers are not connected properly.
- The data security is very poor.

Single Tier

- A single computer that contains a database and a front-end to access the database is known as single-tier.
- Generally this type of system is used in small business
- One tier involves putting all of the required components for a software application on a single server.

Advantages

- A single tier system requires only one stand alone computer. It also requires only one installation of proprietary software which makes it the most cost-effective system available.

Disadvantages

- It can be used by only one user at a time. A single tier system is impractical for an organization which requires two or more users to interact with organizational data stores at same time.

Two Tier Architecture (client / Server)

-- A two-tier System Consists of a client and a Server.

- A two-tier architecture is a Software architecture in which a presentation layer or interface runs on a client and a data layer or data Structure gets stored on a Server.
- In other words, the database is stored on the Server and the interface used to access the database is installed on client.

Advantages

- This System performance is higher because business Logic and database are physically close.
- By having Simple Structure, it is easy to setup and maintain entire System Smoothly.

Disadvantages

- Performance deteriorates if number of users increases.
- There is restricted flexiblity and choice of DBMS, since data language used in Server is proprietary to each vendor.

n-tier Architecture

n-tier architecture is a client-server architecture in which presentation, application processing and data management functions are logically separated. By segregating an application into tiers, developers acquire the option of modifying or adding a specific layer, instead of reworking the entire application.

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three-tier architecture

- Three tier architecture is a client-server architecture in which the functional process logic data access, computer data storage and user interface are developed and maintained as independent, modules on separate platforms.
- Three tier architecture is a software design pattern and well established software architecture.
- Its three tiers are presentation tier, application tier and data tier.

Advantages

- Clear Separation of user interface - Control and data presentation from application - logic. Through this separation more clients are able to have access to a wide variety of Server applications.
- Dynamic load balancing. If bottlenecks in terms of performance occur, the Server process can be moved to other Servers at runtime.
- It is easy and faster to exchange a Component on the Server than to furnish numerous PCs

Disadvantages

- Current tools are relatively immature and are more Complex.
- It Created an increased need for network traffic management, Server load balancing, and fault tolerance.

ADS - NHP

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Date :

Information System Layers

1) **Application Software** - This includes all those Computer Software that cause a Computer to perform useful tasks beyond the running of the Computer itself. Application Suite, Enterprise Software, Content Access Software etc.

2) **DBMS** - DBMS are Software that aid in organizing, Controlling and using the data needed by the application programme. Commercially available DBMS are Oracle, SQL Servers.

3) **System Software** - System Software is a Computer Software that is designed to operate the Computer hardware and to give and maintain a platform for running application Software. Example - operating System.

4) **Hardware** - Hardware basically Consists of devices that perform the functions of input, processing, data Storage and output activities of the Computer.

Network Links - Effective and efficient Communication is a valuable resource which helps in good ~~ton~~ Management. To enable this Communication, we need Communication networks.

People/users - The people involved users of the System and information Systems personnel, including all the people who manage, run, program and maintain the System.

INFORMATION SYSTEM CONTROLS

Managerial Controls

- Top Management Controls
- Information System management Controls
- System Development Management Controls
- Programming Management Controls
- Data Administration
- Quality Assurance management Controls
- Operations Management Controls
- Security administration Controls.

Application Controls

Boundary Controls

- Cryptography
- Access
- PIN
- DSC
- Proxies Cards

Input Controls

- Source Document
- Data Coding
- Batch
- Validation

Communication Controls

- Physical Component
- Line Error
- Flow
- Link
- Topological
- Channel Access
- Inter networking

Processing Controls

- Run-to-Run totals
- Reasonableness Verification
- Edit Checks
- Field Initialization
- Exception Reports

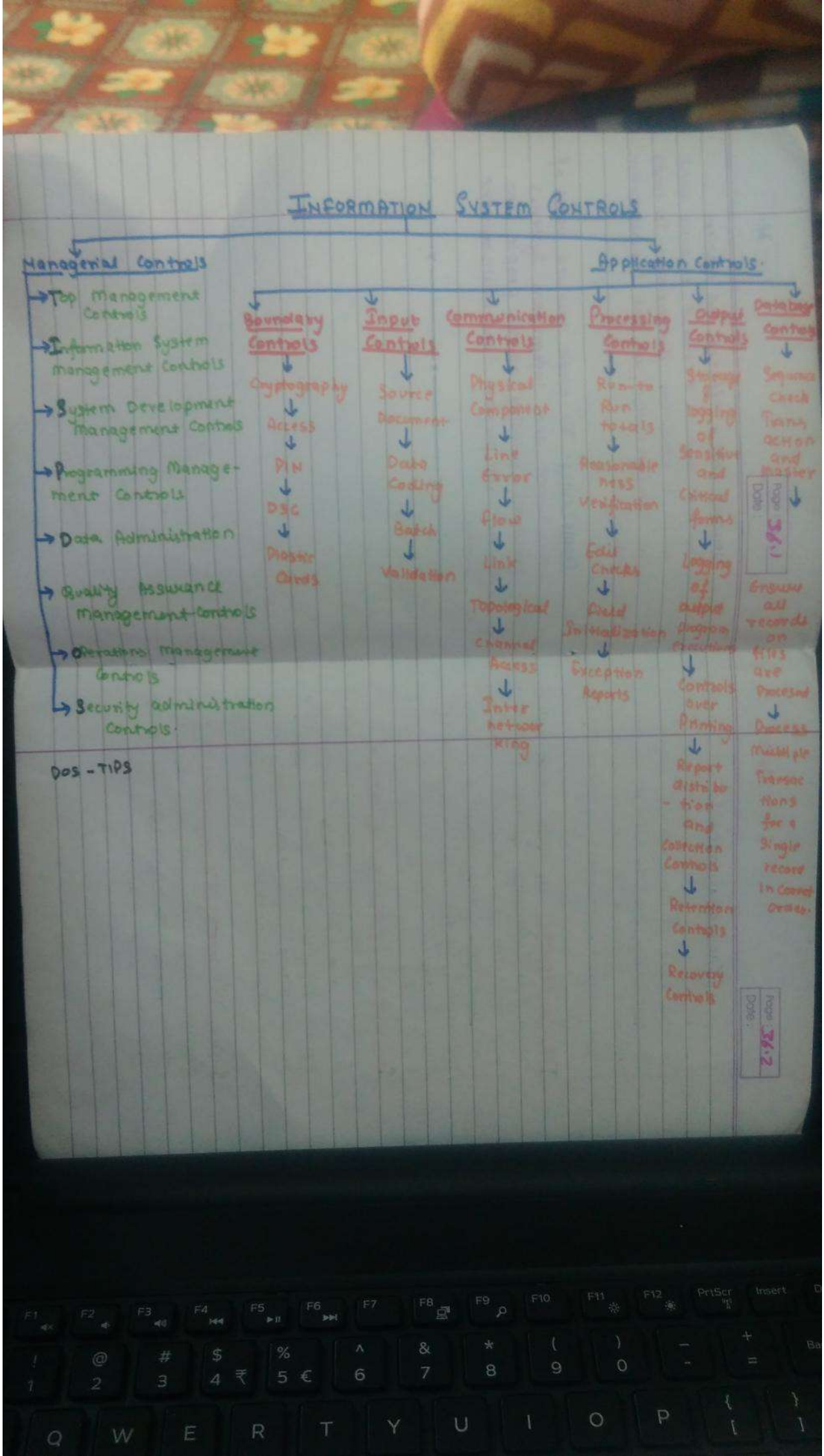
Output Controls

- Storage & logging of Sensitive and Critical forms
- Logging of output Spooling
- Controls over Printing
- Report distribution and Collection Controls
- Retention Controls
- Recovery Controls

Database Controls

- Sequence Check Terminal action and master
- Ensure all records on files are Processed
- Process Multiple Transactions for a Single record in Correct Order.

DOS - TIPS



Managerial Controls

In this part we shall examine controls over the managerial functions that must be performed to ensure the development, implementation, operation of information System.

Top Management:- Top Management must ensure that Information Systems function is well managed. It is responsible primarily for long-run policy decisions on how information System will be used in the organizations.

Information System Management.- IS management has overall responsibility for the planning and control of all information System activities. It also provides advice for top management in relation to long run policy decision making.

System Development Management.- System development management is responsible for the design, implementation of application systems.

Programming Management - It is responsible for programming new system, maintain old system and providing general system support software.

Data Administration - Data administration is responsible for addressing planning & control issues in relation to use of organization's data.

Quality Assurance Management - It is responsible for ensuring information system development, implementation and maintenance conform to established quality standards.

Security administration - It is responsible for access controls and physical security over the information systems function.

Operations Management - It is responsible for planning and control of the day to day operations of information systems.

Boundary Controls

Cryptographic Controls - These are designed to protect data privacy and to prevent unauthorized modifications to data. Cryptography achieves this goal by scrambling data into codes so that it is meaningless to anyone who does not possess the authentication to access the respective system resource.

Access Controls - These Controls restrict the use of Computer System resources to authorized users, limit the actions authorized user can take with these resources. Access Control mechanism processes users requests for resources in three steps:-

- Identification - first users to identify themselves to the mechanism, thereby indicating their intent to request system resources.
- Authentication - It is a two way process wherein users must authenticate themselves, and the mechanism must authenticate itself.

Authorization - Users must request specific resources and specify the actions they intend to take with the resources.

- PIN - The PIN is similar to password assigned to a user by an institution based on the user characteristics and encrypted using a Cryptographic algorithm

- Digital Signature - In Computer System, Digital Signature establish the authenticity of persons and prevent the denial of messages when data is exchanged electronically.

- Plastic Cards - Plastic Cards are used to store information required in an authentication process. These Cards are used to identify a user need to go through procedural Controls like application preparation of Card, Issue Card, use Card.

Input Controls

These are responsible for ensuring that accuracy and Completness of data that are input into an application System.

Source Document Control- From a Control viewpoint, a well designed Source documnt reduces the likelihood of data recording errors, increases the speed with which data can be recorded and Controls the work flow.

Data Coding Controls - Data Coding Controls are put in place to reduce user error during data feeding.

Batch Controls - These are put in place at locations where batch processing is being used. Batch processing is where there is a time gap between occurance and recording of transactions.

Validation Controls - These validate the accuracy of input data. Input validation Controls are intended to detect errors in transaction data before the data are processed.

Communication Controls

Components in Communication are responsible for transporting data among all the other subsystems within a system and for transporting data from another system.

Physical Component Controls - One way to reduce expected losses in the Communication subsystem is to choose physical component that make them reliable.

Flow time Controls - These are needed because two nodes in a network can differ in terms of rate at which they can send receive and process data.

Link Controls - This involves two common protocols - HDLC and SDLC; the study of these is byond the scope of this book.

Topological Controls - Communication network topology specifies the location of nodes within a network. Some of the four basic topologies include Bus, Ring, Star, Mesh Topology.

Process Controls

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Earlier Done.

Output Controls

Output Controls ensure that the data delivered to users will be presented, ~~formatted~~ and delivered in Consistent and Secured manner.

Control over Printing - It should be ensured that unauthorized disclosure of information printed is prevented.

Report distribution and Collection Controls - Distribution of reports should be made in a Secure way to avoid unauthorized disclosure of data.

Retention Controls - Retention Controls Consider the duration for which outputs should be retained before being destroyed.

Recovery Controls - These Controls are needed to recover output in the event that it is lost or destroyed.

Database Controls

The database subsystem is responsible for defining, Creating, modifying, deleting and reading data in an information system.

- **Sequence check Transaction & Master file-** Correct Sequence of processing between master file and transaction file is Critical to maintainie the integrity of updation, insertion or deletion of record in master file w.r.t transaction records.

- **Ensure all records on files are processed-** while processing the transaction file records mapped to the respective master file the end of file of transaction file w.r.t. end-of-file of master file is to be ensured.

- **Process multiple transactions for a single record in Correct Order-** Multiple transaction can occur based on single master record.