

EXTRACT FROM GANAPATHI SIR MATERIAL

RAPID REVISION MATERIAL FOR MICS

PREFACE

1. First of all, read the chapter thoroughly from study material provided by the ***Mr. GANAPATHI.***
2. After reading the chapter from the study material, memorize the chapter from this notes for each topic.
3. Be clear with the chapter while you are reading it in the material of ***SUPERWHIZZ***
4. It is preferable to go for this material after a thorough knowledge of the concepts since this is an extract of what was present in the material
5. Some of the chapters presented here are just an outlay since the chapter condensation is not possible at large.
6. Whenever you wish to revise the chapter, you will get it within 5 minutes.

Using this notes entire syllabus of MICS can be revised within 2 1/2 hours.

HERE IS SOME ANALYSIS REGARDING CHAPTERS

CHAPTERS-1,2,3,4,5	LOGICAL CHAPTERS
CHAPTERS-7,8,9,10,11	DEVELOPMENT AND DEPLOYMENT
CHAPTERS-13,14,15,17,18	MONITORING & CONTROLLING
CHAPTERS-6,12,16,19	TECHNICAL & OTHER

This way you can revise the syllabus of MICS 4 to 5 times in examination period.

BEST OF LUCK FOR YOUR PREPARATION

**TABLE SHOWING THE OCCURRENCE OF CHAPTERS IN
DIFFERENT QUESTIONS**

ATTEMPT QUESTION NO	N2	M3	N3	M4	N4	M5	N5	M6	N6	M7	N7	M8	N8	M9	
1(a)	17	16	17	16	17	17	17	13	18	14	17	17			CHAPTER 17,13,16
1(b)	13	18	17	17	16	16	17	16	14	18	16	19			
1(c)	0	0	17	0	0	15	13	3	13	19	4	13			
1(d)	0	0	13	0	0	0	13	15	13	17	7	16			
2(a)	3	3	4	7	4	18	4	1	3	9	18	11			CHAPTER 3,5,4,1
2(b)	5	1	3	7	4	5	1	4	4	12	1	3			
2(c)	0	0	0	3	5	3	7	4	0	0	0	0			
3(a)	6	7	6	8	6	8	5	7	7	11	19	7			CHAPTER 6,7,8,
3(b)	7	4	7	9	6	9	8	5	8	5	11	15			
3(c)	7	0	0	0	6	0	0	6	9	0	0	0			
4(a)	12	9	10	13	9	4	9	11	11	8	10	12			CHAPTER 9,10,11
4(b)	11	12	10	14	9	7	12	9	10	13	7	5			
4(c)	11	0	11	15	10	13	0	10	18	15	8	15			
5(a)	16	10	12	4	12	13	15	14	16	7	9	8			CHAPTER 12,13
5(b)	18	11	12	4	11	10	13	12	19	16	13	6			
5(c)	0	0	15	6	11	8	14	19	13	2	15	4			
5(d)	0	0	0	0	0	0	0	0	0	0	0	9			
6(a)	15	17	18	18	15	12	7	18	15	10	12	18			CHAPTER 18,19
6(b)	8	6	19	19	18	12	9	13	16	6	9	10			
6(c)	0	0	0	19	0	19	16	8	16	1	5	13			
6(d)	0	0	0	0	0	0	0	0	0	0	0	18			
7(a)	7	19	5	15	4	14	6	13	12	7	16	1			ALL CHAPTER
7(b)	19	17	8	17	12	7	19	7	17	10	16	3			
7(c)	5	15	16	13	13	6	12	4	18	18	19	9			
7(d)	10	4	9	1	7	15	10	13	18	17	7	13			
7(e)	0	13	14	0	0	0	0	9	0	0	0	0			

**TABLE SHOWING WEIGHTAGE OF EACH CHAPTER IN
DIFFERENT ATTEMPTS OVER A PERIOD**

ATTEMPT CHAPTER	N2	M3	N3	M4	N4	M5	N5	M6	N6	M7	N7	M8	N8	M9	
CH-1	0	10	0	5	0	0	5	10	0	5	10	5			50
CH-2	0	0	0	0	0	0	0	0	0	5	0	0			5
CH-3	8	10	12	10	0	5	0	5	10	0	0	15			75
CH-4	0	14	8	8	20	10	10	15	10	0	5	5			105
CH-5	17	0	5	0	5	5	10	5	0	10	5	5			67
CH-6	8	10	8	12	20	5	5	5	0	5	0	5			83
CH-7	17	10	12	10	5	10	15	15	10	15	15	10			144
CH-8	10	0	5	10	0	15	10	5	5	10	5	5			80
CH-9	0	10	5	10	10	10	15	10	5	10	15	10			110
CH-10	5	10	8	0	10	5	5	5	5	15	10	5			83
CH-11	10	10	12	0	10	0	0	10	10	10	10	10			92
CH-12	10	10	10	0	15	10	15	5	5	10	10	5			105
CH-13	10	4	10	15	5	15	15	20	20	5	5	15			139
CH-14	0	0	5	5	0	5	5	10	5	5	0	0			40
CH-15	10	4	10	10	10	10	10	5	5	5	5	20			104
CH-16	10	10	4	10	10	5	5	5	20	5	15	5			104
CH-17	10	14	10	15	10	10	10	0	5	10	5	5			104
CH-18	10	10	10	10	10	10	0	10	20	10	10	10			120
CH-19	5	4	10	10	0	10	5	5	5	5	15	5			79

FREQUENCY TABLE SHOWING OCCURANCES

OCCURANCES CHAPTER	FREQUENCY	Q1	Q2	Q3	Q4	Q5	Q6	Q7
1	7	0	4	0	0	0	1	2
2	1	0	0	0	0	1	0	0
3	9	1	7	0	0	0	0	1
4	16	1	7	1	1	3	0	3
5	10	0	3	3	1	0	1	2
6	12	0	0	6	0	2	2	2
7	21	1	3	7	2	1	1	6
8	11	0	0	4	2	2	2	1
9	16	0	1	3	5	2	2	3
10	13	0	0	0	6	2	2	3
11	11	0	1	2	5	3	0	0
12	15	0	1	0	4	4	3	3
13	23	8	0	0	3	4	2	6
14	7	2	0	0	1	2	0	2
15	15	2	0	1	3	3	3	3
16	16	7	0	0	0	3	3	3
17	17	12	0	0	0	0	1	4
18	16	3	2	0	1	1	6	3
19	13	2	0	1	0	2	4	4

CHAPTER – 1

BASIC CONCEPTS OF SYSTEMS

“A System is a set of inter-related elements that operate collectively to accomplish some common goal”.

TYPES OF SYSTEMS

1. ACCORDING TO COMPONENTS /ELEMENTS

Abstract System

It is an orderly arrangement of independent ideas or constructs.

Physical System

It is set of elements which operate together to accomplish an objective

It consists of physical elements rather than ideas.

2. ACCORDING TO BEHAVIOUR

Deterministic & Probabilistic system

- A deterministic system operate in a predictable manner
- Interaction among parts with certainty
- Description of the state + description of its operation = next state of the system
Eg: prediction of demand.

3. ACCORDING TO LEVEL OF INTERACTION

Closed system

- Self contained and rarely receives input from the outside
- No interaction across its boundary.
- Relatively closed system (it is a closed but not completely closed system).



Open system

Actively interacts with other systems, establishes exchanges relationships

Behave as relatively closed system to preserve their identity and autonomy



SYSTEM ENVIRONMENT

- The features that define and describe a system, form its boundary
- System is inside the boundary
- Environment outside the boundary

SUB-SYSTEM

It is a part of larger system.

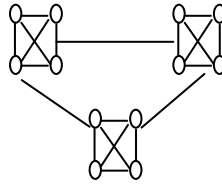
Inter-connections & interactions between the sub-systems are called *interfaces*.

Decomposition

It is the process of dividing a system into sub-systems and so on.
This process is continued until smallest subsystem is of manageable size

Simplification

It is the process of organizing sub-system to simplify their inter-connections (clusters of sub-systems are established).



Preventing system entropy

Decay or become disordered

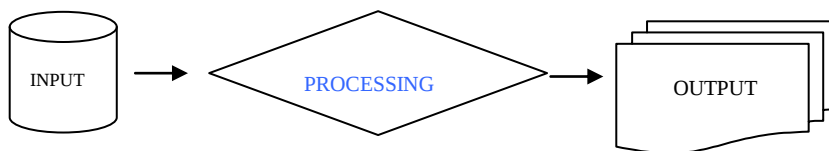
- System Entropy means decay, disorder of a system.
- Negative entropy is the process of preventing entropy by input of matter, repair, replenish & maintenance.

System Stress & System Change

- A stress is a force transmitted by a system's supra-system that causes a system to change.
- It arises due to 2 reasons :-
 - ➔ Change in the goal &
 - ➔ Change in the achievement level.
- Systems accommodate stress through structural changes or process changes.

Supra-system

It is an entity formed by a system / sub-system and its related systems / sub-system



Characteristics

- ➔ Timeliness
- ➔ Purposeful
- ➔ Mode and Format (visual, verbal or written)
- ➔ Redundancy
- ➔ Rate of transmission (bits per minute)
- ➔ Frequency (daily, weekly, or monthly)
- ➔ Completeness
- ➔ Reliability
- ➔ Cost-Benefit Analysis
- ➔ Validity
- ➔ Quality

VALUE OF INFORMATION (READ IN MATERIAL)

Business Information System

- Transaction Processing System
- Management Information System
- Decision Support System
- Executive Information System
- Expert System (Artificial Intelligence) – It replace the need for human expertise. It is useful for a specific area e.g. taxation problem, refinery, etc.

CHAPTER – 2

TRANSACTION PROCESSING SYSTEM

“Transaction processing systems are computerized systems that perform and record the daily routine transactions necessary to conduct the business. Captures data and information reporting”.

TRANSACTION PROCESSING CYCLE

- ➔ Revenue cycle
- ➔ Expenditure cycle
- ➔ Production cycle
- ➔ Finance cycle

Components of transaction processing system

- ➔ Input
- ➔ Processing (on-line processing, batch processing)
- ➔ Storage
- ➔ Output

PLEASE REFER MATERIAL FOR FURTHER DETAILS

CHAPTER-3

BASIC CONCEPTS OF MIS

“MIS as an approach that visualize the organization as a single entity composed of various inter-related and inter-dependent sub-systems to provide timely & accurate information for management decision making, which leads to the optimization of overall enterprise goals”

- MIS is a network of information that supports management decision making.
- It uses the information resource for effective & better achievement of organizational objectives.

M I S

Management

- Determining the objectives
- Developing plans
- Securing & organizing various resources
- Exercising adequate controls
- Monitoring the results

Information

- Reprocessing of data & putting them into a meaningful & useful context

System

- Consisting of a number of elements operating together for accomplishment of an objective.

Characteristics of an effective MIS

1. *Management oriented* [Development of MIS starts from the need of the management]
2. *Management directed* [management actively directs the MIS development]
3. *Integrated* [all the information sub-system works as a single entity]
4. *Common Data Flow* [common input, processing & output procedures & media]
5. *Heavy planning element* [consumes substantial time to develop]
6. *Sub-system concept* [entire MIS is divided into smaller sub-systems]
7. *Common Database*
8. *Computerized*

Misconceptions about MIS/Myths about MIS [and their clarifications]

1. **The study of management information system is about the use of computers**
 - a. [it may or may not involve computers]
2. **More data in reports means more information for managers**
 - a. [quality of data and not the quantity of data is relevant]
3. **Accuracy in reporting is of vital importance**
 - a. [Information may be approximate. Accurate information involves higher cost]

PRE-REQUISITES OF EFFECTIVE MIS

- ➔ Database and DBMS
- ➔ Qualified system & management staff
- ➔ Support of Top management
- ➔ Control & maintenance of MIS
- ➔ Evaluation of MIS

CONSTRAINTS IN OPERATING MIS

- Non availability of experts
- Difficulty in dividing MIS into sub-systems
- MIS is non standardized
- Non co-operation from staff
- Difficult to quantify the benefits of MIS
- High turnover of experts in MIS

EFFECTS OF USING COMPUTER MIS

- ➔ Speed in information processing & retrieval of data increases
- ➔ Scope of use of information system has expanded
- ➔ Scope of analysis widened
- ➔ Complexity of system design and operation increased
- ➔ Integrates the working of different information sub-system
- ➔ Increases the effectiveness of information system
- ➔ More comprehensive information

LIMITATIONS OF MIS

- a. Effectiveness of MIS depends upon the quality of input and process
- b. Not a substitute of effective management
- c. MIS lacks flexibility
- d. MIS cannot provide tailor made information packages
- e. Ignores the non quantitative factors (attitude & morale)
- f. Useless for non programmed decisions
- g. Difficult to maintain privacy & secrecy
- h. MIS effectiveness decreases with frequent changes in top management organizational structure and operational team

INFORMATION NEEDS OF MANAGERS

“Information is the substance on which business decisions are based”

TYPES OF INFORMATION

Environmental Information

- Govt. policies
- Factors of production
- Technological information
- Economic trend

Competitive Information

- Industry demand
- Firm demand
- Competitive data

Internal

Information

- Sales forecast
- Financial budget
- Supplier factors
- Internal policies

INFORMATION REQUIREMENT

Operational function

Grouping of functional activities on the basis of related activities into a sub-system

Types of decision making

REFER NOTES FOR CONVINIENCE

Level of management activity

REFER NOTES FOR CONVINIENCE

LEVELS OF MANAGEMENT & THEIR INFORMATION REQUIREMENT

Top Level (Strategic Level)

- Determining the overall goals & objectives
- Economic / political / social information
- Competitive information

Middle Level (Tactical Level)

- Sales Manager, Purchase Manager, Finance Manager
- Most of the information is internal
- Demand & supply information

Supervisory Level

- Section officers, Foreman
- Instruct and supervise employees
- Make routine & day to day decisions.

Database is a super-file that consolidates & integrates the data that was previously stored in different files.

CHAPTER – 4

SYSTEMS APPROACH & DECISION MAKING

System Approach to Management

- ⇒ It's a way of thinking about management problems.
- ⇒ Each problem should be examined in its entirety and effect of the proposed changes to each part of the organization
e.g. changing from batch production to continuous production will affect finance, warehousing, purchase department, etc.

Steps involved in decision making

1. Defining the problem
2. Analyzing the reasons
3. Identifying the alternative solutions
4. Evaluation of the same
5. Selection of the best alternative
6. Implementation of the solution

Decision-Making

- ⇒ It is a never-ending process of choosing a particular course of action out of several alternative courses for achievement of desired goals.
- ⇒ Pre-decisional, decisional & post-decisional functions are performed by management.

Classification of decisions

1. Programmed & non-programmed decisions
2. Strategic & tactical decisions
3. Individual & group decisions

Model

A model is created with help of simulation techniques in such a way that it behave exactly in the same way as the real life system

- Define the problem
- Define the objectives
- Create a model with the help of simulation techniques
- Collect sample data
- Feed the sample data in model & collect result
- Compare the results with real life system and refine the model if necessary
- Then use model in decision making to study a large number of characteristics before selecting a most suitable alternative.

Functional Information Areas

Finance & Accounting	Production	Marketing	Personnel
Financial decision making involves decision regarding procurement & effective utilization of funds. - Estimation of funds & the timing. - Capital structure. (Optimum Mix) - Capital budgeting (Investment) - Profit planning - Tax management - Working capital management - Current Assets management.	⇒ Production Planning ⇒ Production Control ⇒ Material requirement planning (MRP) Production Planning ⇒ What to produce ⇒ When to produce ⇒ How to produce.	Marketing bridges the gap between the firm & its customers. - Sales support & analysis. - Market research & intelligence. - Advertising & promotion. - Product development & planning. - Product pricing - Customer service <u>3 types of information</u> - Internal - Competitive - Environmental	⇒ Proper recruitment ⇒ Placement ⇒ Training ⇒ Compensation ⇒ Maintenance ⇒ Health & Safety <u>Sources of information</u> ⇒ Accounting information system ⇒ Payroll processing ⇒ Cost estimating for wage neogatiations

CHAPTER – 5

DECISION SUPPORT

&

EXECUTIVE INFORMATION SYSTEM

Decision Support System

- ⇒ It is a system that provides tools to managers to assist them in solving semi-structured & unstructured problems (it is not a means to replace the management).
- ⇒ Programmed Decision System replace human decision making (no management is involved).

Properties of DSS

1. Support semi-structured & unstructured decisions
2. Ability to adapt the changing needs
3. Ease of learning & use

Components of DSS

1. Users → (Managers)
2. Databases
3. Planning Languages (General purpose, special purpose)
4. Model Base (Brain of the DSS, custom developed)

Tools of DSS

1. Data based software
 2. Model based software
 3. Statistical software
 4. Display based software
- } Integrated Tools combines all these software in one package.

Example DSS in Accounting

2. Cost Accounting System (Generally used in Health Care industry)
3. Capital Budgeting System (Calculates NPV, IRR of various projects)
4. Budget Variance Analysis System (Forecasting budget & analyzing variances)
5. General Decision Support System, etc.

Executive Information System

1. It is a DSS designed to meet the special needs of top-level management and having additional capabilities such as e-mail.
2. It provides on-line access to information in a useful & navigable format (mouse & touch screen driven, pictorial & graphical presentation).

Types of planning by top level management

- ⇒ Executives
- ⇒ Executive roles and decision making
- ⇒ Strategic Planning (CEO level)
- ⇒ Tactical Planning (Planning to carry out Strategic Planning)
- ⇒ Fire Fighting (Major damage, new competitor, strike)
- ⇒ Control (General controls)

Characteristics of Information obtained in EIS

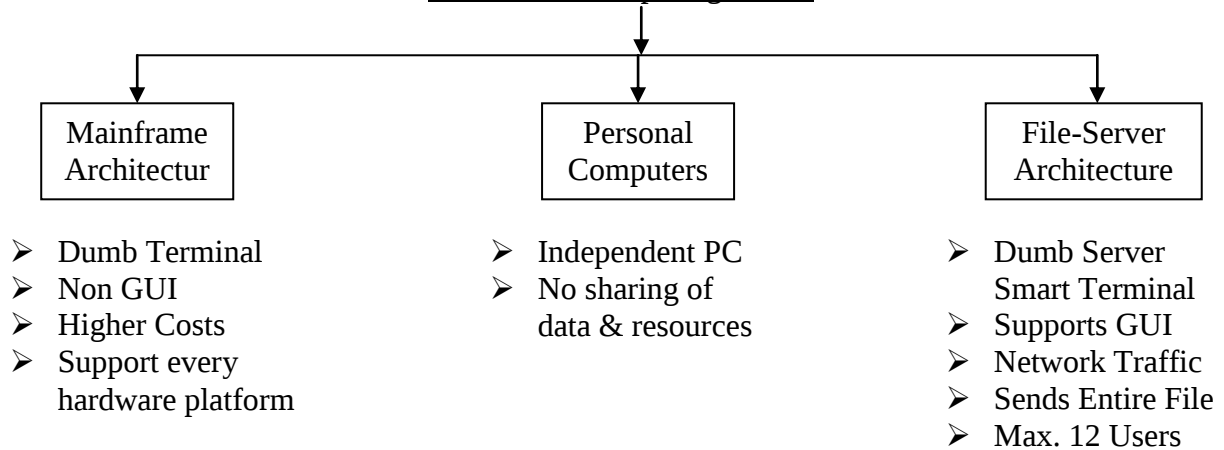
- Lack of structure
- High degree of uncertainty
- Future Orientation (Economic trend, govt. decision, consumer choice, competitor, etc.)
- Informal source
- Informal Source
- Low level of details

READ THE REST OF MISCELLANEOUS TOPICS IN THE MATERIAL

CHAPTER-6

ENABLING TECHNOLOGIES

Traditional Computing Model



Client Server (C/S) Model - (Cost Reduction Technology)

- It's a form of distributed processing
- Divides processing work between server & work-station
- Server-Global Task; Client-Local Task
- Send only requested data

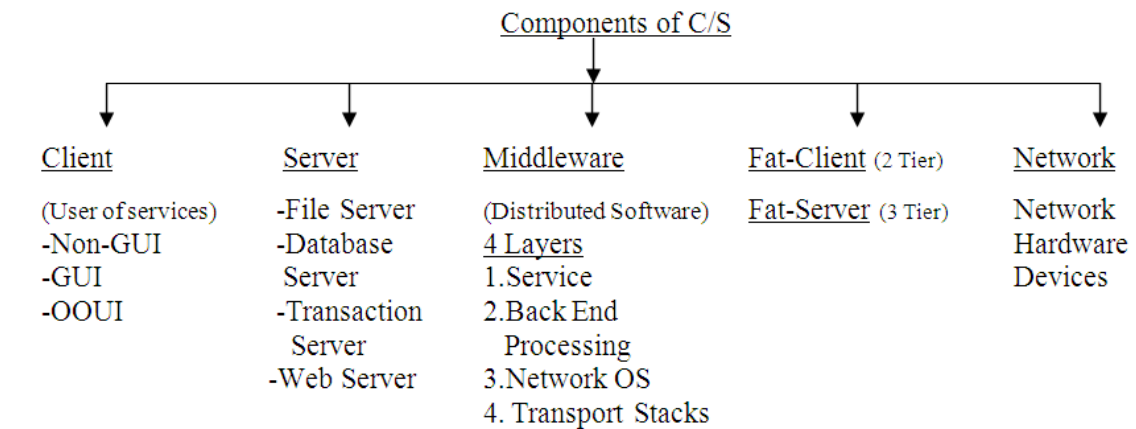
Advantages of C/S

- | | |
|--|----------------------------------|
| 1. Cost Reduction | 7. Easy to add new hardware |
| 2. Improved flow of information | 8. Takes less people to maintain |
| 3. Direct access to data | 9. User Friendly GUI |
| 4. Increased data integrity & security | 10. SQL capability |
| 5. Better Connectivity | 11. Data protection & security |
| 6. Increased Productivity | 12. Access to multiple servers |

Example of C/S :- Online Banking, Call-Centre, E-Comm., Internet

Elements of C/S

- | | |
|-------------------------|---------------------|
| 1. Data Storage | 4. Operating System |
| 2. DBMS | 5. User Interface |
| 3. Application Software | 6. Display Devices |



Middleware – It is a distributed software that allows client & server to connect

Service Layer – Carries coded data from software application.

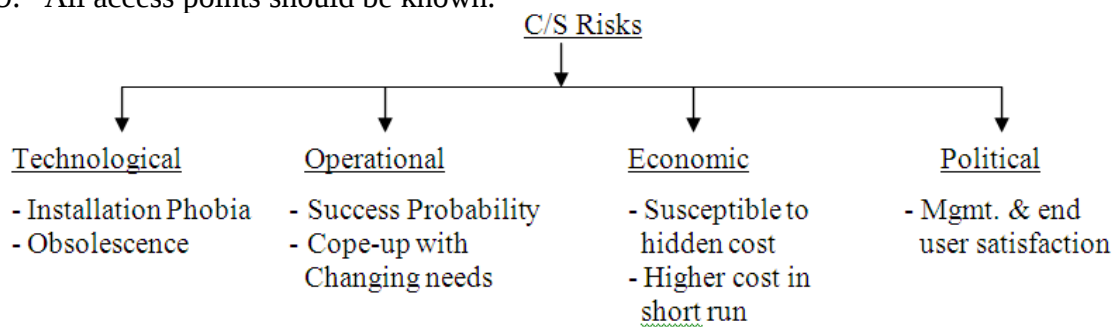
Back End Processing – Encapsulate network instructions.

Network OS – Adds additional instructions.

Transport Stacks – Transfers data packets to the designated receiver.

Considerations for C/S Security

1. Disabling Floppy Drives
2. Disk-less workstations
3. Automatic booting
4. Network Monitoring
5. Data Encryption
6. Authontication System (Log-in ID & Password)
7. Smart Card System
8. Access only to required task.
9. All access points should be known.



Server Centric Model

C/S with dumb terminals.

Processing is done on server; client does the data entry & gets display of information.

CHAPTER-7

SYSTEM DEVELOPMENT PROCESS

- Process of examining of business situation with the intent of improving it.

System Analysis

System Design

System Development Life Cycle (Traditional Approach)

- Preliminary Investigation
- Requirement Analysis
- System Analysis (*Present & Proposed*)
- Design of System
- Acquisition & Development of software
- System Testing
- Implementation & Maintenance

Reasons for failure to achieve system development objectives

1. Lack of senior management support
2. Changing user needs
3. Difficult to design strategic system (Because they are unstructured)
4. Incompatibility of staff with new technology.
5. No proper standard & method of project management & system development
6. Over-worked or under-trained development staff
7. Resistance to change
8. Lack of user participation in development
9. Inadequate testing & training.

Approaches to System Development

1. Traditional Approach

- Perception and expression of needs
- Preliminary investigation
- Requirement analysis
- Systems design
- Systems acquisition
- Systems testing
- Systems implementation.

- Activities are performed in sequence
- Work performed in each stage are reviewed by managers & users
- It takes years to develop, analyze & implement.

2. Prototyping Approach

- Develop small pilot version called proto type of part or all of the system
 - Useful when system requirement is not known or difficult to determine
 - Developed in small parts (*prototypes*) & at lesser cost
 - Developed prototypes are refined & either turned into final system or scrapped.
- Prototyping can be viewed as a series of four steps:

- a) Identifying information system requirement
- b) Develop the initial prototype
- c) Test & Revise
- d) Obtain user's signoff of the approved prototype

Advantages

- a) It involves intensive involvement by the systems users and typically results in a better definition of the user needs and requirements
- b) A very short time is required to develop
- c) More reliable Less costly

Disadvantages

It can be successful if the system users are willing to devote significant time in experimenting with the prototype

3. End User Development Approach

- End user is responsible for system development
- Low-cost technology
- Decline in standards & controls
- Reduction in quality assurance
- Unrelated & incomplete systems
- No experienced staff

4. Top Down Approach

- High Degree of top mgmt. involvement

Stages:

- 1) Analyse the objectives & goals of the entity
- 2) Identify the functions. e.g. – Production, Marketing, R & D
- 3) Ascertain the major activities, decisions & functions
- 4) Find out the information requirement
- 5) Prepare information processing program

5. Bottom Up Approach

- Starts from Supervisory management (Used to design various sub-systems)
- Identification of life stream systems that are essential for day to day activities
- Identify basic transactions, file-requirements & programs and develop system for each such life stream
- Integration of data & such systems
- Addition of decision models & planning models
- Involvement of supervisory management.

6. Systematic Approach

- Used in small organizations in which no MIS personnel is involved.

Steps:

- 1) Identify requirements
- 2) Locate suitable software & hardware
- 3) Implement the system

Reasons for Project Failure

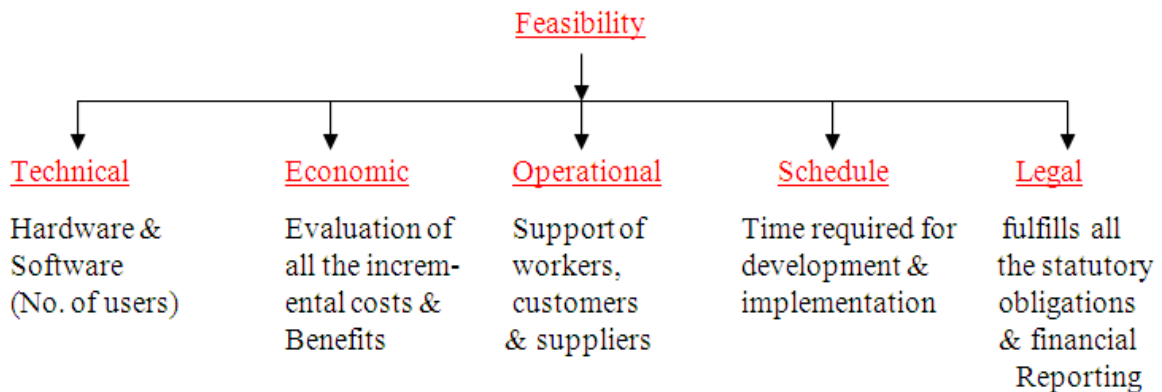
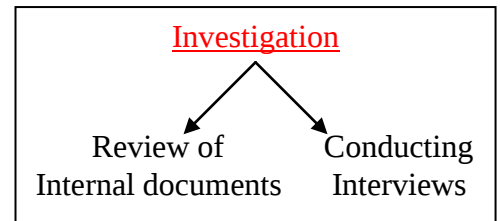
- Under estimation of time
- Lack of senior mgmt. participation
- Under estimation of resources
- Under estimation of size & scope of project
- Inadequate control
- Inadequate planning
- Changing system specifications

System Development Methodology

- Formalized, standardized & documented set of activities used to manage system development project. Division of project into small modules.
- Deliverables (Specific report & documentation) must be produced periodically
- Approval of development process by users, managers & auditors (Sign Offs)
- System Testing
- Proper Training
- Prevent unauthorised changes to complete program by formalizing system modifications.
- Post implementation review.

Preliminary Investigation

1. Starts when a problem / opportunity is identified by user or manager.
2. Clarify & understand the project request.
3. Determine the size of the project
4. Determine the feasibility of alternative approaches
5. Determine their costs & benefits
6. Final report to the management with recommendations.



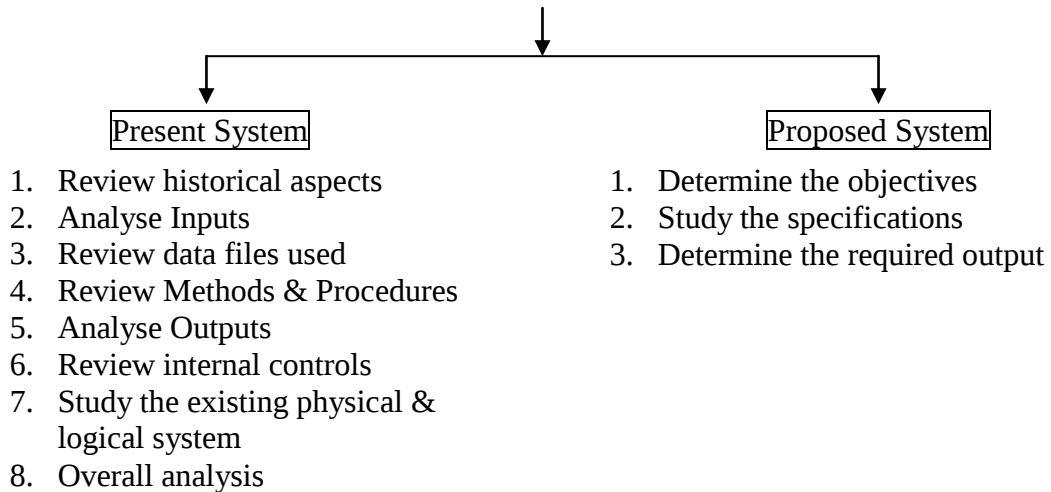
Requirement Analysis

- Determining user needs
- Study of application area in depth
- Assessing the strengths & weaknesses of present system
- Reporting to management
- Fact Finding Techniques

1. Documents
2. Questionnaire
3. Interviews
4. Observations

Input forms, Output forms, Organization Manual / Chart

SYSTEM ANALYSIS



System Development Tools

1. System Flow Chart (Documents flow of system & information processing procedures)
Presented by variety of symbols & connecting arrows.

2. Data Flow Diagram (Flow of data within an organisation)
[Data sources & destinations, Data flows, Transformation process, Data Stores]

Symbols in DFD – □



□ Data Source & Destination

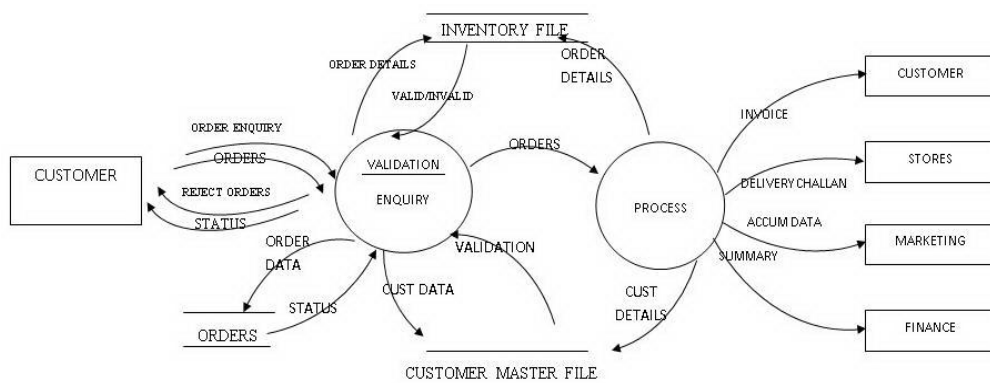


→ Data Flow

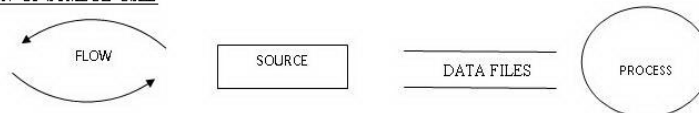
○ Transformation Process



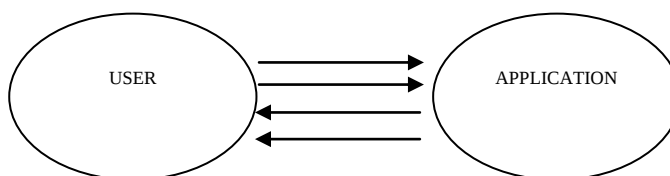
= Data Storage



REPRESENTATION OF SYMBOL USED



3. Lay out forms & screens (Pre printed forms)
Used to design source document, output, display.



[illegible]

- ### Category of Tools

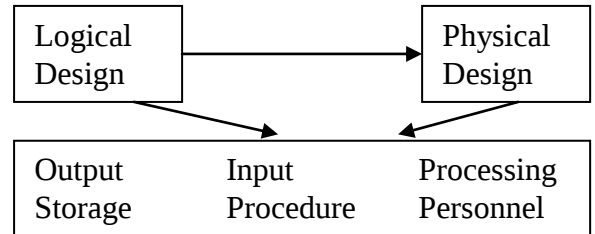
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CHAPTER-8

SYSTEMS DESIGN

STAGE -III

1. Review System's informational and functional Requirements
2. Developing a model including logical and physical specifications



3. Reporting to Management

Output (Report, Document, Message) → Displayed
→ Printed

Logical design:

- It is an engineering blueprint
- It shows many features of a system and how they are interrelated

Physical construction

It is an activity following logical design, produces program software's, files and a working system

Developing a model for a new system

When developing a system the development team determines how the system components realized at logical and physical levels.

- Output
- Processing
- Storage
- Procedures and
- Personnel

Output objectives

7. Convey Information (*Past, Current & Future Projections*)
8. Signal important events, opportunities, problems or warnings
9. Trigger an action
10. Confirmation of an action

Important factors in output Designing

1. Content (Piece of data included in output, it must be objective)
2. Form (Refers the way of presenting content –

2.1. Quantitative

2.2. Non- Quantitative

2.3. Graphical

2.4. Audio

3. Volume (Amount of data output required – **High Speed Printer / Monitor**)
4. Timeliness (**Daily / Weekly / Monthly or on real time basis**)
5. Media (**Paper / Display / Audio / Video**)
6. Format (**Manner in which data are arranged – Tabular / Graphic**)

How to present information?

Tabular format:

- Exceptions to normal expectations
- Major categories or groups of activities
- Summaries of major categories or activities
- Unique identification information
- Time dependant entities

Graphic format

They are used to improve the effectiveness of output for the targeted recipients, to manage information volume and to suit personal preferences

Input (Efficient data capture, effective coding & appropriate data entry methods)

Guidelines for form designing

1. Easy to fill (logical division, proper flow, captioning)
2. Purposeful
3. Accurate completion
4. Attractive

Characteristics of good coding scheme

[Code: - Brief no./title/symbol used instead of lengthy/ambiguous description]

1. Unique Code
2. Brief
3. Convenient
4. Expandability (compatible with future growth)
5. Suggestive
6. Permanence

Coding Schemes

1. Classification codes (Used to classify record in a particular class)
2. Function codes (Used to describe a function e.g. – sold, delivered)
3. Significant digit subset codes (Permanent Account No.)
Entire code is divided into meaningful parts.
4. Mnemonic Code (Linking with description e.g. MBA, C.A., C.S.)
5. Hierarchical Classification / Progressive Code

CHAPTER-9

SYSTEM'S ACQUISITION, SOFTWARE DEVELOPMENT & TESTING

Acquisition of Hardware

1. Latest possible technology.
2. Speeds & capabilities.
3. Software Considerations.
4. Compatibility to future expansion.
5. Vendor selection & machine selection

Acquisition of software (Pre-packaged Application Software)

(Sources may be computer manufacturer, software houses, retail stores, user groups)

Advantages

1. Rapid Implementation
2. Quality
3. Low Risk
4. Lower Cost (No hidden costs)

Steps for selection of a computer system

1. Prepare design specification.
2. Distribute request for proposal (RFP)
3. Analysis of proposals.
4. Contact present users of proposed system
5. Conduct Benchmark Test.
(Actual testing of the system)
6. Select the equipment/system.

Evaluation & Ranking of Proposals (Factors)

1. Capability & Quality
2. Cost-Benefit Analysis
3. Cost of maintenance
4. Compatibility
5. Services provided by the vendor



System Maintenance
System Development Support
Training
Back-up
Complement Hardware / Software

Method of Evaluation

1. Checklists (Subjective Method)
2. Point-scoring analysis
3. Public evaluation reports (consultancy agency, present users, financial statement analysis, credit rating agency)

Development of Software

Stages [Program Development Life Cycle]

1. Program Analysis. [Analyse the output required, input available & processing]
2. Program Design. [Planning the basic layout of the program e.g. Flow Charts, etc.]
3. Program Coding [Flow Charts converted into program statements. Eg:- Interpreter or Compiler] Coded instructions are entered into a magnetic media that constitutes source language. Then it is translated into machine language. It should be simple, short & require less processing time.
4. Debug the program. [including walkthrough, tests & review of program codes]
5. Thorough testing of the program.
6. Documentation.
7. Program maintenance.

Tools

1. Program Flow Charts. (Graphical Format)
 2. Pseudo Code. (English-Like statements)
 3. Structure Chart. (Similar to organization chart ; No program logic)
 4. 4GL Tools. (Automation of manual task)
 5. Object Oriented Programming & Designing Tools.
- } Represents program logic

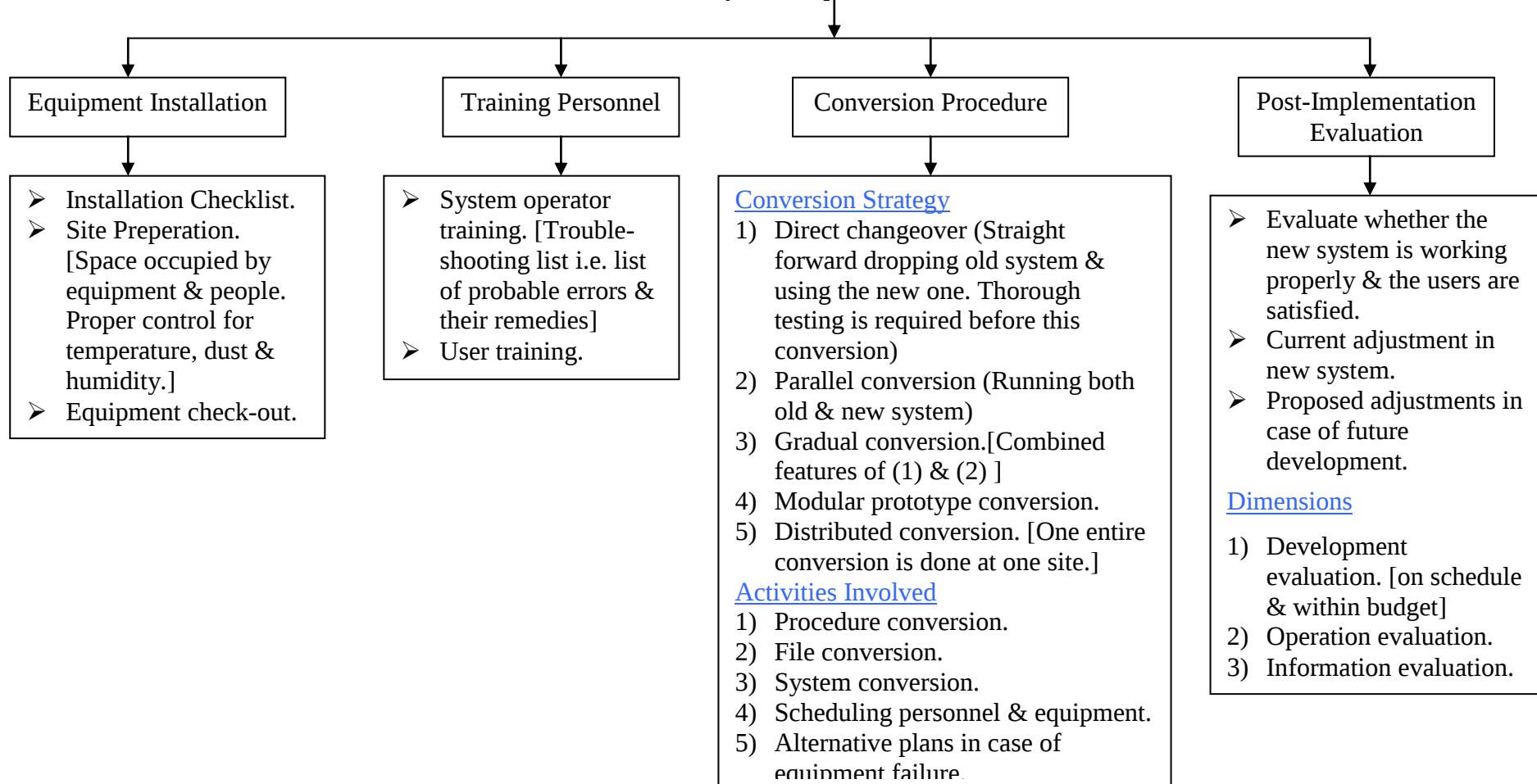
System Testing

- a. Preparation of realistic test data.
- b. Parallel operation with the existing system.
- c. Thorough checking of the results.
- d. Review of the results.

CHAPTER – 10

SYSTEM IMPLEMENTATION & MAINTENANCE

System Implementation



CHAPTER – 12

ENTERPRISE RESOURCE PLANNING – REDESIGNING BUSINESS

DEFINITION

ERP is a fully integrated business management system covering all functional areas of an enterprise like Logistics, Production, Finance, and Accounting & Human Resource. It organizes & integrates operations processes and the information flows to make optimum use of resources such as men, material, money and machine

EVOLUTION OF ERP

- Aggressive cost control initiatives
- Need to analyze costs/revenues on a product or customer basis
- Flexibility to respond to changing business requirements
- More informed management decision making
- Changes in ways of doing business
- The difficulty in getting accurate data, timely information and proper interface of complex business functions, have been identified as the hurdles in the growth of any business

Following applications and planning systems have been introduced

1. Management information system (MIS)
2. Integrated information system (IIS)
3. Executive information system (EIS)
4. Corporate information system (CIS)
5. Enterprise Wide systems (EWS)
6. Material Resource planning (MRP)
7. Manufacturing resource planning (MRP II)
8. Money resource planning (MRP III)

ERP CHARATERISTICS

1. Flexibility
2. Modular & open system architecture.
3. Comprehensive. [Wide range of business organizations]
4. Beyond the company
5. Best business practices
6. Integration of all organization processes.
7. Use of EFT, EDI, Internet, Intranet, E-Comm., etc.

FEATURES OF ERP

- It provides multi platform, multi facility, multi mode manufacturing multi currency multi lingual facilities

- Supports strategic and business planning activities, operational planning and execution activities creation of material and resources
- End to end supply chain management to optimize overall demand and supply data.
- Facilitates companywide integrated information system covering all functions (payables, selling & distributions)
- Performs core activities and increase customer service
- Bridge the information gap across the organization at different locations under same management.
- It is a solution for a better project management
- It allows introduction of EFT (electronic fund transfer) EDI (Electronic data interchange), internet, and intranet.
- Eliminates problems like material storage productivity enhancement etc
- Provide tools like DSS, EIS

BENEFITS OF ERP

- Boosting productivity and eliminating their reliance on computer personnel & assists employees & managers.
- Reduction of paper document by providing online formats
- Timeliness of information
- Greater Accuracy of information
- Improved cost control
- Faster response
- More efficient cash collection etc
- Better monitoring & quick resolution for queries
- Quick response to business operations and market conditions
- Improving business process
- Improve supply demand linkage
- Unified customer data base
- Improve international operations
- Improve information access & management
- Provide solution to Y2K problems, SMU single monetary unit, and Euro currency.

WHOLE BEING GREATER THAN THE SUM OF ITS PARTS.

Business Process Re-engineering [BPR]

BPR is the fundamental re-thinking & radical redesign of process to achieve dramatic improvement, in critical, contemporary measures of performance such as cost quality service and speed

Business Engineering = BPR + Information Technology

METHOD OF IMPLEMENTING ERP

Before implementation ERP must be divided into modules & components. It must be customized as per the requirement. Implementation must be formalized.

- Identifying the needs for implementing ERP.
- Evaluating the present situation.

- Deciding the proposed situation.
- Re-engineering of processes.
- Evaluation of various alternative ERP packages.
- Finalizing the ERP package.
- Installation of required Hardware & Network.
- Hiring the ERP consultants.
- User training.
- Final implementation of ERP package.

READ STEP FOR IMPLEMENTATION IN DETAIL FROM MATERIAL

Determination of ERP package

1. Flexibility. [Ability to change according to future requirements]
2. Comprehensive. [Applicable to all industries]
3. Integration.
4. Beyond the company. [Supports processes with customers, suppliers, banks, etc.]
5. Best Business Practices. [Best Business Practices stored in ERP knowledge base]
6. New technology.

Implementation Guidelines

1. Understanding the corporate needs.
2. Doing Business Process Re-engineering.
3. Establishment of good communication network.
4. Provide strong Leadership for down line Motivation.
5. Finding an efficient Project Manager.
6. Creating a balanced team of implementation consultants.
7. Selection of suitable methodology with minimum customization.
8. Training end users
9. Final implementation.
10. Adapting the new system and making the necessary changes
11. List down the Critical Success Factors (CSF's) at departmental level.
12. Numeric values assigned to CSF's is called Key Performance Indicators (KPI's).

POST IMPLEMENTATION

POPULAR EXPECTATIONS

- ✓ Improvement in processes.
- ✓ Increased productivity of all fronts
- ✓ Automation of processes and manual disbanding.
- ✓ Improvement in KPI's.
- ✓ Elimination of manual record keeping.
- ✓ Real-time information.
- ✓ Total integration.(only processes
- ✓ Improved networking features.

HOST OF FEAR

- ✗ Job redundancy.
- ✗ Loss of importance as information is no longer an individual prerogative
- ✗ Change in job profile
- ✗ Loss of control & authorization
- ✗ Increased stress caused by greater transparency
- ✗ Individual fear of loss of authority.

SAMPLE LIST OF ERP VENDORS

ERP Vendors

- Baan (The Baan Company) 1994
- Business planning and control system (BPCS)
- Mapics XA (Marcam Corporation)
- MFG/Pro (QAD)
- Oracle Applications(Oracle)
- Prism (Marcam)
- R/3 (SAP)
- System 21 (JBA)

ERP AUDIT

- Necessary for ensuring the proper functioning of ERP package.
- May be specific or general.
- Evaluation of security, authorization & control.
- ERP audit trail.

MODULES OF ERP SOFTWARE PACKAGE

1. **Financials.** [Financial Accounting, General Ledger, Accounts Receivable/Payable, fixed Assets Accounting, etc.]
2. **Controlling.** [Cost Centre Accounting & profitability analysis]
3. **Investment Management.** [Budgeting, Appropriation, Depreciation forecast]
4. **Treasury.** [Cash, Fund & Market risk management]
5. **Integrated Enterprise Management.**
6. [Accounting data prepared by subsidiaries are automatically incorporated for corporate reporting. It has 3 modules :-

Enterprise Controlling – Consolidated Statements	Enterprise Controlling – Profit Centre Allocation	Enterprise Controlling – Executive Inf. System
➔ Automatic consolidation of various branches & Subsidiaries. ➔ Inter-branch transfers are eliminated.	➔ Consolidated figures are allocated to respective Profit centres. ➔ Inter-branch transfers are Considered.	➔ EC-CS & EC-PCA are integrated & inter-firm comparisons are made for decision making.

7. **Sales & Distribution.** [Product billing on a real-time basis. Sales, calls, quotations, inquiries, marketing, competitors & their products. Pricing is carried out automatically & verification of availability checks.]
8. **Product Data management (PDM)** [Creating & managing product data throughout product life-cycle]
9. **Product planning & control.**
10. **Material management.** [Purchasing, Inventory, Warehousing & Invoice verification]
11. **Human Resource Management.** [Employee master data, Recruitment management, Selection & Training]
12. **Payroll Accounting.**
13. **Internet & Intranet.**

CHAPTER – 13

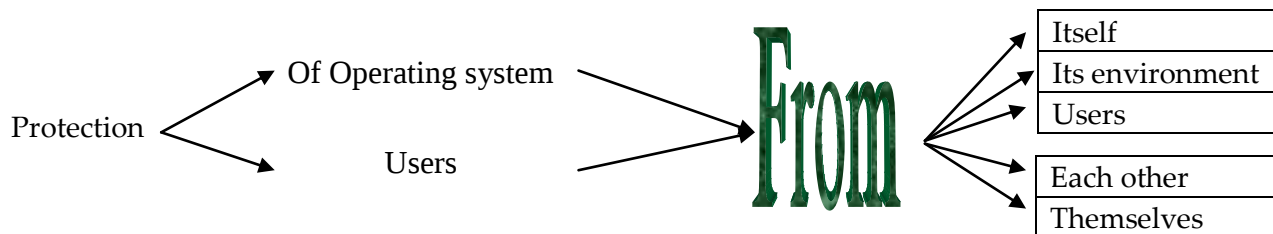
CONTROLS IN EDP SET-UP: GENERAL CONTROLS

CBIS internal controls are as follows:

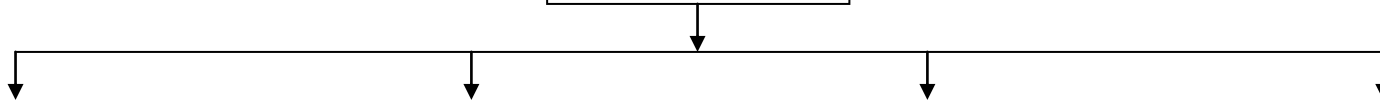
General controls:	Application controls
a) Operating system controls b) Data management controls c) Organizational structure controls d) Systems development controls e) Systems maintenance controls f) Computer centre security controls g) Internet & intranet control h) Personal computer controls	a) These are focused on exposures associated with specific systems such as payroll ,accounts receivable etc

1. Operating System Control
 - Main functions of operating system are
 - Translates High level language
 - Allocates resources to users
 - Job-scheduling, multi-tasking.

Objectives of Operating System Control



OS SECURITY



OS Security	Threats to OS integrity	Controlling against Virus, etc.	Controlling Audit Trail
1. Log on procedure. [User ID & Password] 2. Access Token. [Contains user ID, password & privileges granted also access token is created by OS for each session. 3. Access Control List. [List of privileges to all valid users] 4. Discretionary access control. [System administrator usually determines who is granted to specific resources one valid user can assign to other at his discretion]	1. Accidental threat [Hardware failure, OS failure] 2. Intentional threat [Illegal access to data or violate user privacy Computer virus]	1. Virus. [Penetrates OS] 2. Worm. [Occupies idle memory] 3. Logic Bomb. [triggered by pre-determined event] 4. Back Door. [Unauthorised access] 5. Trojan Horse. [Captures ID's & passwords] Controlled by :- 1. Anti-Virus program 2. Anti-Viral program/vaccine [Run continuously on a computer system to detect virus]	Objectives – 1. Detecting unauthorized access. [Real time / subsequently] 2. Analyzing the reasons for such event. 3. Personal accountability.

2. Data Management Control

Access Controls	Back-up Controls
➤ Flat File System – Easy to control. ➤ DBMS – 5 control features :- 1. <i>User View</i> – Privileges to required users only. 2. <i>Database Authorization Table</i> – Contain actions a user can take. 3. <i>User Defined Procedures</i> – Series of personal questions. 4. <i>Data Encryption</i> 5. <i>Biometric Devices</i> – Finger Prints, Voice Prints, etc.	➤ Back up may be in magnetic disc or in magnetic tape. ➤ 4 features :- 1. <i>Back-up</i> 2. <i>Transaction Log</i> – Provides an audit trail. 3. <i>Checkpoint</i> – Several checkpoints in 1 hour. 4. <i>Recovery Module</i>

3. Organisation Structure Control

- i. Separating System Development from Computer Operations.
- ii. Separating System Development from Maintenance.
- iii. Separating Database Administration from other functions.
- iv. Separating Data Library from Operations.
- v. An Alternative Structure for System Development.

4. Computer Centre Security & Control [It may be accidental or incidental.]

Risks	Controls
1. Fire Damage 2. Water Damage 3. Energy Variations 4. Pollution Damage 5. Unauthorised Intrusion	1) <i>Disaster Recovery Plan</i> i. Emergency Plan ii. Back-up Plan iii. Recovery Plan iv. Test Plan 2) Insurance of Hardware & Data

5. System Development Controls	6. System Maintenance Control
i. <i>System Authorisation</i> – Evaluation of the system before the development. ii. <i>Users Specifications</i> – Active involvement of user during the development phase. iii. <i>Technical Design</i> – Documentation of user specifications and development process. iv. <i>Internal Audit Participation</i> v. <i>Program Testing</i> vi. <i>User acceptance</i>	i. <i>Maintenance Authorisation, Testing & Documentation.</i> ii. <i>Source Program Library (SPL) Controls</i> – Documentation of retrieval, change, obsolescence, etc. of program in SPL. iii. <i>Password Control in SPL</i> iv. <i>Audit Trail & Management Report</i> v. <i>Program Version Number</i> vi. <i>Message Sequence Numbering</i>

7. Internet & Intranet Controls

➤ 2 types of risks :-

- i. Component Failure – Communication Line, Hardware & Software.
- ii. Subversive Threats – Unauthorised Intrusion.
 - a) *Invasive Tap* – Can read & modify data.
 - b) *Inductive Tap* – Can read only.

➤ Subversive Attacks – Insert / Delete / Modify / Alter the sequence / Discard / Delay Messages.

➤ Control features :-

1) Firewall

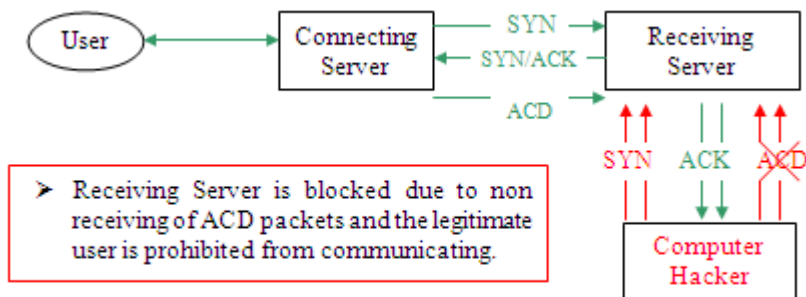
➤ Controls the communication between two networks. Insulates the organisation's network from external networks.

➤ 2 Types :-

- i. Network-level Firewall – Low cost & low security level.
- ii. Application Level Firewall – Costly & higher security level.

2) Controlling Denial of Service Attacks

3) Encryption [Clear text → Cipher text → Clear text]



- Conversion of data into secret codes for storage / transmission.
- 2 types :-
 - i. Private Key Encryption – Single key used by both sender and receiver.
 - ii. Public Key Encryption – Public key is used to encrypt the data and private key is used to decrypt the data.

4) Message Translation Log

Record of all incoming & outgoing messages.

5) Call Back Devices

Calls back only the valid user to establish the connection.

8. Personal Computer Controls

Risks	Controls
1. Incompatibility of Hardware / Software.	1. Centralizing PC purchase
2. Poor Data Security	2. Physical locking of hardware
3. Decentralisation of processing	3. Regulating the use of floppy
4. Computer Virus	4. Proper training
5. No thorough testing.	5. Virus prevention
6. Weak access control	6. <i>Proper Back-up arrangement</i> – Floppy, Dual Internal Hard Disks, External Hard Disk, Tape Back-up.
7. Inadequate Back-up procedures	7. Multi-level password control.

CHAPTER-14

APPLICATION CONTROLS IN EDP SET-UP

INPUT CONTROLS

1. SOURCE DOCUMENT CONTROL

- Use-Pre-numbered Source Document
- Use Source Document in Sequence
- Periodically audit Source Document

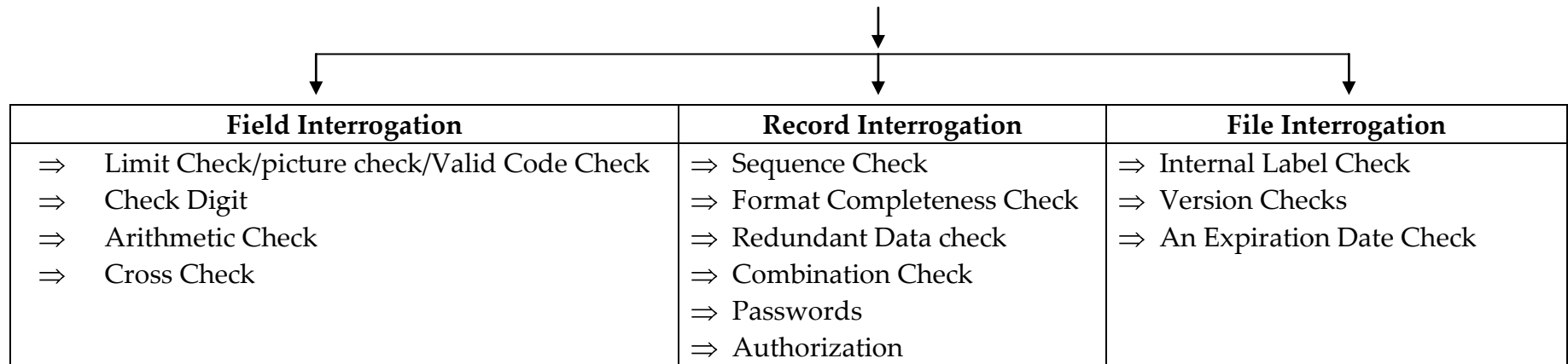
2. DATA CODING CONTROL

- Transcription Error
 - Addition
 - Truncation
 - Substitution
- Transposition Error (e.g. 38276-83276)
 - Check Digit (11-module check digit)

3. BATCH CONTROL

- All records in the batch are processed
- No records are processed more than once
- An audit trail of transaction is created from input through processing to the output stage of the system
- **Batch Transmittal Sheet** – It is prepared by user department & submitted along with batch of source document.
 - A unique Batch no.,
 - A Batch Date
 - A Transaction Code
 - Total Amount value of a financial field (Batch Controls Totals)
 - The total of a unique non-financial field [Hash, Total]
- **Batch Control Log** – Contains the details of all the batches processed during a period.

4. VALIDATION CONTROL



5. INPUT ERROR CORRECTION

- ⇒ Immediate Correction.
- ⇒ Create an Error File.
- ⇒ Reject the Entire Batch.

PROCESSING CONTROLS

1. Run-to-Run Control
2. Recalculates control totals
3. Transaction Codes
4. Sequence Checks.
5. Operator Intervention control
6. Audit Trail Control
 - a. *Transaction Logs (Log of all successful transactions)*
 - b. *Transaction Listings*
 - c. *Log of Automatic Transactions*
 - d. *Listing of Automatic Transactions*
 - e. *Unique Transactions Identifiers*

Error Listings (List of error records)

OUTPUT CONTROLS

Controlling batch system output:

1) Tape & Disk Output Controls

- ⇒ Parity Bit Checking (*Hardware Controls*)
- ⇒ Check Digits (*Software Controls*)
- ⇒ ECHO Check
- ⇒ File retention

2) Output Controls for Printed output

i. Verification of output

- ⇒ Output directly related to input
- ⇒ Output indirectly related to input
- ⇒ Exception reports

ii. Procedure for acting on exception reports

iii. Distribution of output

iv. Controlling real-time systems output

- ⇒ Exposures from equipment failure and
- ⇒ Exposures from Subversive acts.

CHAPTER – 15

DETECTION OF COMPUTER FRAUDS

COMPUTER FRAUD

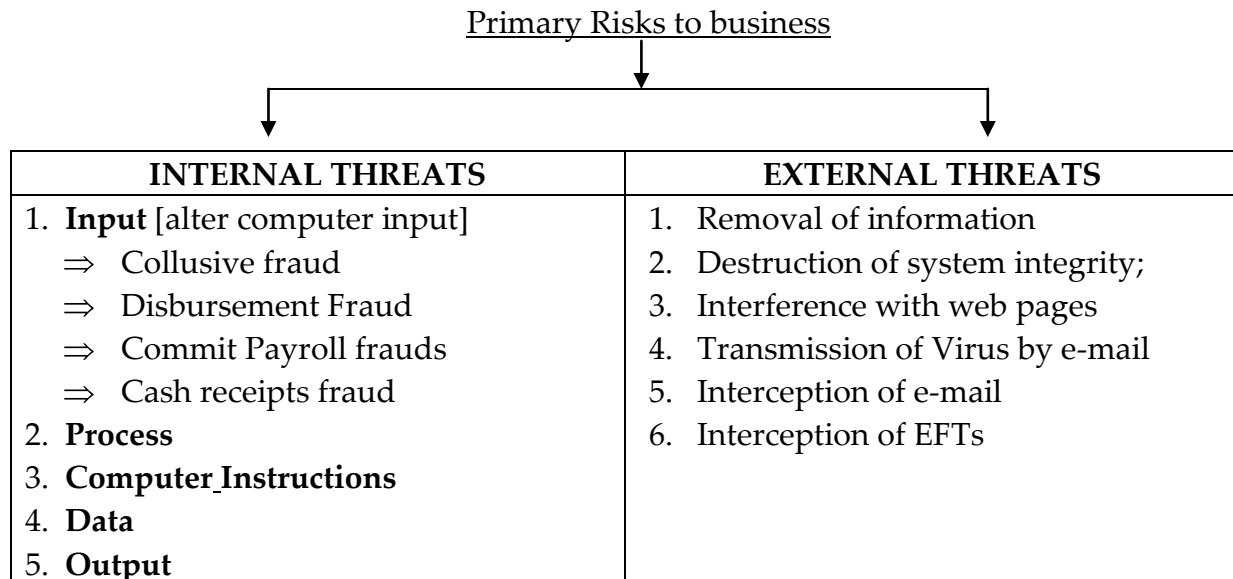
- Unauthorized access, use, access, modification, copying and destruction of software or data.
- Theft of money by altering computer records or the theft of computer time
- Theft, destruction of computer hardware.
- Use of plan to operate computer resources to commit an offence
- Intend to illegal obtain information or tangible property through the use of computer

DEFINITIONS OF COMPUTER FRAUDS

- Clearly recognizable frauds
- Vandalism of web pages
- Manipulation of computer
- Theft and/or destruction
- Abuse of computer system by employees (for personal purpose)
- Software piracy (unlicensed software)

Why should business take computer fraud seriously?

- Dependence on network or stand alone computers
- Electronic payment
- Growth of electronic commerce
- Growth of electronic cash



INTERNET FRAUD

- Unregulated (No license fee, central authority).
- Very Low cost.
- Impressive site.
- Glamour and novelty of the internet.
- Legal jurisdiction.

PREVENTING COMPUTER FRAUD

- Make Fraud less likely to occur
- Use proper Hiring and firing Practices
- Manage Disgruntled Employees
- Train Employees in Security and Fraud Prevention Measures
- Security measures
- Telephone disclosures.
- Fraud awareness.
- Ethical considerations.
- Punishments for unethical behavior.
- Educating employees in security issues.
- Manage and track software Licenses.
- Require Signed confidentiality Agreements.

INCREASE THE DIFFICULTY OF COMMITTING FRAUD

- Developing a strong system of internal control
- Segregation duties.
- Require vacations and rotate Duties.
- Restriction access to computer equipment and data files
- Encrypt data & programs
- Protect telephone lines
- Protect system from viruses
- Control sensitive data
- Control use of laptop.

IMPROVE DETECTION METHODS

- Conduct frequent Audits.
- Use of Computer security officer
- Use computer consultants
- Monitor System activities
- Use Fraud detection software

REDUCE FRAUD LOSSES

- Maintain adequate insurance cover
- Keep a current back-up copy of all program and data files in a secure off-sites location.
- Develop contingency plan
- Using special software designed to monitor system activities

PROSECUTE AND INCARCERATE FRAUD PERPETRATORS

- Computer frauds yet undetected
- Reluctant to report computer crimes
- Law enforcement officials and the courts.
- Fraud goes unreported.
- Computer skills needed to investigate, prosecute, and evaluate computer crimes.
- Cases are prosecuted and a conviction is obtained.

DETECTION OF COMPUTER FRAUDS

Disk imaging and analysis Technique

Stages are as follows:-

- Using specialist hardware and software.
- Image copy of the disk.
- Analysis of processed image.
 - Free space.
 - Lost chains.
 - Slack space.
 - Deleted files.
 - The contents of the Windows SWAP file.
 - Internet cache files or temporary internet files.

CHAPTER-16

CYBER LAWS AND INFORMATION TECHNOLOGY

ACT, 2000

OBJECTIVES OF THE ACT

- Grant legal recognition to electronic transactions.
- Legal recognition to digital signature
- Facilitate electronic filing of documents.
- Facilitate electronic storage of data
- Facilitate EFTs
- Recognition to books of account in electronic form

SCOPE OF THIS ACT

Extend to all over India and also to any offence committed there under outside India.

DEFINITIONS

ASYMMETRIC CRYPTO SYSTEM

Key Pair consisting of a private key (for creating digital signature) and a public key (to verify the digital signature).

DIGITAL SIGNATURE

Authentication of electronic record by means of an electronic method.

Secure System {Hardware, Software & Procedure}

- ✓ Is secure from unauthorized access
- ✓ Provide a reasonable level of reliability
- ✓ Suited in performing the intended functions.
- ✓ Adhere to generally accepted security procedures.

Power of CG to make rules in respect of digital signature

1. Type of digital signature
2. Manner and format for affixing it.
3. Manner & procedure to identify the originator.
4. Control procedures to ensure security & confidentiality.
5. Any other matter to give legal effect to digital signature.

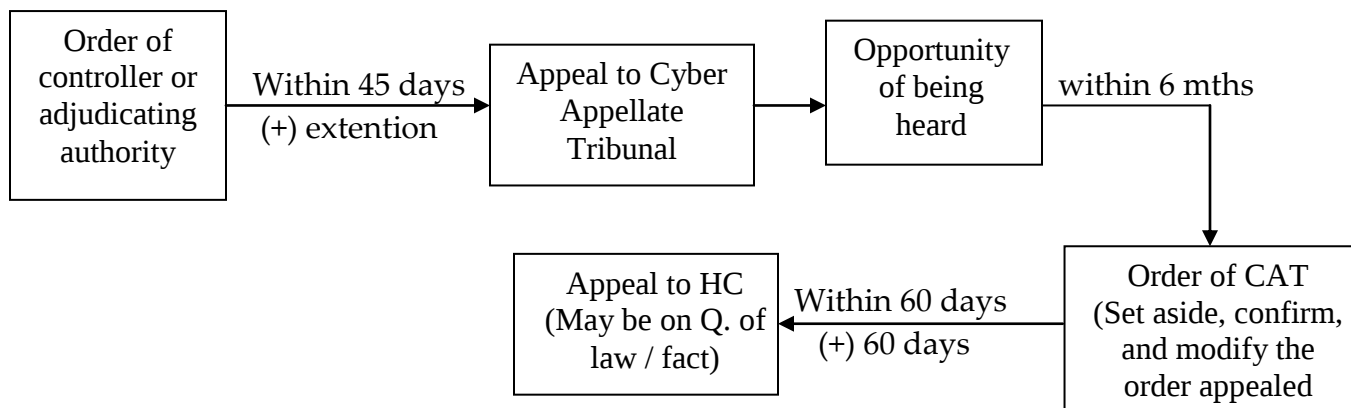


Damage to Computer, Computer system, Computer network, hardware etc.

- Accesses or secures access to
 - Downloads or copies any data from such
 - Introduces or causes to introduce any virus into the
 - Damages or causes to damage any
 - Denies or causes denial access to such
 - Provides assistance to access to
 - Tampering or manipulating
- } Computer
Computer System
Computer Network
Computer Resource etc.
(Compensation upto Rs. 1 Cr.)

Penalties

- | | |
|----------------------------------|---|
| ➤ Failure to furnish information | upto Rs.1.5 lakh for each failure |
| ➤ Failure to file return | upto Rs.5000/- per day |
| ➤ Failure to maintain books | upto Rs.10000/- per day |
| ➤ Hacking with computer system | upto 2 lakhs/imprisonment upto 3yrs./both |
| ➤ Misrepresentation | upto 1 lakh/imprisonment upto 2yrs/both |
| ➤ Breach of confidentiality | upto 1 lakh/imprisonment upto 2yrs/both |



Compounding of offences

- Either before or after institution of adjudication
- Compounded by Controller or Adjudicating Officer
- Similar contravention cannot be compounded within 3 yrs.

Power of CG to make rules (Sec 87)

- By notification in the official gazette and in the electronic gazette
- Matters to be specified in the rules
 - ✓ Manner of authentication by means of digital signature
 - ✓ Electronic form of filing, issue, payment etc.
 - ✓ Type and manner of affixing digital signature.

- ✓ Qualification, disqualification and terms & conditions of service of controller etc.
- ✓ Standards to be observed by controller
- ✓ Form and manner of application for license.
- ✓ Form for application for issue of digital certificate. etc.

Steps to create Digital Signature

- Electronic record is converted into “Message Digest” using mathematical function known as “Hash Function” which freezes the electronic record.
- Private Key attaches itself to the message digest.

Liabilities of Companies

- Every person who was in-charge / responsible for day-to-day activity & the company shall be deemed to be guilty of such offense & shall be liable to be punished & proceeded against.
 - Every Manager, Director, Officer with whose connivance such offense was committed shall also be liable.
 - No liability if he proves his innocence.
- ➔ Controller shall act as repository for all digital signatures issued under this act.

CHAPTER-17

AUDIT OF INFORMATION SYSTEMS

IS Auditor must ensure that provisions are made for:

- An adequate audit trail
- Control over the accounting
- Handling exceptions
- Testing
- Control over changes to the system
- Authorization procedures for system overrides
- Determining whether organization and Govt. policies & procedures are adhered
- Training user personnel
- Evaluation criteria of system
- Adequate control over the interconnected computers.
- Adequate security procedures
- Back up & recovery procedures
- Technology provided by different vendors
- Data bases adequately designed

Computer auditing approach different from manual auditing

- Electronic evidence
- Terminology
- Automated processes
- New risks and controls
- Reliance of controls

The IS Audit's Scope & Objectives :

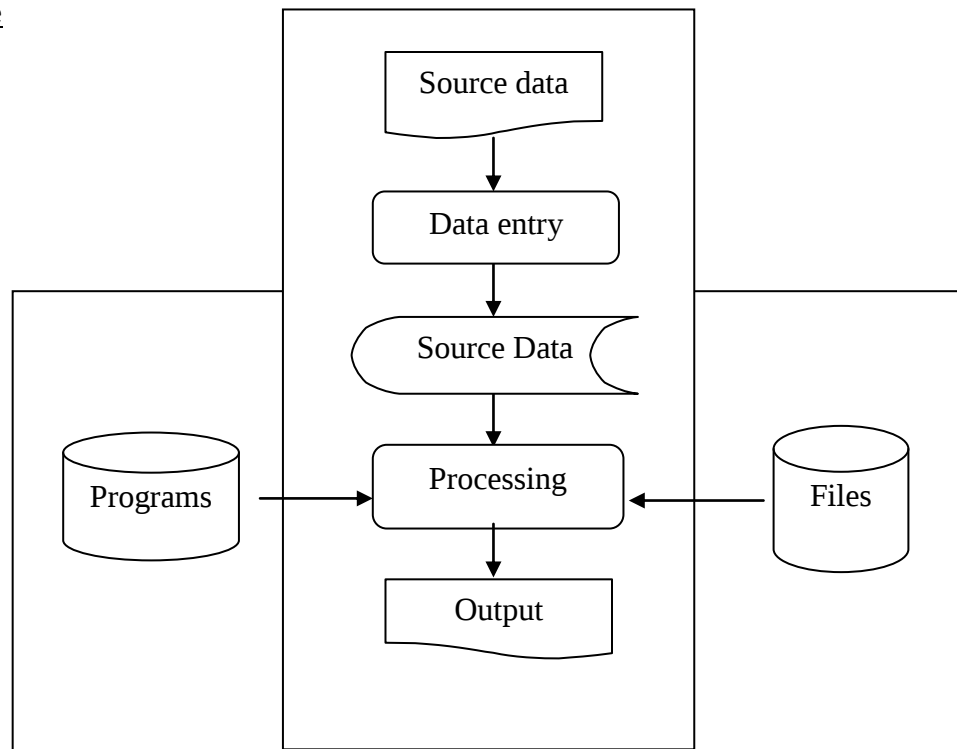
- Computerized system & Applications
- Information processing facilities
- System development
- Management of Information Systems
- Client/server, telecommunications, and intranets

The IS auditor's Role:

- Security provisions
- Program development
- Program modifications
- Processing of transactions, files, reports etc.
- Inaccurate source data or improperly authorized data is identified

→ Computer data files are accurate

Objective



COMPUTER SECURITY

- Types of security errors and fraud faced by companies
- Accidental/Intentional damage, unauthorized access, modification, theft etc.
- Control procedures to minimize security errors and fraud
- Systems review audit procedures
- Test of controls audit procedures
- Compensating controls.

TABLES READ FROM MATERIAL

COMPUTER PROCESSING

- Observe, understand & evaluate the processing controls.
- Ensure that they are practically followed
- Periodical re-evaluate processing controls
- Specialized techniques to eliminate control deficiencies.

Test data processing –

Concurrent Audit Techniques

Auditors commonly use five concurrent audit techniques:

1. *An Integrated test facility* ITF (fictitious records) –
No need to reverse the test transactions & the user is unaware of this process of testing.
2. *Snapshot Technique* –
Snapshot data is stored in a separate file & is reviewed by auditor
3. *System control audit review file (SCARF)* –
Collects data of special transactions e.g. exceeding certain amount.
4. *Audit hooks* –
Flag suspicious transactions & display a message at the auditor's terminal
5. *Continuous and Intermittent Simulation* –
This audit module works along with the DBMS like SCARF. It does parallel simulation & reports the discrepancy through a separate log file.

Analysis of Program logic

1. Automated flowcharting programs
2. Automated decision table programs
3. Scanning routines
4. Mapping programs
5. Program tracing

TABLES READ FROM MATERIAL

SOURCE DATA CONTROLS

- Detection of inaccurate & unauthorized source data.
- Input control matrix (control applied to each field of input data)
- Periodical review of control procedures to maintain effectiveness

Data Files Controls

- Data storage risk (access, modification, destruction)
- Audit procedures checklist

CHAPTER – 18

INFORMATION SECURITY

Importance of information security

- Widespread use of technology
- Interconnectivity of systems
- Elimination of distance, time, and space as constraints
- Unevenness of technological changes
- Decentralization of management & control
- Attractiveness of conducting
- External factors

Objective of Information Security

1. Protecting the interest of the users of the information.
2. Protecting the Information System.
3. Protecting the communication.

SECURITY OBJECTIVE

- Availability – Information is available whenever required.
- Confidentiality – Disclosed only to authorize persons.
- Integrity – Protected against unauthorized modifications.

What information is Sensitive?

1. Strategic Plans
2. Business Operations
3. Financial Information.

Establishing better information protection:

- Not all data has the same value
- Know where the critical data resides
- Develop an access control methodology
- Protect information stored on media
- Review hardcopy output

WHAT ARE THE PRINCIPLES OF INFORMATION SECURITY?

1. Accountability – It must be formalized & communicated. Use of proper audit trail.
2. Awareness-Risks and security activities
3. Multi-disciplinary – Technological and non-technological issues.
4. Cost Effectiveness-Must be cost effective
5. Integration – Security system must be co-ordinated.

6. Re-assessment – Periodical changes.
7. Timeliness – Monitoring & timely response.
8. Social factors – Respecting rights / interests of others.

PROTECTING COMPUTER HELD INFORMATION

Preventative Information Protection

1. Physical (e.g. locks and guards, floppy access lock)
2. Logical / Technical (e.g. passwords & authentications, etc.)
3. Administrative (e.g. Security awareness)

Restorative Information Protection

Timely restoration of lost information after occurrence of the event.

Holistic Protection

Planning for unexpected and unknown events to happen.

WHAT IS THE BEST APPROACH TO IMPLEMENT INFORMATION SECURITY?

- 1) **Security Policy**
- 2) **Policy development**
- 3) **Roles & Responsibilities to individuals –**

Individuals	Responsibilities
Executive Management	Overall responsibilities
IS Security Professionals	Design & Implementation of security policy.
Data Owners	Maintaining accuracy & integrity
Process Owners	Ensuring appropriate security embedded in there IS.
Technology Providers	Assist in implementation of Information Security System.
Users	Follow the set procedures.
IS Auditors	Independent assurance.

Design

- 4) **Implementation.**

Physical and environmental controls
Computer Planning Controls

Monitoring

- Disciplinary & corrective actions.
- Minimization and recovery of losses
- Refinery of security levels
- Changes of standards or policies
- Changes of design and implementation of security
- Initiation of re-assessment programs, including root causes and pattern analysis
- Initiation of intelligence monitoring systems with interactive feedback; and
- Initiation of network or system penetration studies.

Awareness, Training, & Education

- Posting the security policies
- Training to all staffs
- Non disclosure statements
- Company newsletter
- Visible enforcement of security rules
- Periodic audits
- Conduct fake security

ROLE OF A SECURITY ADMINISTRATOR

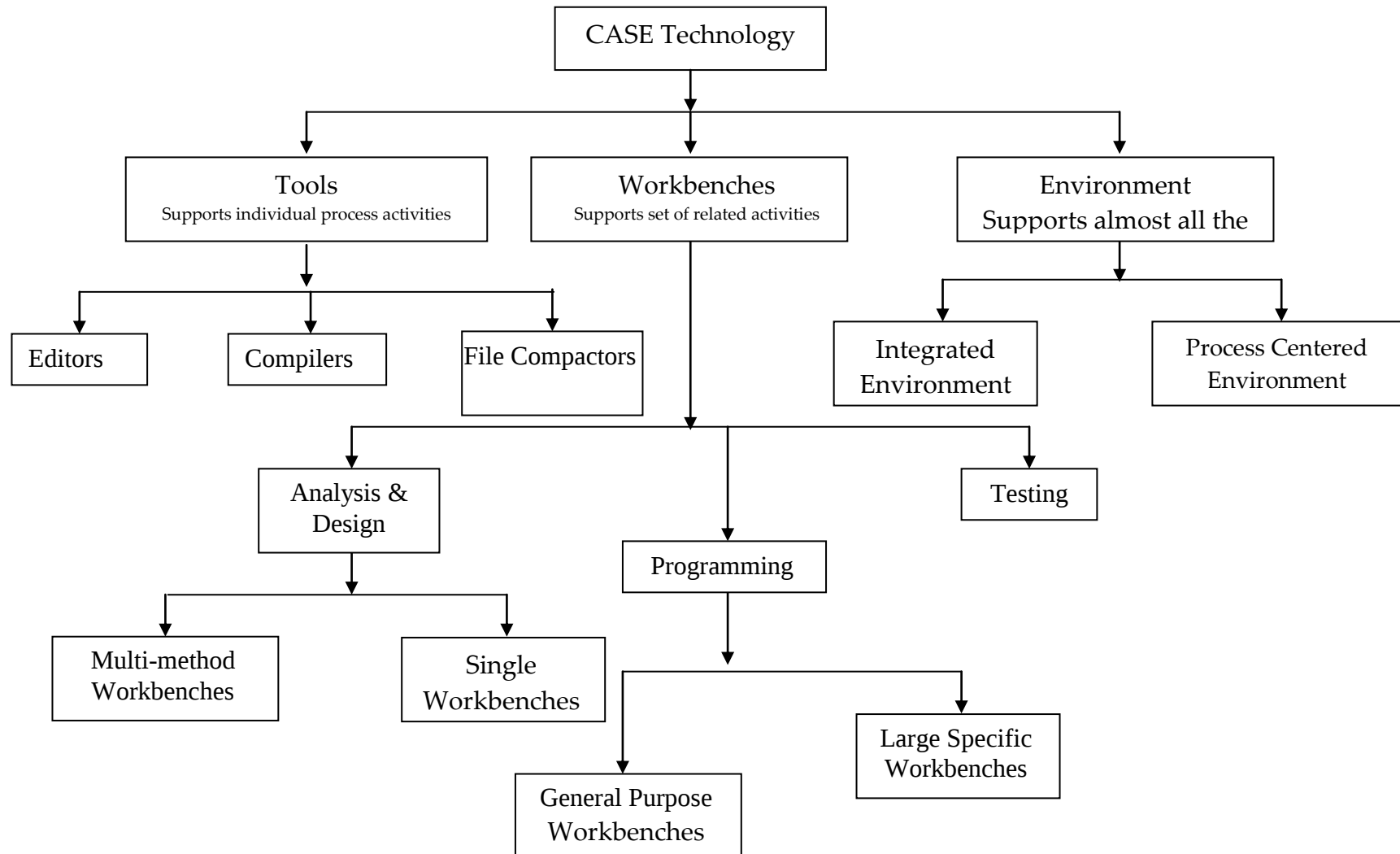
- Responsible for controlling and coordinating the activities related to security aspects.
- Ensures adequate Information Security; Sets Policies; Investigates; Advices; Trains the users; Monitors the activities related to Information Security.

Security committee

End users, executive management, security administration personnel, IS personnel and legal counsel members should be an integral part of the security committee and discuss the policies and procedures regarding security periodically.

CHAPTER – 19

CASE TOOLS AND DIGITAL TECHNOLOGY



CASE TOOLS

- Concerned with creation & maintenance of system software
- Automated tools to solve specific problems

INTEGRATED CASE TOOLS

- Specialized CASE Tools are combined together to form an integrated CASE Tool.

1. Platform Integration

Integration of all the tools/workbenches run on the same platform. Platforms may be a computer / network / operating system.

2. Data Integration

- Process of exchange of data by CASE Tool.

- 3 Levels

- i. Shared Files: - All the tools recognize a single file format.
- ii. Shared Data Structures: - Make use of shared data structures including programmed/design language information.
- iii. Shared Repository: - Integrated around a object management system.

3. Presentation Integration

Tool use a common standard presentation for user interaction.

[Window System, Comparable Functions and Interaction Integration]

4. Control Integration

Mechanism to control the integration of other CASE Tools.

5. Process Integration

Integrates the knowledge about processes, their phases, their constraints, etc. to support their activities.

Typical Components of a CASE Workbench

1. Diagram Editor.	2. Data Dictionary.
3. Analysis, Checking & Correction	4. Report Generator.
5. Query Language.	6. Import/Export facility.

