Developing specifications and steps of data preparation are included in input design. Data preparation steps are very important because it helps to put transaction data into a usable form for data entry processing. The activity of putting data into the computer for processing is known as data entry processing.

The objectives of input design are to:

1. **Keep the process simple**: The analyst should try to achieve all the objectives in the simplest manner as possible. If simple alternatives are available, complexities should be avoided.
2. **Reduce the input volume**: The input design should control the quantity of input data. Data reduction can lower costs by reducing labor expense. The analyst can also speed up the entire process from capturing the data to providing the results to the user.
3. **Avoid delay**: A delay in processing as a result of data preparation or data entry operation is known as bottleneck. While designing the input, analyst should always try to avoid bottleneck.
4. **Avoid errors in data**: The input data design should be such that the errors in data are as minimal as possible. Quantity of data plays a major role in deciding the rate at which errors occur. Smaller the amount of input data, fewer the opportunities of errors.
5. **Avoid extra steps**: Sometimes the transactions volume and amount of data preparation cannot be controlled. It becomes very important that the analyst must ensure that the process is as efficient as possible.

10.3.1 Data Capture Guidelines

It is very important to know what data is important in a transaction and what data should be collected for input and processing. It is the responsibility of the analyst to capture only those items that should be considered as input.

There are two types of data that must be input when transactions are processed. They are—

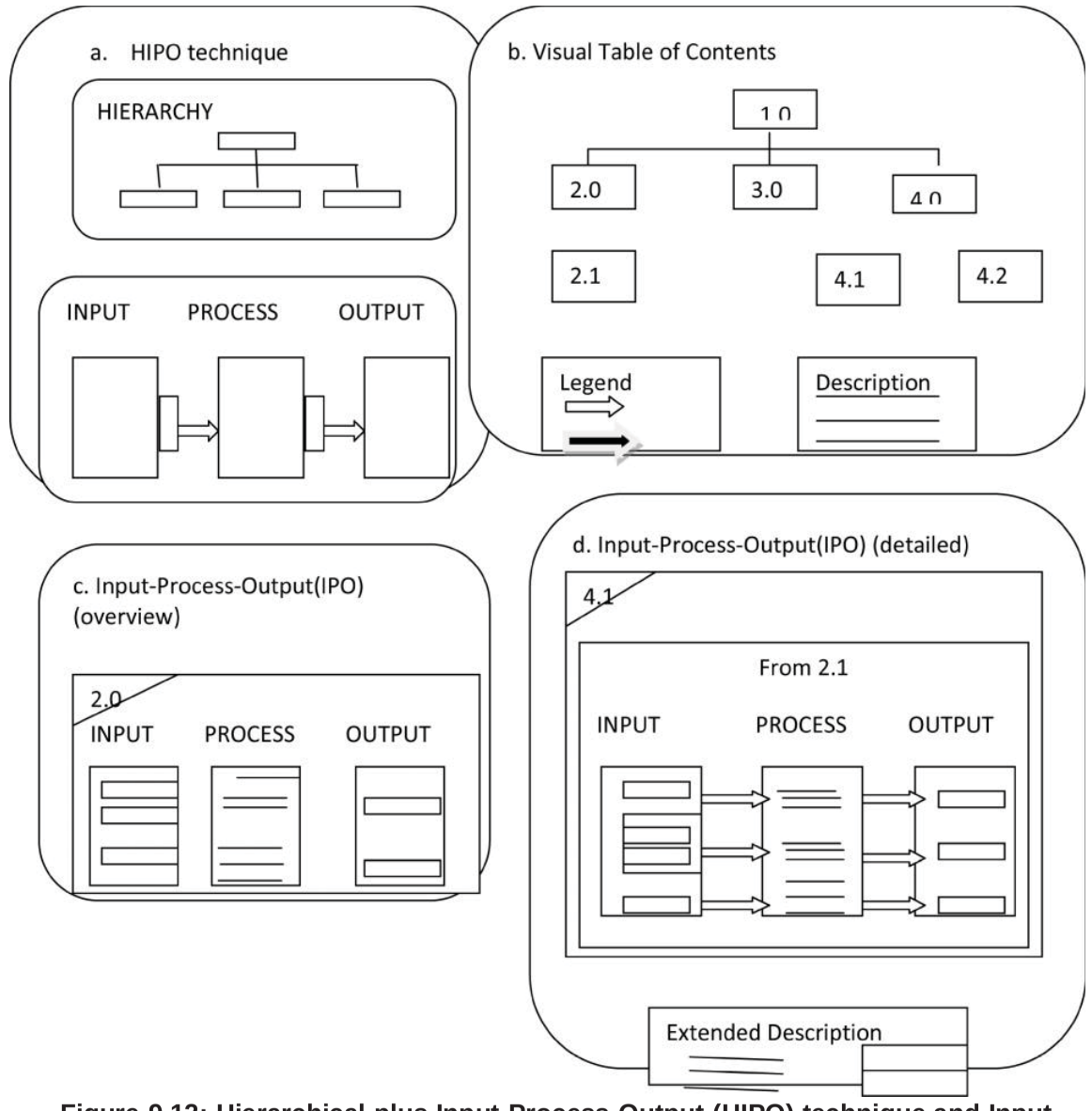


Figure 9.12: Hierarchical plus Input-Process-Output (HIPO) technique and Input-Process-Output (IPO) diagrams



CHECK YOUR PROGRESS

Q4. Draw the hierarchy chart of inventory system?

Q5. Name all the components present in the HIPO/IPO package.

Q6. Write four purposes of HIPO/IPO chart.



9.7 LET US SUM UP

- System design is the process of defining a developing a system in order to satisfy the specified requirements of the user. It defines the components, architecture, modules, interfaces and data for a system.
- There are two types of system design: logical and physical.
- Logical design shows the logical representation of data flow, input and output of the system. The logical design of a system can be represented by using different diagrams like Entity-Relationship Diagram.
- Logical design is followed by physical design. Here the working system is produced by defining design specifications that tells the programmer exactly what the system should do.
- Physical design of any system consists of steps: Design the physical system, plan system implementation, devise a test and implementation plan, specify any hardware or software and update costs, benefits, system constraints and conversion dates
- It is a data flow-based methodology. It allows identifying the input and output of the developing device. The main goal of structured design is to minimize the complexity of the system and increase the modularity.
- Structured design partitions a program into small, independent modules. This method is useful in minimizing complexity and making a problem manageable by subdividing it into smaller segments. This approach is known as modularization or decomposition.
- Functional decomposition is a fundamental technical analysis. It breaks down a complex problem into successive layers that are manageable and comprehensive.
- The documentation tool for structured design is called the structured chart. It is a graphical tool for representing hierarchy

10.2 INTRODUCTION

In the previous unit, we are already acquainted with the types of system design. The logical and physical process of system design is explained in the last unit. Under design methodologies, structured design is explained clearly. We now know how to design structure chart. We also know how to design the HIPO/IPO chart under form driven methodology.

In this Unit, we will see the input data types and input design. The various types of input will be discussed. We will know what type of data should be entered and what type of data should be avoided. Online data entry will be discussed. We will know how to design online data entry by using menus, formatted form and prompts. The output design will be explained. The design of forms, its requirements and types of forms will also be discussed. The next unit will explore the topics related to database design.

10.3 INPUT DESIGN

In an information system, raw data is the input that is processed to produce the output. The most common cause of errors in data processing is inaccurate input data. Input design can control the errors entered by data entry operators. The process of converting user originated inputs to a computer based format is known as input design. In the system design phase, logical data flows, sources and destinations and data stores are identified in the data flow diagram. Database transaction files and computer programs are specified in a system flow chart. Input data from various sources are collected and similar input data are organized into groups. After that, for processing, appropriate input media is selected.

The input design is the connection that joins information system of the world to the users. The manner in which data enters into the system is described in the input specifications. If the input design features are found proper, it can produce reliable system otherwise it may result in the production of faulty system.

- In the evaluation of the modules two criteria are considered. Coupling and cohesion. They help in determining the complexity of the system.
- The module's connection to other module is called coupling. It defines the degree of dependency of each module on another.
- The inter-module strength is known as cohesion. It is the measure of the closeness of the relationship between its components.
- HIPO is a form-driven technique. It describes clearly the data input and output from processes.
- The HIPO/IPO package format consists of the following: Hierarchy chart, Visual table of contents, IPO chart, Overview diagram and Detail diagram



9.8 FURTHER READINGS

1. Kenneth E.Kendall& Julie E.Kendall,9th Edition 2015, System Analysis and Design, Pearson
2. Goyal, A. (2011). *Systems Analysis and Design*. PHI Learning.



9.9 ANSWERS TO CHECK YOUR PROGRESS

Ans. to Q No 1: The main differences between logical and physical design are—

a. Logical design shows the logical representation of data flow, input and output of the system. In physical design, the working system is produced by defining design specifications that tells the programmer exactly what the system should do.
b. Logical design comes first. Then comes the physical design.
c. The logical design of a system can be represented by using different diagrams like Entity-Relationship Diagram. In physical design the programmers write the necessary programs or modify the software package so that the system can accept inputs from the user.

UNIT 10: INPUT/OUTPUT AND FORM DESIGN

UNIT STRUCTURE

10.1 Learning Objectives
10.2 Introduction
10.3 Input design
  10.3.1 Data Capture Guidelines
10.4 Input data
  10.4.1 Source Data
  10.4.2 Design of Source Document
  10.4.3 Source Data Capture Methods
10.5 Input Media and Devices
10.6 Online Data Entry
10.7 Screen Design
10.8 Output Design
  10.8.1 Basic Principles
  10.8.2 Types of Outputs
10.9 Form Design
  10.9.1 Requirement of Form Design
  10.9.2 Types of Forms
10.10 Let Us Sum Up
10.11 Further Readings
10.12 Answers to Check Your Progress
10.13 Model Questions

10.1 LEARNING OBJECTIVES

After going through this unit, you will be able to –

- learn about input design
- explain input data, source data and input media and devices
- design online data entry
- learn about output design
- discuss about form design

d. System specifications are mentioned in logical design and procedure specifications are mentioned in physical design.

Ans. to Q No 2: The structure chart of food ordering system is—

Ans. to Q No 3: The difference between cohesion and coupling are—

a. Cohesion follows the concept of intra module. Coupling follows the concept of inter module.

b. Increase in cohesion for good for a software system. Increase in coupling is not good for a software system.

c. Cohesion represents the functional strength of the modules. Coupling represents the independence among modules.

d. In cohesion, focus is given on a single module. In coupling, modules are connected on other modules.

Ans. to Q No 4: Hierarchy chart of online sales is—

Ans. to Q No 5: The components present in HIPO/IPO system are—

a. Hierarchy chart

b. Visual table of contents

c. IPO chart

d. Overview diagram

e. Detail diagram

Ans. to Q No 6: The four purposes of HIPO/IPO chart are—

1. To understand structure and functions of systems.
2. To provide easily understandable description of various parts of the system.
3. State the function to be performed by the programmer rather than specifying program statement to be used to perform the function.
4. Provide the visual description of input to be used and output to be produced for each level of the diagram.



9.10 MODEL QUESTIONS

Q1. What is system design?

Q2. Write notes on logical design and physical design.

Q3. Explain the steps involved in the process of physical design.

Q4. What is structured design?

Q5. What is modularization? Mention its advantages.

Q6. What is functional decomposition? Mention its advantages and disadvantages.

Q7. Draw the structured chart to find the area of a circle.

Q8. Write notes on coupling.

Q9. What are the different types of cohesion?

Q10. What is form-driven methodology?

Q11. Draw the hierarchy chart of a hotel management system.

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