

Learning Guide Unit 5

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Book: Learning Guide Unit 5

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Description

Learning Guide Unit 5

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Overview

Unit 5: Object Oriented Design and Analysis

Overview

Topics

- Object Oriented Analysis Activities
 - State Transition Diagram
 - Automated Support Tools for Analysis
 - Time Order Event Diagram
 - BOOCH Diagram
 - Package specifications and Prototype
 - Automated Support for Design
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Learning Objectives:

By the end of this Unit, you will be able to:

1. Perform Object Oriented Analysis on a given problem by using OO analysis concepts like encapsulation and inheritance
 2. Develop lists and state transition diagrams for doing the requirement analysis.
 3. Discuss validation processes used in object oriented design process and its applicability.
 4. Explain the structure and application of Booch diagrams used in Object Oriented Design
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Tasks:

- Read through the Learning Guide and the Reading Assignment
- Complete the Discussion Assignment by posting in the Discussion Forum
- Respond to three of your fellow classmates' posts in the Discussion Forum
- Complete and submit the Programming Assignment
- Submit the Learning Journal
- Take and submit the Self-Quiz

Introduction

CHAPTER 11: The chapter focuses on reanalysis of requirements done in the previous chapter, using the Object Oriented approach. It further explores the various schools of thought that have emerged on how best to represent object thinking.

The first school is object orientation that uses many graphical forms paralleling those of other methodologies. Authors using this approach are Coad and Yourdon and Rumbaugh et al.

The second school of object orientation is tabular, using mainly tables to list and define objects and their parts. This approach is used by Booch and Berrard. Since the graphical methodologies lack the reasoning processes of Booch's approach, while the tabular method is not easily communicated because of the extensive detail generated, the Booch and Coad and Yourdon approaches are both modified and integrated throughout the chapter discussions.

Later in the chapter, we discuss the declarative steps that are performed to develop an object analysis including identification of class/objects, identification of processes, class and hierarchy definition, definition of attributes of operations, definition of inter-object messages, and class/object state-transition definition.

CHAPTER 12: The chapter takes the analysis of the problem domain further to assign the encapsulated objects to one of the four subdomains, elaborate component definitions to include service processes, design module interactions and define the required messages and their type. It categorized the process to Seven Steps of Object-Oriented Design, linking them to the tables developed during object-oriented analysis. These steps are:

- First, the objects are allocated to four subdomains: human, hardware, software, and data.
- The second step is the development of time-event diagrams for all processes and all objects.
- Thirdly, their service object needs are identified. Service objects closely parallel operations performed by an operating system (OS).
- The fourth step is to develop a Booch diagram to summarize the objects both application and service and their interactions. Booch recommends a 3" x 5" approach for which each object and its processes are shown as a package on a 3" x 5" index card.
- The next step is to define message communications. Each called object and its calling object, input message, output message, action type, and return object are identified.
- At a higher level of abstraction, the next step is to develop a process diagram that shows the distribution of functionality and equipment for the application being developed.
- The last step of OOD is to develop package, or module, specifications for programming. The information from the various tables and graphics is rearranged to show the relevant information for each particular module.

Reading Assignment

TEXT: The New Software Engineering:

- Chapter 11: Object-Oriented Analysis
- Chapter 12: Object-Oriented Design

Additional Readings:

- State Transition Diagram: <http://mfleck.cs.illinois.edu/building-blocks/version-1.0/state-diagrams.pdf>
- Finite State Machines: <https://web.archive.org/web/20140309092834/https://www.cs.umd.edu/class/sum2003/cmsc311/Notes/Seq/fsm.html>
- The BOOCH Method: Download the [pdf](#).

Discussion Assignment

Describe the validation processes used throughout an object-oriented design process. Reason the placement of each validation step in the process and what is the purpose of each validation?

You must post your initial response (with references) before being able to review other student's responses. Once you have made your first response, you will be able to reply to other student's posts. You are expected to make a minimum of 3 responses to your fellow student's posts.

Programming Assignment

Perform an object-oriented analysis on the problem you chose in Unit 3 for structured analysis. Develop all lists, tables, state transition diagrams (using mealy model), and pictures required to document the requirements of the problem.

Paper Criteria:

- Has the student created all Lists for the given assignment?
- Has the student developed all the tables for the given assignment?
- Has the student developed all the diagrams/pictures for the given assignment?
- Has the student labeled the transition lines to identify the events that initiate the change?
- Has the student labeled the lines with the processes that manage the event and written the process names under the lines?
- Has the student defined the process attributes?
- Has the student written a summary paragraph and used it to identify the processes?

Learning Journal

The Learning Journal is a tool for self-reflection on the learning process. In addition to completing directed tasks, you should use the Learning Journal to document your activities, record problems you may have encountered and to draft answers for Discussion Forums and Assignments. The Learning Journal should be updated regularly (on a weekly basis), as the learning journals will be assessed by your instructor as part of your Final Grade.

Your learning journal entry must be a reflective statement that considers the following questions:

- 1. Describe what you did, what you learned, your weekly activities, in what ways are you able to apply the ideas and concepts gained, and finally, describe one important thing that you are thinking about in relation to the activity*
- 2. Booch recommends the use of 3" x 5" cards to create and 'play' with the Booch diagram contents. What is the playing for? Why are 3" x 5" cards helpful to that process?*

Self-Quiz

The Self-Quiz gives you an opportunity to self-assess your knowledge of what you have learned so far.

The results of the Self-Quiz do not count towards your final grade, but the quiz is an important part of the University's learning process and it is expected that you will take it to ensure understanding of the materials presented. Reviewing and analyzing your results will help you perform better on future Graded Quizzes and the Final Exam.

Please access the Self-Quiz on the main course homepage; it will be listed inside the Unit.

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