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INTRODUCTION TO COMPUTERS & MIS

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COMPUTER SOFTWARE SYSTEM

SOFTWARE SYSTEM CONCEPTS

- TYPES OF SOFTWARES
 - APPLICATION SOFTWARE
 - SYSTEM SOFTWARE
- PROGRAMMING LANGUAGES
- SYSTEM DEVELOPMENT LIFE CYCLE (SDLC)

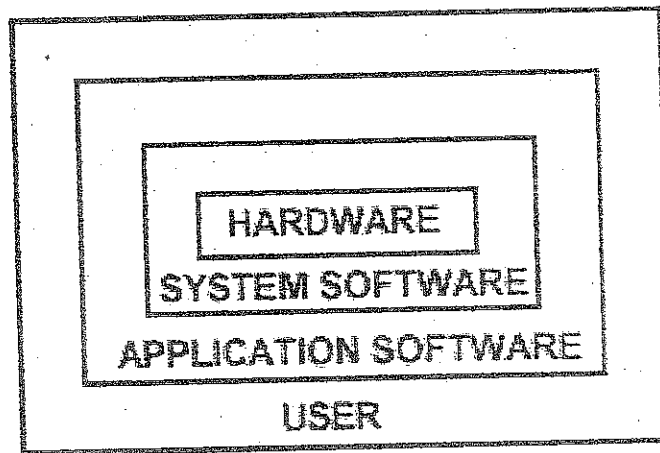
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WHAT IS SYSTEM

▪ SYSTEM

SYSTEM IS NOTHING BUT IT IS A SET OF COMPONENTS LINKED TOGETHER TO PERFORM DESIRED OBJECTIVES. WHICH MAY BE PEOPLE, RESOURCE, CONCEPTS OR SOME PHYSICAL ELEMENTS SO ARRANGED THAT THEY WORK IN A COORDINATED MANNER TO ACHIEVE A PRE DEFINED GOALS.

RELATIONSHIP BETWEEN HARDWARE, SYSTEM SOFTWARE AND APPLICATION SOFTWARE.



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APPLICATION SOFTWARE

APPLICATION SOFTWARE

Application software consists of instructions that directs a computer System perform specific information processing activities and that provides functionality for users.

TYPES OF APPLICATION SOFTWARE

- **Proprietary Application Software**
- **Off-the- Shelf Application Software**

TYPES OF APPLICATION SOFTWARE

Proprietary Application Software

These software addresses a specific or unique business need for a company. This type of software may be developed "In-House" by the organization or get it developed from a software vendor.

- **Manufacturing MIS**
- **Marketing MIS**
- **Human Resource MIS**
- **Financial MIS**
- **Accounting MIS**

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TYPES OF APPLICATION SOFTWARE

Off-the- Shelf Application Software

These are standard package or it may be customizable special purpose programs or “ package “ can be tailored for a specific purpose. These software support general types of processing , rather than being linked to any specific business function.

Off-the- Shelf Application Software

This software consists following widely used packages encompassing.

- **Spreadsheet** Microsoft's Excel , Lotus
- **Data Management** Microsoft's Access
- **Word Processing** Microsoft's Word
- **Graphics** CAD/CAM
- **Multimedia** Media Player , Real one player
- **Communication** E-Mail Software like Out look express
- **Speech Reorganization Software** Via Voice from IBM
- **Groupware** Newsgroups Discussion Forum groupware like Lotus Notes , Microsoft Net Meeting, Netscape Conference, Novell's Group Wise
- **Software suits** Which combine some of these packages and integrate their functions

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PROGRAMMING LANGUAGES

PROGRAMMING LANGUAGES

- **Machine Language** (Based on 0 and 1 1st GL)
- **Assembly Language** (Based on Mnemonics code 2nd GL)
- **Procedural Languages** (HLL, Much closer to Natural Language , Ex. Cobol, C, 3GL)
- **Non Procedural Languages** (Another type of HLL , Ex SQL:Oracle, 4GL)
- **Visual Programming language** (used within graphical environment are referred as VP Languages Ex. Visual Basic, Visual C ++)
- **HTML** : Hypertext markup language Used for Website designing
- **Object Oriented Programming Languages** : Are based on the idea of taking a small amount of data and instructions about what to do with that data and putting both of them together into what is called an object. (The process is called encapsulation) Ex. Smalltalk, C ++, JAVA
- **Natural Language** (Intelligent Language . Translator programs translate Natural Language into structured machine readable form 5th GL)

LANGUAGE TRANSLATOR PROGRAMS

ASSEMBLER :

An assembler is a system software program that translates the symbolic instruction codes of an assembly language program into machine language. The translated program is known as machine language program or object code. Example ADD, MUL, DIV, SUB,

INTERPRETERS :

It is system software program that that translates the instructions of High level language into machine language instruction and execute one instruction at a time. Example BASIC

COMPILERS

A computer program which translates the whole instructions of a high level language to machine language instruction that the computer can interpret and execute . The example of compilers are FORTRAN , COBOL, C, C++

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SYSTEM SOFTWARE

- **A SYSTEM SOFTWARE** : is a special computer program serves as intermediary between hardware and functional applications which manages the hardware resources of the computer system and functions between the hardware and the application software.
- It performs basic tasks, such as controlling the keyboard, display screen, network and disk or keeping track of files on the disk.

SYSTEM SOFTWARE

THE SYSTEM SOFTWARE CAN BE GROUPED INTO TWO MAJOR FUNCTIONAL CATEGORIES

SYSTEM CONTROL PROGRAMS :

Control the use of the hardware , software and data resources of a computer system

The main System Control program is the operating system

SYSTEM SUPPORT PROGRAMS :

Supports the operation, management and users of a computer system by providing a variety of support services and monitor performance and security of the system.

Ex. System utility programs

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SYSTEM SOFTWARE

OPERATING SYSTEM :

- An operating system is software which interact with the hardware of the computer in order to manage and direct computer resources.
- Every computer system runs under the control of an operating system so it is a system of programs that controls the execution of a computer program and may provide scheduling, debugging, input/output control, system accounting, compilation, storage Assignment, Data Management and related services.

MAJOR FUNCTION OF OPERATING SYSTEMS

- User Interface
- Resource Management
- File Management
- Task Management

MAJOR FUNCTION OF OPERATING SYSTEMS

- **User Interface** The user interface is the part of the operating system that allows you to communicate with it so that one can load progrms access files and accomplish task.

Ex. Command driven, Menu driven, Graphical user interface

- **Graphical user interface (GUI)** It is a part of operating system that the users interact with and uses graphic icons, pull down menus and computer mouse to issue commands and make selections. GUI is improve user friendliness by making the human machine interface as simple as possible.
Ex. Windows *Exp*

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MAJOR FUNCTION OF OPERATING SYSTEMS

- **Resource Management** It refers to managing the use of hardware resources of computer system including its CPU, Memory, Telecommunication Processors, Input Out Put Devices
- **File Management** It involves creation , deletion and access of files of data and program.
- **Task Management** Managing the programs (also called jobs) running on the processor at a given time

Multitasking or Multiprogramming : Where two or more task or programs running on the computer system at the same time

SYSTEM SOFTWARE

COMMON OPERATING SYSTEM TASKS

- Monitoring performance
- Correcting errors
- Providing and maintaining the user interface
- Starting (Booting) the computer
- Reading programs into memory
- Managing memory allocation to those programs
- Placing files and programs in secondary storage
- Creating and maintaining directories
- Formatting Diskettes
- Controlling the computer monitor
- Sending Jobs to the Printer
- Maintaining Security and Limiting Access
- Locating Files
- Detecting Viruses
- Compressing Data

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SYSTEM SOFTWARE

EXAMPLES OF OPERATING SYSTEMS

▪ Major Desktop Operating Systems :

MS-DOS, Windows 95, 98, 2000, 2003, Windows XP, Windows NT, Windows (Compact Edition), IBM OS/2, Unix, LINUX, JAVAOS

▪ Major Departmental Server Operating System

UNIX, Windows NT Server, IBM's OS/2 Warp Server, Novell NetWare, Linux, Novell NetWare, IBM's OS/400, (Java OS).

▪ Enterprise Operating System :

The major enterprise operating systems include MVS (Multiple Virtual Storage), IBM's VM (Virtual Machine), IBM's VSE (Virtual Storage Extended) and digital open VMS (Virtual Machine System). These Operating System support online applications, secure electronic commerce, multiple concurrent users, large database and for processing millions of transactions per day.

SYSTEM SOFTWARE

SYSTEM UTILITY PROGRAMS

- Utility software is a type of computer software that is designed to help manage and tune the computer hardware, operating system or application software and perform a single task or a small range of tasks or repetitive task
- Utility software or software utilities are the software bits that function like full application software but at a smaller "scale" or for a particular purpose

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SYSTEM SOFTWARE

- System utility programs provided by a computer hardware manufacturer or software vendor and used in running the system
- Utility software have long been integrated in most major operating systems. *Windows Explorer* in the MS Windows operating systems is one of the utility software

SYSTEM SOFTWARE

- A utility is a program that performs a task that is not typically handled by the operating system
- Some utilities enhance the operating system's functionality
- Some of the major categories of utilities include:
Example. Data compression, Backup , Antivirus , Disk Defragmenters , Disk Cleaner , Backup Software, File management

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**SUMMARY OF
SYSTEM AND UTILITY SOFTWARE**

- Both System & Utility software form a very important part of the computing concept
- They have their own niche & function to assist to make the life of the user more easier & productive

SYSTEM DEVELOPMENT LIFE CYCLE (SDLC)

- **SYSTEMS INVESTIGATION**
- **SYSTEMS ANALYSIS**
- **SYSTEMS DESIGN**
- **SYSTEMS DEVELOPMENT AND IMPLEMENTATION**
- **SYSTEM MAINTENANCE AND REVIEW**

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SYSTEM DEVELOPMENT LIFE CYCLE

SYSTEM INVESTIGATION (UNDERSTAND PROBLEM)

- What problem are we trying to solve by developing a new system
- What are the objectives of the new system

SYSTEM DEVELOPMENT LIFE CYCLE

SYSTEM INVESTIGATION (SOME POSSIBLE PROBLEMS)

- The Existing system has a poor response time (It is Slow)
- It is unable to handle the workload
- The problem of cost i.e. (The existing system is not economical)
- The problem of accuracy and reliability
- The problem of security
- The requisite information is not produced by the existing system

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SYSTEM DEVELOPMENT LIFE CYCLE

SYSTEM ANALYSIS (UNDERSTAND SOLUTIONS)

- **Gain through understanding of the problem**
- **Conduct feasibility study**
 - Technical Feasibility
 - Operational Feasibility
 - Economic Feasibility
- **Determine and establish system requirement**
(End user and Organizational needs)

SYSTEM DEVELOPMENT LIFE CYCLE

SYSTEM DESIGN (SELECT AND PLAN BEST SOLUTION)

- Explore different designs and select best design
- Provide a detail plan for converting requirements into actual performance
- Create logical and physical design specification
- Plan , coordinate, control and manage technical aspects of the system

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SYSTEM DEVELOPMENT LIFE CYCLE

SYSTEM IMPLEMENTATION

(PLACE SOLUTION INTO EFFECT)

- Convert design specification into program code
- Perform system testing
- Decide on implementation strategy :
(Parallel, Direct Conversion)
- Evaluate system performance

SYSTEM DEVELOPMENT LIFE CYCLE

SYSTEM MAINTENANCE AND REVIEW

(EVALUATE RESULT INTO SOLUTION)

- Maintaining systems operational efficiency
- Make Modification and enhancements to ensure that system continues to meet user needs & standards
- Evaluating the results of the system

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SYSTEM ANALYSIS

METHODS OF SYSTEM ANALYSIS AND DESIGN

INTERVIEWS

Helps to gather facts, constraints, allocation of duties and problems failures in the existing system

Helps to know needs, plans, accuracies of information essential for system design.

OBSERVATION

Helps to find out hidden facts, attitudes of the employees background of department, organization etc.

INVESTIGATION

In this Methods Information is gather through carefully frame questionnaire

RECORD INSPECTION

The study of organizational charts procedure manuals and statistics can reveal much information about a procedure.

SYSTEM ANALYSIS

TOOL FOR MAKING SYSTEM ANALYSIS AND DESIGN

1 Flow Charts

Program Flow Charts

System Flow Charts

Data Flow Diagram (DFD)

2 Decision Table

3 Decision Tree

4 Simulation

5 Gantt Charts

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TOOL FOR SYSTEM ANALYSIS & DESIGN

FLOW CHART :

It is defined as a graphical representation of the definition, Analysis or solution of a problem using symbols to represent operations data flow equipment. A flow chart provides a picture of a sequence of activities. It is accompanied with a narrative discussion of the various activities of the chart

- **Program Flow Chart** : It describe the specific steps and their sequence for a particular computer program in short it is a symbolic representation of solving the step by step problem.
- **System Flow Chart** : It depicts the flow of data through all parts of a system with a minimum of detail. Generally it shows input entering a system their processing , control and leaving the system in the form of storage or output.
- **Data Flow Diagram** : A graphical tool used to describe and analyze the movement of data through a system. It show the movement of various forms, documents or reports from person to person or from department to department . It is a graphical representation of the logical flow of data .

TOOL FOR SYSTEM ANALYSIS & DESIGN

DECISION TABLE :

- It is tabular representation of a program logic. It lists all conditions to be tested or factors necessary for taking a decision.
- It displays all conditions affecting particular situation and the appropriate action of action to be taken for each set of conditions.

THE GENERAL FORMAT OF A DECISION TABLE HAS FOUR BASIC PARTS :

- **CONDITION STUB** : It lists all conditions to be tested or factors necessary for taking a decision.
- **ACTION STUB** : It lists statements describing all actions that can be taken
- **CONDITION ENTRY** : It indicates conditions which are being met or answers the questions in the condition stub
- **ACTION ENTRY** : It indicates the actions to be taken

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TOOL FOR SYSTEM ANALYSIS & DESIGN

- **DECISION TREES** : The logic of the process can easily be represented using a graphic representation which looks like the branches of a tree called decision tree. A decision tree has as many branches as there are logical alternatives.
- **SIMULATION** : Simulation involves the construction of a model which is largely mathematical in nature. It is typically nothing more or less than the technique of performing sampling experiments on the model of the system.
- **GANTT CHART** : Gantt charts are use for scheduling a systems project, starting from the first major phase to the last one.

SYSTEM DESIGN

TYPES OF SYSTEM DESIGN (LOGICAL AND PHYSICAL DESIGN)

LOGICAL DESIGN :

Also known as conceptual design.

- It is the base and prerequisite for the Physical design
- It lay out the components of the system and their relationship to each other.
- It shows what the system will do as opposed to how it is actually implemented physically

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LOGICAL DESIGN

CONCEPTUAL DESIGN INVOLVES THE FOLLOWING STEPS

Define Problem

Define problem to be solved

Identify Constraints

Known as Problem boundaries or restrictions

Determine Information Needs

What we want out of an information systems

Items of information that are needed to achieve the pre-determined objectives.

Determine Information Sources

Sources of information are Internal and External Records

Managers and operating personnel

Develop Various Designs

Document the conceptual design and Prepare Report

To get management approval so as to start detailed design

PHYSICAL DESIGN

- Physical design is also known as Detailed design, translate the abstract logical design into specific technical design for the new system.
- The performance requirements specified by the conceptual design become inputs to the detailed design phase.
- The objective of the detailed system design is to prepare a blue print of a system that meets the goals of the conceptual system design requirement.

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PHYSICAL DESIGN

PHASES OF DETAILED SYSTEM DESIGN

- **Input Design**
- **Out design**
- **Database design**
- **Procedure design**
- **Documentation Design**

PHYSICAL DESIGN

INPUT DESIGN

OBJECTIVES OF INPUT DESIGN

- **Designing Data Entry**
- **Control the volume of input data (Avoid capturing unnecessary data)**
- **Avoid data entry errors**
- **Keep the Process simple**

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PHYSICAL DESIGN

OUT PUT DESIGN

- Specific output which are required to meet the information needs are identified.
- Reports, formats or other documents that act as carrier of information, produced by an MIS are designed.

PHYSICAL DESIGN

PROCEDURE DESIGN

Procedures are the rules, standards or methods designed to increase the effectiveness of the information system

Data entry procedures

Edit and update procedures

Data processing

Security and back up procedures

Software documenting procedure

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PHYSICAL DESIGN

DATABASE DESIGN

- It is design of the structure of databases and files to be used by a proposed information system
- Identify attributes or characteristics of the entities (object, people, places, events) about which the proposed information system needs to maintain information.
- Identify fields and key fields for each table and relations between various tables.
- Determined the data type and width for each field

PHYSICAL DESIGN

DESIGN DOCUMENTATION

System Objectives constraints

Data Files

Procedures (Manuals)

Proposed System (A summary and detailed flow charts)

Input / Output specifications

Program Specifications

Database specifications

Cost of installation and Implementation

System test conditions

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SYSTEM DEVELOPMENT AND IMPLEEMTATION

- 1 **PROGRAMMING**
- 2 **TESTING OF SYSTEM**
 - Unit Testing/ Program Testing
 - System Testing
- 3 **SYSTEM CONVERSION**
 - Parallel Conversion
 - Phased Conversion
 - Pilot Conversion (Modular Approach)
 - Direct Conversion
- 4 **SYSTEM BACK UP PLAN** – Procedure to maintain duplicate copies
- 5 **SYSTEM RECOVERY PLAN** – Procedure to be followed in order to restore a system after a crash

SYSTEM DEVELOPMENT AND IMPLEEMTATION

- 6 **PREPARARION OF PHYSICAL SITE**
- 7 **TRAINING TO USERS**
- 8 **SYSTEM DOCUMENTATION MANUALS**
 - System Design Documentation
 - Software Documentation
 - Operation & User reference Documentation
- 9 **SYSTEM MAINTENANCE**
 - Preventive Maintenance – Prescheduled Maintenance (Periodic)
 - Rescue Maintenance – On Demand

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SYSTEM DEVELOPMENT AND IMPLEMENTATION

10 SYSTEM EVALUATION

- Quality Assurance Review
- Computer Performance Evaluation
- Service Level Monitoring
- Post Installation Review
- Cost Benefit Analysis

11 USER INVOLVEMENT

- End user & Management Involvement
- Role of System Analyst
- Consultant

SYSTEM MAINTENANCE

- CORRECTIVE MAINTENANCE
- ADAPTIVE MAINTENANCE
- PERFECTIVE MAINTENANCE

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SYSTEM MAINTENANCE

CORRECTIVE MAINTENANCE

This type of maintenance implies removing errors in a program which might have crept in the system due to faulty design or wrong assumptions .

Thus, in corrective maintenance processing or performance failure are repaired

SYSTEM MAINTENANCE

ADAPTIVE MAINTENANCE

- **Change in the organizational procedures**
- **Change in forms**
- **Change in Information needs of managers**
- **Change in system control and security need**
- **Change in organizational Objectives, Goals , Policies etc**

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SYSTEM MAINTENANCE

PERFECTIVE MAINTENANCE

- Change in governmental policies, laws
- Economic and competitive conditions
- New Technology

SYSTEM DEVELOPMENT AND IMPLEMTATION

SYSTEM ANALYSTS ROLE

**PRELIMINARY
COMMUNICATION
EDUCATION
PARTICIPATION
TRAINING
JOB DESIGN**

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SKILL REQUIRED FOR SYSTEM ANALYST

INTERPERSONAL SKILLS

Communication
Understanding
Teaching
selling

TECHNICAL SKILLS

- **Creativity**
- **Problem Solving**
- **Project Management**
- **Dynamic Interface (Blending technical and nontechnical consideration)**
- **Questioning attitude and inquiring mind**
- **Knowledge of the basic of the computer and the business function**

SOFTWARE ISSUES

MANAGERS CHECKLIST FOR SOFTWARE SELECTION FACTORS

Size and Location of User Base	Does the proposed software support a few users in a single location ? Or Can it accommodate large numbers of geographically dispersed users ?
Availability of System Administration Tools	Does the software offer tools that monitor system usage ? Does it maintain a list of authorized users and provide the level of security needed
Costs –Initial and Subsequent	Is the software affordable , taking into account all costs , including Installation, Training and Maintenance ?
System Capabilities	Does the software meet both current and anticipated future needs ?
Existing Computing Environment	Is the software compatible with existing hardware,software and communications networks?
In-House Technical Skills	Should the organization develop software applications in house, purchase off the shelf or contract software

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SOFTWARE ISSUES

MANAGERS CHECKLIST FOR SOFTWARE EVALUATION CRITERIA

CRITERIA	YES	NO
Ease of Development		
Learning (For Developers and for users)		
Reporting Capability		
General Functionality		
Data Handling		
Graphic Presentation		
Performance		
Out Put Options		
Environment and Hardware		
Security		
Documentation		
Maintenance		
Vendor Support		
Cost		

Thank You

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