Amity School of Business

BBA General , 2nd Semester

System Analysis and Design

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Module-V

System Implementation & Operation

(System Management)

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Topics

- Activities in implementing a system
- Testing and types of testing
- Installation Approaches
  - Direct
  - Parallel
  - Single Location
  - Phased
- Training and supporting users
- Types of Training Methods
- Reason of system implementation failures
- Maintenance and types of maintenance
  - Effective Maintenance
  - System Enhancement
  - Quality Assurance

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Activities in implementing system

System implementation and operation is made up of seven major activities:

- Coding
- Testing
- Installation
- Documentation
- Training
- Support
- Maintenance

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The purpose of these steps is to convert the final physical system specifications into working and reliable software and hardware, document the work that has been done, and provide help for current and future users and caretakers of the system.

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3 group of Activities

- Activities that lead to the system going into operation - **coding, testing, and installation.**
- Activities that are necessary for successful system operation - **documenting the system and training and supporting users.**
- Activities that make system ongoing and needed to keep the system working and up-to-date: - **maintenance.**

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Coding, Testing, And Installation

- Coding : The Process through which the physical design specifications created by design team are turned into working computer code by programming team.
- Testing : The process can begin and proceed in parallel. As each programmer module is produced, it can be tested individually, then as part of a larger program and then as part of larger system.

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- Installation : The process during which the current system is replace by the new system. It includes conversion of existing data, software, documentation, and work procedures to those consistent with the new system.

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Why System Testing?

- The purpose of System testing is to identify and correct errors in the candidate system.
- In this the performance and acceptance standards are developed. Substandard performance or service interruption that result in system failure are checked during the test.

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Types of System Testing

- Program Testing
- String Testing
- System Testing
- System Documentation
- User Acceptance Testing

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Program Testing

- A program represents the logical elements of a system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with the other programs. Achieving an error free program is the responsibility of the programmer.
- Program testing checks for two type of errors : Syntax and Logic.

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String Testing

- Programs are invariably related to one another and interact in a total system. Each program is tested to see whether it conforms to related programs in the system. Each portion of the system is tested against the entire module with both test and live data before the entire system is ready to be tested.

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System Testing

- It is designed to uncover weaknesses that were not found in earlier tests. This includes forced system failure and validation of the total system as it will be implemented by its users in the operational environment.

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System Documentation

- All design and test documentation should be finalized and entered in the library for future reference. The library is the central location for maintenance of the new system. The format, organization, and language of each documentation should be in line with system standard.

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User Acceptance Testing

- An acceptance test ha the objective of selling the user on the validity and reliability of the system. It verifies that the system procedures operate to system specifications and that the integrity of vital data is maintained. Performance of an acceptance test is actually the user's show. User motivation and knowledge are critical for the successful performance of the system.

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Approaches to Installation

Four approaches of installation are there:
- Direct Installation
- Parallel Installation
- Single Location
- Phased Installation

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Direct Installation

- Changing over from the old information system to new one by turning off the old system when the new one is turned on.

Characteristics	Advantages
Abrupt	Low cost
"Cold turkey"	High interest in making installation a success.
	May be the only possible approach if new and existing systems cannot coexist in some form.

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Direct Installation

Current System

Install New System

New System → Time

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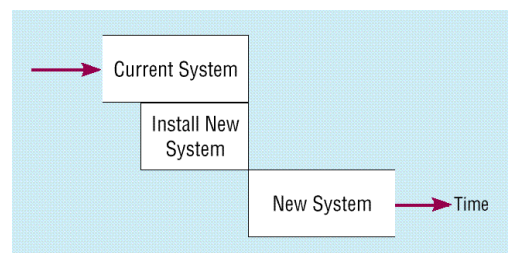
Direct Installation-Risks

- Operational error have direct impact on users and organization.
- It may take too long to restore old system, if necessary.
- Time-consuming and benefits may be delayed until whole system is installed.

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Parallel Installation

- Running the old information system and the new one at the same time until management decides the old system can be turned off.

Characteristics	Advantage
Old and new system coexist.	New system can be checked against old systems.
Safe	Impact of operational errors are minimized because old system is also processing all data.

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Parallel Installation
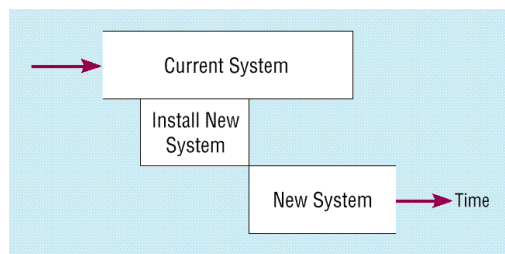
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Parallel-Risks

- Not all aspects of new system can be compared to old system.
- Very expensive due to duplication of effort to run and maintain two systems.
- Can be confusing to users.
- May be delay until benefits result.
- May not be feasible due to costs or system size.

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Single Location Install

- Trying out a new information system at one site and using the experience to decide if and how the new system should be deployed throughout the organization.

Characteristics	Advantage
Pilot approach	Learning can occur and problems fixed by concentrating on one site.
Middle-of-the road approach	Limits potential harm and costs from system errors or failure to selected pilot sites
May involve series of single location installations	Can use early success to convince other to convert to new system
Each location may be branch office, factory, or department	

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Single Location Installation

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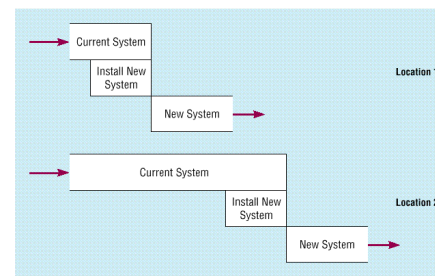
Single Location-Risks

- Burden on IS staff to maintain old and new systems.
- If different sites require data sharing, extra programs need to be written to "bridge" the two systems.
- Some parts of organization get benefits earlier than other parts.

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Phased Installation

- Changing from the old information system to the new one incrementally, starting with one or a few functional components and then gradually extending the installation to cover the whole new system.

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Characteristics	Advantage
Staged, incremental, gradual, based on system functional components.	Allows for system development also to be phased.
Similar to bringing system out via multiple releases.	Limits potential harm and costs from system error or failure to certain business activities/functions.
	Risk spread over time.
	Some benefits can be achieved early.
	Each phase is small and more manageable.

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Phased Installation
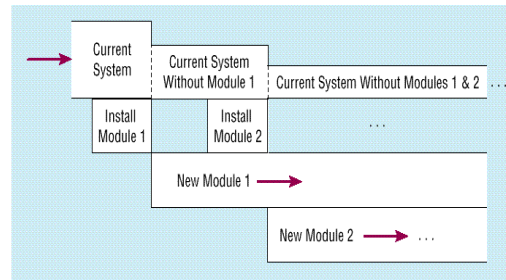
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Disadvantage-Phased

- Old and new systems must be able to work together and share data, which likely will require extra programming to "bridge" the two systems.
- Conversion is constant and may extend over a long period, causing frustration and confusion for users.

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Two Audiences for the Final Documentation

IS Personnel   Users

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System Documentation

- Detailed information about a system's design specifications, its internal workings, and its functionality.
- System Documentation is intended primarily for maintenance programmers, user documentation is intended mainly for users.
- System Documentation is further divided into internal, external.

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- Internal Documentation
  - It is a part of program source code.
- External Documentation
  - It includes the outcome of all of the structured diagramming techniques such as DFD,ER Diagram.
- User Documentation
  - Written or visual information about an application system, how it works, and how to use it.

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What Makes Good Documentation?

- Contains an overview, index, getting started instructions, i.e. – very structured
- Describes functionalities
- Contains task-based documentation
  - "How to's…"
  - Frequently Asked Questions
  - Messages & their meanings

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Training the end-users

- Training and support help people adequately use computer systems to do their primary work.
- Without proper training and the opportunity to ask questions and gain assistance/consultation when needed, users will misuse, under use, or not use the information system you develop.
- Support is providing ongoing educational and problem solving assistance to information users.

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Training Methodologies

- Resident Expert
- Computer based instruction
- Formal courses-several people taught at the same time.
- Software help components.
- Tutorials-one person taught at a time.
- Interactive training manuals-combinations of tutorials and computer aided instruction
- External sources, such as vendor.

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Supporting the End-user

- Automated Issue Tracking
- Automating support
- Providing support through a Help Desk
- Other things to consider:
  - Providing recovery and backup
  - Disaster recovery
  - PC maintenance

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Why Implementation Sometimes FAIL?

Two conditions are necessary for a successful implementation effort:

•Management support of the system

•Involvement of users in the development process.

Despite the support and active participation of users and management, information systems implementation still sometimes fails.

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Some insights about Implementation process

- Risk
- Commitment to project
- Commitment to change
- Extension of project definition and planning
- Realistic user expectation

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Two most common and trusted ways of determining system implementation success are:

•The extent to which the system is used and the user's satisfaction with the system.
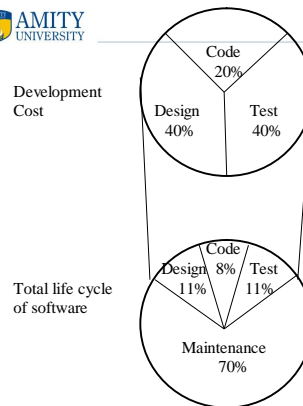
•Political Factors.

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What is System Maintenance?

- Software maintenance is a very broad activity that includes error corrections, enhancements of capabilities, deletion of obsolete capabilities, and optimization.
- So, any work done to change the software after it is operational is considered to be a maintenance work.
- The purpose of maintenance is to preserve the value of software over time.

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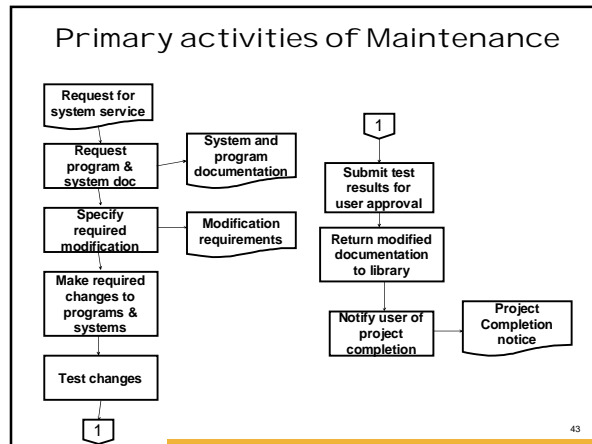- System maintenance is a very important activity of software life cycle which may span for more than 20 years and constitute the highest cost incurred in SDLC.

- Maintenance accounts for 50-80% of total system development as shown in following figure.

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Development Cost: Code 20%, Design 40%, Test 40%

Total life cycle of software: Code 8%, Design 11%, Test 11%, Maintenance 70%

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Primary activities of Maintenance

```
Request for
system service
      │
      ▼
Request              System and
program &            program
system doc           documentation
      │
      ▼
Specify              Modification
required             requirements
modification
      │
      ▼
Make required
changes to
programs &
systems
      │
      ▼
Test changes
      │
      ▼
     (1)
```

```
     (1)
      │
      ▼
Submit test
results for
user approval
      │
      ▼
Return modified
documentation
to library
      │
      ▼
Notify user of       Project
project              Completion
completion           notice
```

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Types of Maintenance

Three types of maintenance are:

- Corrective Maintenance
- Adaptive Maintenance
- Perfective Maintenance

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Corrective Maintenance

- It means repairing processing or performance failures or making changes because of previously uncorrected problems or false assumptions.
- Corrective maintenance is initiated by the defect in the system.
- The defect can result from design errors, logic errors, coding errors, performance or processing failure.

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Adaptive Maintenance

- It includes modifying the software to match the changes in the ever changing environment.
- The term environment includes totality of all conditions and influences which act from outside upon the software, for e.g., business rules, government policies, work pattern, software and hardware operating platforms.
- A change in the whole or part of the environment will require a corresponding modification of the software.

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Perfective Maintenance

•It involves making enhancements to improve processing performance, interface usability, or to add desired, but not necessarily required, system features.

•It means enhancing the performance or modifying the programs to respond to the user's additional or changing needs. *Of these types, more time and money are spent on perfective than corrective and adaptive maintenance together*.

•Perfective maintenance refers to enhancements making the product better, faster, smaller, better documented, cleaner structured, with more functions and reports.

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Adaptive 25%

Perfective 50%

Corrective 25%

Fig: Distribution of Maintenance Efforts

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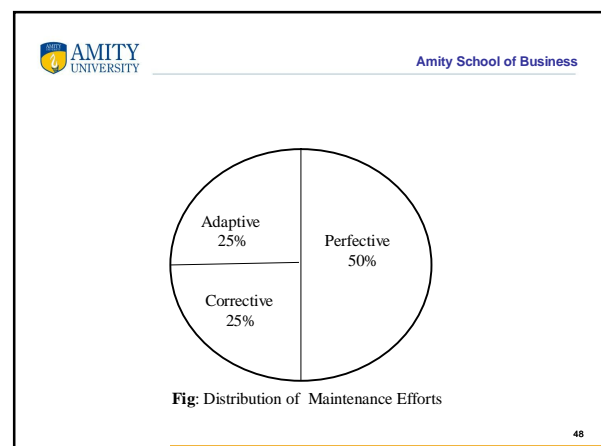
Measuring Maintenance Effectiveness

- Because maintenance can be costly, it is important to measure its effectiveness which is measured in terms of following factors:
- No. of failures
- Time between failures
- Type of failure

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System Maintenance Vs Enhancement

- If the changes are made in existing functionalities of a system, after it is operational ,then these changes are categorized as system maintenance.
- However when new functionality is added onto a existing system then this activity is termed as system enhancement.

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Quality Assurance

- It is to certify that the program or software package is current and confirms to standards.
- With a growing trend toward purchasing ready to use software, certification has become more important.
- A package that is certified goes through a team of specialists who test, review, and determine how well it meets the vendor's claims.

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Thank you

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