



## *Green University of Bangladesh*

*Department of Computer Science and Engineering (CSE)  
Semester: (Fall, Year: 2024), B.Sc. in CSE (Day)*

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# KSA 01 for Final

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*Course Title: Information System Design  
Course Code: CSE-403  
Section: 221-D10*

### Students Details

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*Submission Date: 25/12/2024  
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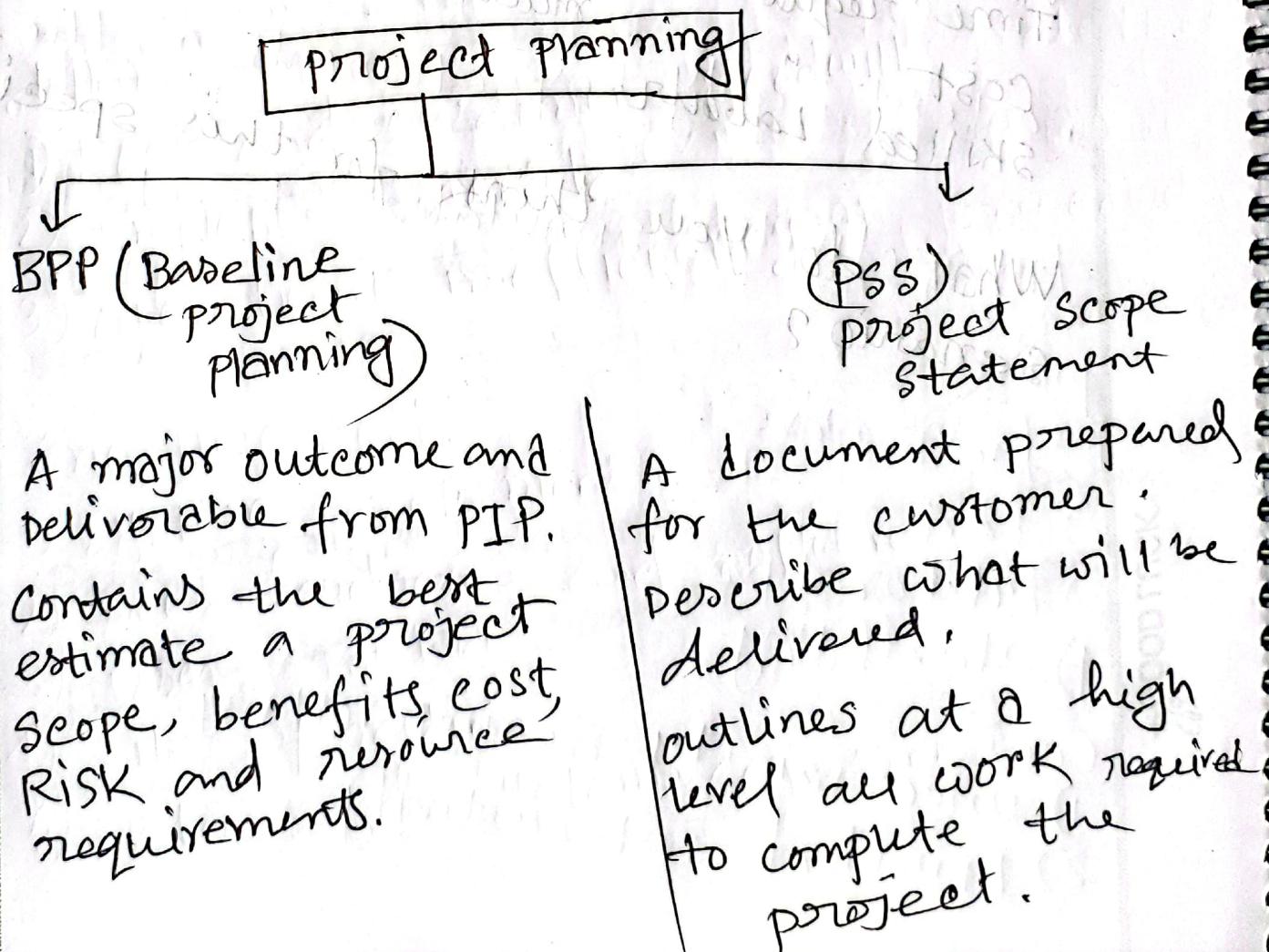
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<u>Lab Project Status</u>	
<b>Marks:</b>	<b>Signature:</b>
<b>Comments:</b>	<b>Date:</b>

TOPIC NAME: Slide-5 (Planning) DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

process of initiating and planning IS Development

- 1) Establishing the project Initiating Team  
Relationship with the customer
- 2) " project initiation plan
- 3) " project procedures
- 4) " management
- 5) " project management
- 6) " project workbook
- 7) " charter



TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

## Assessing project feasibility:

- 1) Economic
- 2) Technical.
- 3) Operational
- 4) Scheduling
- 5) Legal and contractual
- 6) Political

## Determining project Benefits

- 1) Cost reduction & avoidance.
- 2) Error reduction
- 3) Increased flexibility
- 4) Increased speed of activity
- 5) Improvement of management planning
- 6) opening new markets and increasing sales opportunity

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

Tangible benefits: can be measured

in dollars and with certainty.

- 1) Hardware costs
- 2) Labour cost
- 3) operational costs or including employee training and building renovations.

Intangible cost: can't be measured in dollars.

- 1) Loss and customer goodwill
- 2) Employee morale
- 3) operational inefficiency

One time cost.

- 1) System development.
- 2) New hardware and software
- 3) user training
- 4) Site operation
- 5) Data and system conversion.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

Recurring cost: This cost is done with period of time.

- 1) Application, software maintenance
- 2) Incremental data storage expenses
- 3) Incremental communication
- 4) New software hardware leases
- 5) Supplies and other expenses.

The time value of Money

Net Present Value

$$PV_n = Y \times \frac{(1+i)^n}{\rightarrow \text{Future Cash Flow}} \quad \begin{matrix} \text{time (years)} \\ \text{percentage} \end{matrix}$$

Break-Even-Ration =  $\frac{\text{Yearly NVP} - \text{Total NVP}}{\text{Yearly NVP}}$

$$= \frac{5000 - 25000}{5000}$$
$$= -4$$

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

## Technical Feasibility (cont.)

- 1) Failure to attain expected benefits from the project.
- 2) Inaccurate project cost estimates.
- 3) Inaccurate project duration estimates.
- 4) Failure to achieve adequate system performance levels.
- 5) Failure to adequately integrate the new system with existing hardware, software or organizational procedures.

TOPIC NAME: Project Management DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: \_\_\_\_\_

## project RISK factors:

- 1) project size
- 2) project structure
- 3) development group
- 4) user group

## Building the baseline project plan:

- 1) problem statement
- 2) project objectives
- 3) project description
- 4) Business benefits
- 5) Deliverables
- 6) Expected duration

TOPIC NAME: Information System DAY: \_\_\_\_\_  
Chapter - 6 TIME: \_\_\_\_\_ DATE: / /

## Good System Analyst characteristics:

- 1) Impertinence
- 2) Impartiality
- 3) Relax constraints
- 4) Attention to details
- 5) Reframing

## Choosing Interview Question:

open ended - Question: That questions haven't pre-specified answers.

Closed - Ended - Questions: questions that ask those responding to choose from among a set of specified responses.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

## Interviewing Groups:

Drawbacks to individual interviews:

- i) contradictions and inconsistencies between interviewees.
- ii) Follow-up discussions are time consuming.
- iii) New interviews may reveal new questions that require additional interviews with those interviewed earlier.

## Group Interview:

### Advantages:

- a) More effective use of time
- b) Agreements and disagreements at once
- c) Opportunity for synergies.

### Disadvantages:

- d) Difficult to schedule. ↳ After all of their perception a new decision or conclusion arises.

## Nominal Group Technique (NGT)

A facilitated process to support idea generation in groups.

process:

- 1) Members initially work individually despite being in a group.
- 2) Each member writes down their ideas.

- 3) A facilitator reads the ideas aloud and records them on a blackboard or flipchart.

- 4) The group discusses the ideas for clarification.

- 5) Ideas are prioritized, combined, selected and reduced.

uses:

- ① complements group meetings.
- ② Often used as part of Joint Application Design (JAD) efforts.

TOPIC NAME : \_\_\_\_\_ DAY : \_\_\_\_\_  
TIME : \_\_\_\_\_ DATE : / /

## Directly Observing Users:

### Direct Observation:

- 1) Watching users do their jobs.
- 2) Used to obtain more firsthand and objective measures of employee interaction with information systems.
- 3) Can cause people to change their normal operating behavior.
- 4) Time consuming and limited time to observe.

### Analyzing procedures and other documents (Cont.)

- 1) Information to be discovered:
  - ① problem with existing system.
  - ② opportunity to meet new need
  - ③ organizational direction.
  - ④ Names of key individuals.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

- ① Values of organization
- ② Special information processing circumstances
- ③ Reasons for current system design.
- ④ Rules for processing data.

Formal Systems: The official way

a system works as described in organizational documentation like work procedure.

Informal System: how the system works like interviews, observations.

Analyzing procedures and other documents,  
useful documents (Report)

- ① primary output of current system
- ② Enables you to work backwards from the report to the data needed to generate it.
  - ↳ current information system description.

TOPIC NAME: Methods for determining system Requirements. DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

## JAD: collaborative methodology

Key users → Who will use the system.

Managers → Who observe processes and goals.

System Analyst → Who design and build the system.

Purpose: To collect system Requirements from the critical stakeholders at the same time to ensure efficiency and accuracy.

Offsite to minimize distraction and promote focus.

## Case tools:

1) Analyze the existing systems for their strengths and weaknesses.

2) Discover requirements to adapt the system to changing business condition.

System prototype:

Iterative Development: Basic version of the system is built.

Refine understanding of system requirement in concrete terms.

TOPIC NAME: Joint Application Design (JAD)

DAY: M

TIME: 10 AM - 1 PM

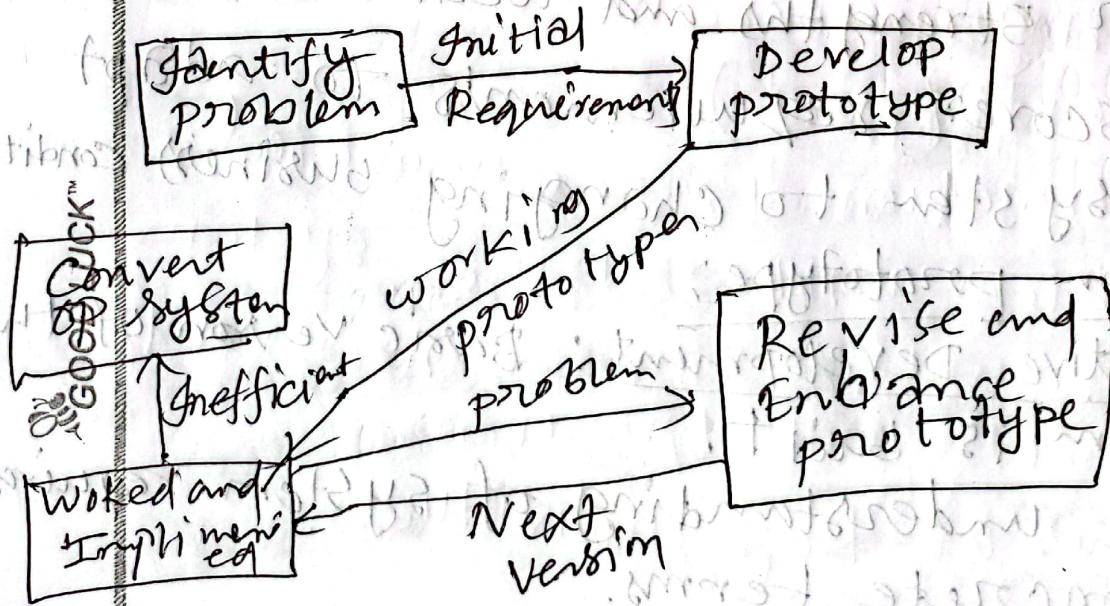
DATE: 10/10/18

## Joint Application Design (JAD):

- ④ Intensive group-oriented requirements determination technique.
- ④ Team members meet in isolation for an extended period of time.
- ④ Highly focused
- ④ Resource intensive

Leader, users, Managers, Sponsor, Analyst, Scribe

IS Staff: Listen and Observe, Record the session



TOPIC NAME: Using prototyping DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

### When to use?

- 1) User Requests are not clear.
- 2) Few users are involved in the system.
- 3) Designs are complex and require concrete form.
- 4) There is a history of communication problem between analysts and users.
- 5) Tools and data are readily available to build prototypes.

### Drawbacks:

- 1) Tendency to avoid formal documentation.
- 2) Difficult to adapt to a more general user audience.
- 3) Other systems are hardly considered when building prototypes.
- 4) SDLC checks are often bypassed.

# Information System Design

TOPIC NAME:

DAY:

TIME:

DATE:

## Design:

### Four Key steps:

- 1) Develop a logical data model for each known user interface for the application
- 2) Combine normalization principles.
- 3) Translate E-R data models for the app.
- 4) Compare the consolidated logical database design with the translated E-R model and produce one final logical DB.

## Designing Physical Tables:

- 1) Relational database is a set of related tables.
- 2) A named set of rows and columns that specifies the fields in each row of the table.
- 3) Denormalization: the process of splitting or combining normalized relationships.
- 4) Efficient use of secondary use and processing speed.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

## File organization:

Physical file: A named set of tables rows stored in a contiguous section of Secondary memory.

A file contains rows and columns from one and more tables.

File organization: Physically arranging the records of a file.

Arranging Table rows:

### Objectives:

- 1) Fast data retrieval.
- 2) High throughput for processing transactions.
- 3) Efficient use of storage space.
- 4) protection from failure of data loss.
- 5) minimization of needs of organization.
- 6) security from unauthorized use.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: \_\_\_\_\_

### 3 types of File organization.

① Sequential: Rows are stored in sequence according to a primary key value.

② Hashed File organization: Rows are usually stored nonsequentially.

The primary key value is converted into row address by algorithm.

Indexed: Rows can be stored sequentially and non-sequentially an index allows quick access to rows.

① Can create multiple indexes similar to the file title, author and subject indexes in a library.

#### Disadvantage:

Extra space is required to store the index.  
Extra time necessary to access and maintain indexes.

Forms: Business documents containing predefined data, sometimes with areas for user input.  
Reports: passive business documents containing predefined data from various records and transactions.

### Common Types of Reports:

- Scheduled Reports: Generated at fixed intervals for routine needs.
- Key Indicator Reports: Summarize critical information regularly.
- Exception Reports: Highlights data outside normal range.
- Drill-down: Provide details for key indicator and exception reports.
- Ad-hoc Reports: Respond to unplanned requests for non-routine information needs.

# The process of designing forms and Reports

DAY: \_\_\_\_\_

TIME: / /

DATE: / /

Based on:

- 1) Who uses it?
  - 2) purpose ?
  - 3) Timing and Delivery?
- ④ Use prototyping for design and refinement
- ⑤ Deliverables include design specifications
- Narrative overview
  - Sample design (wireframes, coding sheets)
  - Testing and usability assessment.

prototyping:

Initial prototype is designed from requirements.

Users review prototype design and either accept the design or request changes. Construction-evaluation-refinement cycle is repeated until it is accepted.

TOPIC NAME: Design Forms DAY: 1  
TIME: 10:00 AM - 11:00 AM DATE: 1/1/2023

## Deliverables and outcomes:

Design specifications have three sections:

Narrative overview: characterizes users, tasks, system and environmental factors.

Sample Design: Image of the form.

## Testing and usability assessment:

Measuring usability/testing results.  
(consistency, sufficiency and accuracy)

## Formatting forms and Reports:

- use meaningful titles and information
- Ensure a balanced layout with adequate spacing.
- provide an easy navigation system.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

## Highlighting Information:

- Techniques like blinking, color differences, size variations and underlining for emphasis.
- Avoid excessive or conflicting highlighting methods.

## Color in Design:

Benefits: Enhances usability, draws attention, organizes information.

Challenges: May washout, degrade resolution, affect print quality.

## Formatting Text, Tables, and Lists:

Text: Use mixed case, conventional punctuation, left justification and avoid hyphenation.

Tables: Ensure meaningful labels, adequate spacing and proper alignment (numeric data right justified, textual data left aligned).

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

Usability:

Task completion efficiency.

Speed: Task completion efficiency.

Accuracy: Expected output quality.

Satisfaction: User experience and enjoyment.

Success-Matrices: Learnability, efficiency,

error rates, memorability, satisfaction.

Tips for Pine Valley Furniture Webstore:

- Use lightweight graphics for faster loading.
- Apply forms and data integrity rules (clear labels, optional vs required fields)
- Utilize stylesheet-based HTML.
- For consistency and easier maintenance.

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## TOPIC NAME: System Implementation

DAY: \_\_\_\_\_

TIME: \_\_\_\_\_

DATE: / /

### Purpose:

- 1) Convert final system specifications into functional software.
- 2) Document work for current and future reference.
- 3) Provide assistance for user.

### Major Activities:

- 1) Coding: Transforming Physical Activities into coding.
- 2) Testing: Parallel testing during coding.
- 3) Installation: Transition from the old system to new system.
- 4) Documentation: preparing manuals and guidelines.
- 5) Training: Educating users.
- 6) Support: offering ongoing user support.

Static Testing: Code is reviewed without execution.

Dynamic Testing: code is executed.

Manual VS Automated

Human Intervention required

performed by computer systems

Technique: (seven different types of tests)

Inspection: Identifying language specific errors.

Walkthrough: Peer group review.

Desk checking: Sequential manual execution of code.

Unit Testing: Testing individual modules for errors.

Integration Testing: Combining and testing program modules incrementally.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

System Testing: Combining all programs for testing.

Stub Testing: Substituting Subordinate modules with simplified code.

Testing process: Different angles at which requirements are met.

- 1) Confirm system requirements
- 2) Document test cases for:
  - Typical use
  - Critical scenarios
  - Abnormal use
- 3) Automate code review using testing harness for cross-platform stability.
  - Errors
  - standards violations
  - other design flaws.

Combining Coding and Testing:

Extreme programming is a common technique for refactoring → making a program simpler after adding a new feature.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

## Acceptance testing by users:

The actual users test the system by completed information.

### TWO parts:

1) Alpha Testing: Using simulated data user tasting the complete FS.

2) Beta Testing: User testing of a completed FS using real data in the real user environment.

### Alpha testing Includes:

Recovery testing: forces software to fail so that the system is able to recover the vulnerabilities.

Security Testing: verifies that the protection mechanisms built into the system will protect it from improper penetration.

TOPIC NAME: System Testing DAY: 1

TIME: 10:00 A.M. DATE: 1. 1

Stress Testing: Tries to break the system

Performance Testing: Determines how the system performs on the range of possible environments in which it may be used.

### Installation Strategies:

- 1) Direct Installation: Risky; immediate switch from old to new system.
- 2) Parallel Installation: Both systems run simultaneously.
- 3) Single Location Installation: Pilot testing at one location.
- 4) Phased Installation: Gradual replacement of system components.

TOPIC NAME: Documentation,  
Training and Support.

DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

## Documentation:

System documentation: Technical details

for IT teams.

User documentation: Manuals for end-users.

## Training Method:

classroom sessions.

E-learning and blended learning

External vendor resources

## Support:

Internet Forums.

Help desk with technical and people skills.

TOPIC NAME: Security and Project Close Down DAY: 01 - Friday  
TIME: 10:00 AM - 12:00 PM DATE: 10/10/2023

## D) Security Threats:

- ① Malware (e.g. viruses, worms)
- ② External breaches.
- ③ User vulnerabilities.

## D) Close-down - project activities:

- Evaluate and reassign team members.
- Post-project review and signoff.
- Transition to maintenance mode.

Maintaining Information system means the necessary modification is done when occurs management issues, including organizational structures and configuration management.

System: Software Development Life Cycle (SDLC):

Maintenance involves revisiting SDLC steps with a focus on system changes until implemented.

This is the longest SDLC Phase.

4 Major Activities of Maintenance:

- 1) Obtaining maintenance Activities request.
- 2) Transforming requests into changes
- 3) Designing changes.
- 4) Implementing changes.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

## Types of maintenance

Corrective: Fixing flaws in design or implementation.

Adaptive: Adjusting to evolving business needs and technologies.

perfective: Adding new features or enhancing performance.

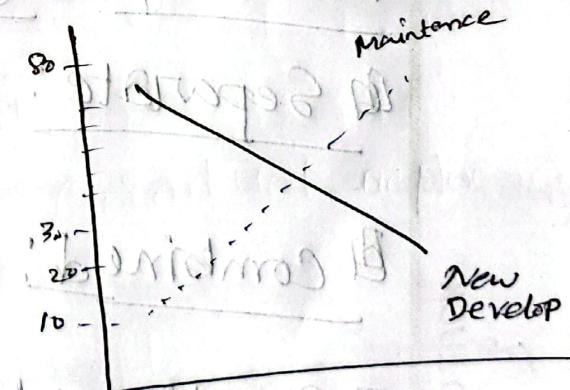
preventive: Proactively avoiding future problems

## Cost Maintenance

Maintenance can consume 70-80% of the information system budget

### 2) Maintenability factors

include latent defects, user base size, documentation quality, staff skill level and tools availability.



TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_

TIME: \_\_\_\_\_ DATE: / /

## Factors Influencing maintainability:

- ④ Latent defects increase corrective maintenance.
- ④ Larger user bases lead to more maintenance requests.
- ④ High quality documentation and well-structured programs facilitate easier maintenance.

## Managing Maintenance personnel:

### Models of organizational structures:

- ④ Separate: Maintenance handled by a dedicated group.
- ④ Combined: Developers manage maintenance.
- ④ functional: Maintenance personnel are distributed across business units.

TOPIC NAME: \_\_\_\_\_ DAY: \_\_\_\_\_  
TIME: \_\_\_\_\_ DATE: / /

## Measuring Maintenance Effectiveness:

Metrics include failure frequency, time between failures, and type of failures.

### Mean Time Between Failures (MTBF):

It is a crucial metric for system quality.

### Controlling Maintenance Requests:

Frequent maintenance requests are prioritized based on types and urgency.

Evaluation involves feasibility analysis.

### Website Maintenance:

Challenges include ensuring continuous availability and managing updates efficiently.

Use tools like HTML validation and broken link checkers.

Plan for future updates and batch processing to maintain consistency.