Lab 2

Analyzing a Problem and Designing a Solution

Objectives

Upon completion of this lab, you should be able to:

- Complete Review Questions
- Analyze a problem using object-oriented analysis (OOA)
- Design classes from which objects will be created

Lab Overview

In this lab, you complete review questions and two exercises.

The exercises are:

- List the objects, attributes, and operations in a sample problem domain
- Model an object using an UML-like notation

Completing Review Questions

Complete the following questions:

1. Which of the following terms refers to the scope of a problem or a system:
   a. The problem context
   b. The problem domain
   c. The system context
   d. The problem area
2. Which of the following terms represents two different characteristics of an object:
   a. Methods and operations
   b. The problem domain
   c. Attributes and operations
   d. Variables and data
3. Which of the following statements is a criteria to test the validity of an object relative to a problem domain:
   a. Relevance to the problem domain
   b. Operation order
   c. Attribute type
   d. If a class has a super class
4. Which of the following statements are true:
   a. A class is an instance of an object.
   b. An object is a blueprint for a class.
   c. An object and a class are exactly the same.
   d. An object is an instance of a class.
   e. An attribute cannot be a reference to another object.

Exercise 1: Analyzing a Problem Domain

This exercise is based on a small case study. You will identify the objects, their attributes and operations involved in the system domain.

Preparation

Read the following case study, and then model the system by choosing objects and their attributes and operations.

Case Study

A soccer league has many players. Each year there are three seasons and the league puts together teams for each season. Each team is comprised of 15 players. The goals scored by each player during each season are tracked. The games played between the teams, their final scores, and each team's standings based on its won and lost games are tracked.

Task – Performing an Analysis

Your task is to produce an object-oriented analysis for a Java technology application that tracks soccer scores. The program should track:

- The list of players on each team
- The number of goals that each player scores
- The games played during a season, including the teams that play each other, and the final score

The application should be able to generate statistics for teams, players, and seasons.

To finalize the analysis, complete the following steps:

1. Create a list of the potential objects.
2. Apply the rules in this module to decide if all your objects are valid.
3. Create a list of attributes and operations for each of your objects.

Notes

Exercise 2: Designing a Solution

In this exercise you will use UML notation to represent a class.

Task – Producing a Design

Your task is to produce a design for each of the classes in the earlier system for tracking soccer scores. Remember to:

- Use short-hand to name your classes, attribute variables, and methods
- Identify a valid range of values for each attribute (where a range is known)
- Use the parentheses to identify methods

Notes

Exercise Summary

Take a few minutes to identify what experiences, issues, or discoveries you had during the lab exercises.

- Experiences
- Interpretations
- Conclusions
- Applications