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INTRODUCTION TO SYSTEM ANALYSIS AND DESIGN WORKBOOK

By:
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PREFACE

This workbook contains a collection of exercises aimed at strengthening students' knowledge and understanding of System Analysis and Design course focusing on the first chapter: Introduction to System Analysis and Design.

To use this book effectively, read each section's instructions attentively to understand the objectives and the concepts covered. Complete the exercises and activities diligently by putting your knowledge into practice. Additionally, this workbook includes Short Test section designed to test overall understanding of the topic. Hope the student take the opportunity to assess their understanding by using this workbook.

I extend my appreciation to all the individuals who contributed to the creation of this workbook.

Hope that this workbook enhances student understanding of System Analysis and Design course.

Happy learning!

ATHIRAH, 2024

TABLE OF CONTENTS

CHAPTER 1 : APPLY INFORMATION SYSTEM

Learning Outcomes

This chapter encompasses of activities which is 1A, 1B and 1C.

On completion of this chapter, you should be able to:

a. Define information and information system.
b. Describe information system components.
c. Identify various types of information system.

Activity 1A	Activity outcome: Define information and information system.

Activity 1A (i)

Match the answers to the CORRECT definition of the following.

- Data that has been transformed into output that is valuable to users.
- A set of related components that produces specific results.
- Consists of basic facts that are the system's raw material.

System:

Data:

Information:

Activity 1A (ii)

Complete the sentence with CORRECT word to describe the term information system.

An information system combines technology, _____(1), and data to provide support for _____(2) functions such as order processing, inventory control, human resources, accounting, and many more.

Activity 1B	Activity outcome: Describe information system components.

Activity 1B (i)

Match the information system component with its CORRECT description.

Hardware	Tasks and business functions that users, managers, and IT staff members perform to achieve specific results.
Software	Consists of everything in the physical layer of the information system.
Data	Raw material that an information system transforms into useful information.
Processes	Person who has an interest in an information system are called stakeholders.
People	Programs that control the hardware and produce the desired information or results.

Activity 1C	Activity outcome: Identify various types of information system.

Activity 1C (i)

Complete the statement to describe the type of the information system with the words provided in the box.

Customer order processing	Email	Payroll processing	Hilton Hotel's reservation system.

1. Enterprise Computing System support company-wide operations and data management requirements.

   Example of the system: _____

2. Transaction processing (TP) systems process data generated by day-to-day business operations.

   Example of the system: _____

3. Business support systems provide job-related information support to users at all levels of a company.

   Example of the system: _____

4. User productivity systems provide employees at all levels with technology that improves productivity.

   Example of the system: _____

Activity 1C (ii)

Name the types of information system based on figure shown.

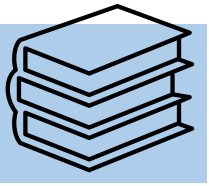
1. 

Types of information system: _____

2. 

Types of information system: _____

TEST TIME!



CHAPTER 1: SYSTEM ANALYSIS
SHORT TEST

10 marks

Section A
This section consists of FIVE (5) objective questions. Circle the correct answer.

1. Choose the **CORRECT** definition of system in information system. [1 mark]

A. Consists of basic facts that are the system's raw material.
B. A set of related components that produces specific results.
C. Data that has been transformed into output that is valuable to users.
D. Characteristic or feature that must be included in an information system.

2. Select the **CORRECT** information system components based on the following examples. [1 mark]

• Servers • Networks • Scanners • Mobile devices

A. Data
B. People
C. Software
D. Hardware

3. What is transaction processing system? [1 mark]

A. Data generated by day-to-day business operations.
B. Provide job-related information support to users at all levels of company.
C. Companies provide employees at all levels with technology that improves productivity.
D. Use a large database called a knowledge base that allows users to find information by entering keywords or questions in normal English phrases.

4. Which type of information system that the company use to provide employees at all levels with technology that improves productivity? [1 mark]

A. Digital assistant
B. User Productivity System
C. Transaction Processing System
D. Knowledge Management System

5. Select the **CORRECT** organizational level based on the following statement. [1 mark]

> Develop long-range plans, called strategic plans, which define the company's overall mission and goals.

A. Top managers
B. Operational Employees
C. Supervisors and Team Leaders
D. Middle Managers and Knowledge Workers

Section B

This section consists of THREE (3) subjective questions. Give your answer in the space provided.

1. Define information in information system. [1 mark]

   _____
   _____
   _____

2. Explain processes as the information system components. [1 mark]

   _____
   _____
   _____

3. List THREE examples of user productivity system. [3 marks]

   i. _____
   ii. _____
   iii. _____

CHAPTER 2

DEMONSTRATE SYSTEM DEVELOPMENT APPROACH

Learning Outcomes

This chapter encompasses of activities which is 2A, 2B, 2C, 2D, and 2E.

On completion of this chapter, you should be able to:

a. Explain system development method.
b. Explain System Development Life Cycle (SDLC) activities.
c. Describe various types of life cycle models.
d. Identify appropriate life cycle models based on given scenario.
e. Describe project management activities.

Activity 2A	Activity outcome: Explain system development method.

Activity 2A (i)

Classify the given descriptions into their CORRECT system development method whether it is Structured Analysis, Object-Oriented Analysis, or Agile/Adaptive method.

1. Represents the system in terms of data and the processes that act upon that data.
   System development method: _____

2. Stresses intense team-based effort.
   System development method: _____

3. Breaks development into cycles, or iterations, that add functionality. Each cycle is designed, built, and tested in an ongoing process.
   System development method: _____

4. Views the system in terms of objects that combine data and processes.
   System development method: _____

Activity 2A (ii)

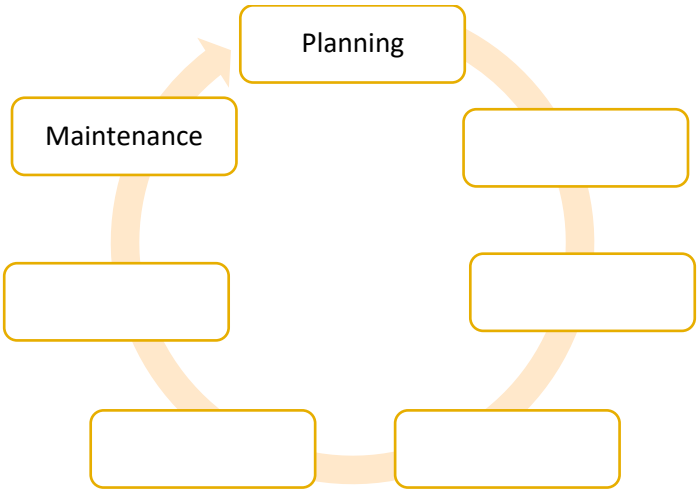
Read each statement carefully and state whether it is True (T) or False (F).

No.	Statement	TRUE (T)/ FALSE (F)
i	Structured Analysis relies heavily on written documentation.	
ii	The pros of using Object-Oriented Analysis is easy to maintain and expand because new objects can be created using inherited properties.	
iii	Agile Methods integrates easily with object-oriented	
iv	Agile Methods need high level of technical and communications skills of the team members.	
v	The cons of using Structured Analysis is interaction of objects and classes can be complex in larger systems.	
iv	The cons of using Agile Method is lack of structure and documentation can introduce risk factors.	

Activity 2B	Activity outcome: Explain System Development Life Cycle (SDLC) activities.

Activity 2B (i)

Fill in the blank with the CORRECT sequence of SDLC activities.



Activity 2B (ii)

Fill in the blanks with CORRECT answers to describe the activities in SDLC with the words provided in the box.

requirements	problem	development	deliverable
implementation	Product	physical	support

1. The purpose of planning activity is to identify the nature and scope of the business opportunity or _____.

2. The _____ of fact-finding during analyze activity is system requirements documents.

3. During design activity, _____ model will be created that need to satisfy all documented requirements for the system.

4. The code is produced during _____ activity.

5. Testing activity will test the code that has been developed against the _____ to make sure the _____ can solve the need addressed.

6. The objective of the systems _____ activity is to deliver a completely functioning and documented information system.

7. New system that has been operational can receive _____ during maintenance activity.

Activity 2C	Activity outcome: Describe various types of life cycle models.

Activity 2C (i)

Read each statement carefully. Circle (T) if the statement is true and (F) if the statement is false.

1. Waterfall model is a non-linear-sequential life cycle model. T/F
2. Each phase in waterfall model must be completed before the next phase can begin. T/F
3. Spiral model is a combination of iterative development process model and sequential linear development model. T/F
4. Process in iterative and incremental development model starts with a simple implementation of a subset of the requirements and iteratively enhances the evolving versions until the full system is implemented. T/F
5. The project that uses agile model needs team members that have high level of technical and interpersonal skills. T/F
6. Agile model is very flexible and efficient in dealing with change. T/F
7. Prototyping is used to allow the users evaluate developer proposals and try them out before implementation. T/F
8. Prototype is a working model of software with full functionality. T/F
9. The advantage of using rapid application (RAD) model is it can be developed mire quickly with significant cost savings. T/F
10. Joint application development (JAD) model involves the system owner and end users in the design and development of the system. T/F
11. JAD model is less expensive compared with traditional methods if the group is too large relative to the size of the project. T/F
12. JAD can result in a more accurate statement of system requirements. T/F

Activity 2D	Activity outcome: Identify appropriate life cycle models based on given scenario.

Activity 2D (i)

Select (√) at the appropriate life cycle models based on the given scenario.

1. Scenario 1:

You are developing a large-scale software system for a government organization. The requirements are stable, and there is a strict emphasis on documentation and regulatory compliance.		
Waterfall model	Agile model	Spiral model

2. Scenario 2:

You are developing a software product for which time-to-market is a critical factor. The project has a clear scope and well-defined requirements, but there is a need for quick delivery of the final product to gain a competitive advantage.		
Prototyping model	Spiral model	RAD model

3. Scenario 3:

You are working on a software project with evolving requirements. The client wants to see frequent demonstrations of the software's functionality to provide feedback and make necessary adjustments.		
Iterative and Incremental model	Prototyping model	Waterfall model

4. Scenario 4:

You are developing a complex web application where user interface design and usability are critical. The client wants to have early visual representations of the interface to gather feedback and ensure a good user experience.		
JAD model	Prototyping model	Agile model

Activity 2E	Activity outcome: Describe project management activities.

Activity 2E (i)

Describe the following project management activities performed by the project manager in information system development.

1. Project Planning

_____
_____
_____
_____
_____

2. Project Scheduling

_____
_____
_____
_____
_____

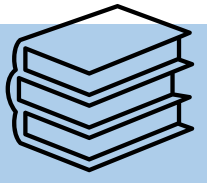
3. Project Monitoring

_____
_____
_____
_____
_____

4. Project Reporting

_____
_____
_____
_____
_____

TEST TIME!



CHAPTER 2: DEMONSTRATE SYSTEM DEVELOPMENT APPROACH
SHORT TEST

10 marks

Section A
This section consists of SEVEN (7) objective questions. Circle the correct answer.

1. Select the **CORRECT** cons of using agile/adaptive method as system development method. [1 mark]

A. Changes can be costly.
B. Interaction of objects and classes can be complex in larger systems.
C. Team members need a high level of technical and communications skills.
D. Users might not be able to describe their needs until they can see examples of features and functions.

2. Select the **CORRECT** pros of using structured analysis method as system development method. [1 mark]

A. Changes can be costly, especially in later phases.
B. Very flexible and efficient in dealing with change.
C. Traditional method that has been very popular over time.
D. Integrates easily with object-oriented programming languages.

3. Identify the **CORRECT** System Development Life Cycle (SDLC) activities based on the following statement. [1 mark]

> - The work is divided in modules/units and actual coding is started.
> - The code is produced so it is the main focus for the developer. This is the longest phase of the software development life cycle.

A. Design
B. Maintenance
C. Development
D. Implementation

4. Select the **CORRECT** life cycle model that has the following advantages. [1 mark]

> - Very flexible and efficient in dealing with change.
> - Team interaction and reflect a set of community-based values.
> - Frequent deliverables constantly validate the project and reduce risk.

A. Agile model
B. Waterfall model
C. Prototyping model
D. Joint Application Development

5. Select the **CORRECT** life cycle model that involves the system owner and end users in the design and development of an application through a succession of collaborative workshops. [1 mark]

A. Agile model
B. Prototyping Model
C. Joint Application Development
D. Rapid Application Development

6. Select the **CORRECT** type of live cycle models that the next phase is started only after the defined set of goals are achieved for previous phase and the phases do not overlap. [1 mark]

A. Agile Model
B. Spiral Model
C. Waterfall Model
D. Prototyping Model

7. Identify the **CORRECT** project management activities where project manager will identify all project tasks and estimating the completion time and cost of each. [1 mark]

A. Project Planning
B. Project Reporting
C. Project scheduling
D. Project monitoring

Section B

This section consists of THREE (3) subjective questions. Give your answer in the space provided.

1. Explain the activity that is done during project monitoring. [1 mark]

   _____

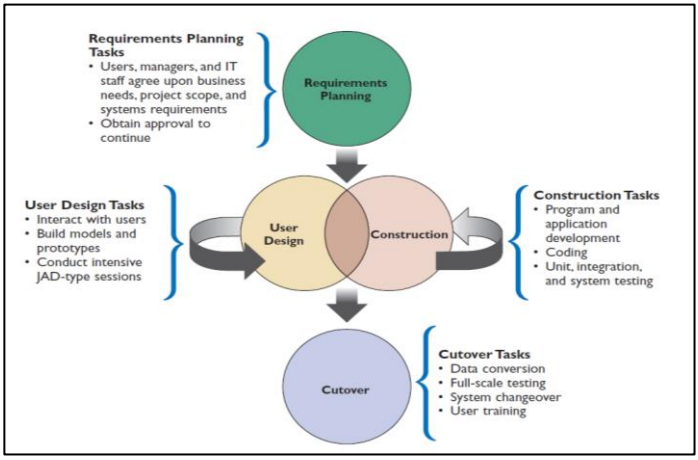
   _____

2. Identify appropriate life cycle models based on given scenario. [1 mark]

   - When the requirements are clearly known and not prone to change.
   - When strong documentation is required.
   - The project is small and short-term.

   Life Cycle models: _____

3. State the **CORRECT** various type of life cycle model based on the following figure. [1 mark]



   Life Cycle models: _____

CHAPTER 3 : APPLY PROJECT MANAGEMENT

Learning Outcomes
This chapter encompasses of activities which is 3A, 3B, 3C, 3D, 3E, and 3F.

On completion of this chapter, you should be able to:

a. Explain project planning, scheduling, monitoring, and reporting.
b. Explain steps in project planning.
c. Describe work breakdown structures, task patterns and critical path analysis.
d. Create work breakdown structure.
e. Explain techniques for estimating task completion times and costs.
f. Explain leadership and project manager.

Activity 3A	Activity outcome: Explain project planning, scheduling, monitoring, and reporting.

Activity 3A (i)

Categorize the given statements based on the CORRECT project management activities.

- Selecting and staffing the project team.
- Monitor the progress of the project.
- Identifying all project tasks.
- Estimating the completion time and cost of each task.
- Regular progress reports to management, users, and the project team itself.
- Creating a Gantt chart and PERT/CPM to visualize project timelines and dependencies.
- Requires strong communication skills and a sense of what others want and need to know about the project.
- Guiding, supervising, and coordinating the project team's workload.

PROJECT PLANNING	PROJECT SCHEDULING
PROJECT MONITORING	**PROJECT REPORTING**

Activity 3B	Activity outcome: Explain steps in project planning.

Activity 3B (i)

State THREE (3) steps in project planning in the correct order.

Activity 3C	Activity outcome: Describe work breakdown structures, task patterns, and critical path analysis.

Activity 3C (i)

What is Work Breakdown Structures (WBS)?

_____

_____

_____

Activity 3C (ii)

Identify whether the following statement is TRUE (T) or FALSE (F).

1. Task patterns is tasks that arrange in a logical sequence. T/F
2. Task depends on each other. T/F
3. Task can be performed in random sequence. T/F
4. A critical path is a series of tasks that, if delayed, would affect the completion date of the overall project. T/F
5. Project can be complete on time according to plan even if any task on the critical path falls behind schedule. T/F

Activity 3C (iii)

Fill in the blank with **CORRECT** answer to describe dependent task.

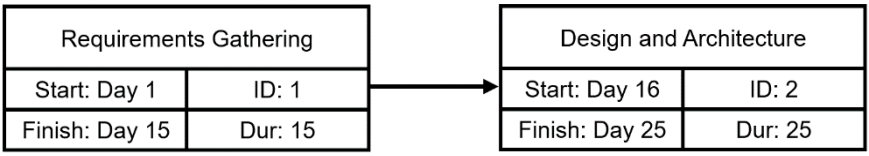
DEPENDENT TASK

- **Definition**: Dependent task is a task (i)_____ where tasks must be (ii)_____ one after another because one task depends on the other tasks.

- **Example**: Given the following tasks for a software development project:

  - Task 1: Requirements Gathering
  - Task 2: Design and Architecture
  - Task 3: Development
  - Task 4: Testing
  - Task5: Deployment.

  Each task is dependent on the completion of the (iii)_____ task. For example, the project team cannot start the design and architecture phase (Task 2) until the requirements gathering (Task 1) is completed. Following figure shows the example in the PERT chart:



Activity 3C (iv)

Draw one example each of multiple successor task and multiple predecessor task using PERT chart. Include *start day*, *finish day*, *ID*, and *duration* in your example.

Multiple successor task (Two or more concurrent tasks depend on a single prior task.)
Multiple predecessor task (A task requires two or more prior tasks to be completed before it can start.)

Activity 3D	Activity outcome: Create a work breakdown structure.

Activity 3D (i)

List TWO (2) tasks in Work Breakdown Structure (WBS).

1. _____

2. _____

Activity 3D (ii)

Explain the differences between a Gantt chart and a PERT/CPM chart.

_____
_____
_____
_____
_____

Activity 3E	Activity outcome: Explain techniques for estimating task completion times and costs.

Activity 3E (i)

Identify the CORRECT time estimates (days) based on the scenario given in figure below.

> Nadhir, the project manager, estimates that conduct stakeholder interviews task could be completed in as few as 9 days or could take as long as 15 days, but most likely will require 12 days.

i. Best-case estimate (B) : _____

ii. Probable-case estimate (P) : _____

iii. Worst-case estimate (W) : _____

Activity 3E (ii)

Based on the scenario given at Activity 3E (ii), calculate the expected task duration using the weighted formula given in the figure below. Provide the step of your calculation.

$$\text{Estimated time} = \frac{(B + 4P + W)}{6}$$

Calculation:

Activity 3F	Activity outcome: Explain leadership and project manager.

Activity 3F (i)

Describe the role of project coordinator.

_____

_____

_____

_____

_____

TEST TIME!

CHAPTER 3: APPLY PROJECT MANAGEMENT
SHORT TEST

10 marks

Section A
This section consists of FIVE (5) objective questions. Circle the correct answer.

1. Which project management activities involve creating specific timetable that shows tasks, task dependencies and critical tasks that might delay the project. [1 mark]

A. Project Planning
B. Project Reporting
C. Project Scheduling
D. Project Monitoring

2. Based on the situation in figure below, identify the **CORRECT** sequence of steps in project planning. [1 mark]

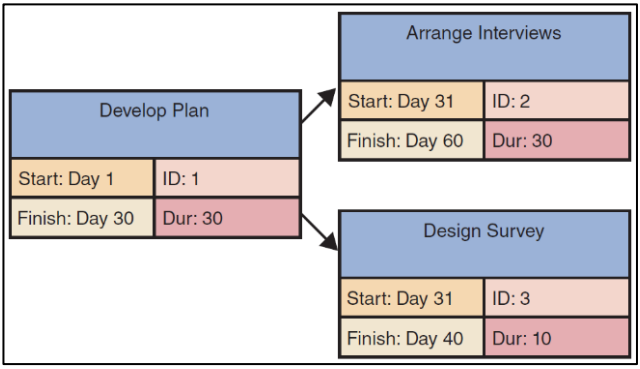
X:	Create a work breakdown structure.
Y:	Calculate the critical path.
Z:	Identify task patterns

A. X, Y, Z
B. X, Z, Y
C. Z, X, Y
D. Y, X, Z

3. Select the **CORRECT** task pattern in which a task requires two or more prior tasks to be completed before it can start. [1 mark]

A. Dependent task
B. Non-dependent task
C. Multiple successor task
D. Multiple predecessor task

4. Identify the **CORRECT** task patterns based on the following figure. [1mark]



A. Dependent task
B. Non-dependent task
C. Multiple successor task
D. Multiple predecessor task

5. Identify the **CORRECT** chart types based on the following statement. [1 mark]

• Contain horizontal bar chart that represents a set of tasks. • The position of the bar shows the planned starting and ending time of each task while the length indicates its duration.

A. Bar charts
B. Gantt charts
C. Horizontal chart
D. PERT/CPM charts

Section B

This section consists of THREE (3) subjective questions. Give your answer in the space provided.

1. Explain critical path. [1 mark]

   _____
   _____
   _____

2. List TWO (2) task in Work Breakdown Structures (WBS). [2 marks]
   i. _____
   ii. _____

3. Ezzul, a project manager, estimates that a Design User Interface task could be completed in as few as 12 days or could take as long as 20 days, but most likely will require 16 days. He often uses the weighted formula as shown in the following for estimating the duration of each task. Calculate the expected task duration for Ezzul's project and show the steps for your calculation. [2 marks]

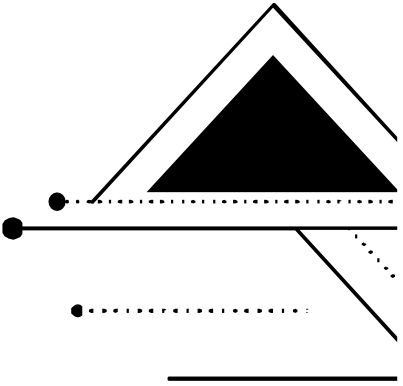
$$\text{Estimated time} = \frac{(\text{B} + 4\text{P} + \text{W})}{6}$$

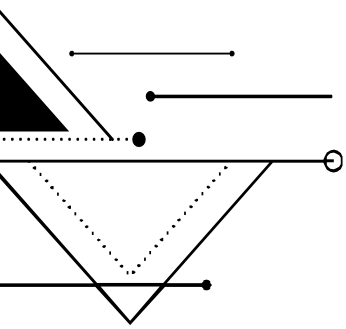
Calculation:

References

1. Tilley. S. (2019). Systems Analysis and Design, 12th edition. United State: Shelly Cashman Series. (ISBN: 0357117816)

2. Valacich. J. &. George. J. (2020). Modern Systems Analysis and Design. United State: Pearson. (ISBN: 0134204921)





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