

Practical 2: Identifying Domain Classes from the Problem Statements

Objectives

After completing this experiment you will be able to:

- Understand the concept of domain classes
- Identify a list of potential domain classes from a given problem statement

Domain Class

In Object Oriented paradigm Domain Object Model has become subject of interest for its excellent problem comprehending capabilities towards the goal of designing a good software system. Domain Model, as a conceptual model gives proper understanding of problem description through its highly effective component – the Domain Classes. Domain classes are the abstraction of key entities, concepts or ideas presented in the problem statement. As stated in, domain classes are used for representing business activities during the analysis phase.

Below we discuss some techniques that can be used to identify the domain classes.

Traditional Techniques for Identification of Classes

Grammatical Approach Using Nouns

This object identification technique was proposed by Russell J. Abbot, and Grady Booch made the technique popular <http://virtual-labs.ac.in/cse08/isad/isad/5/references/>. This technique involves grammatical analysis of the problem statement to identify list of potential classes. The logical steps are:

1. Obtain the user requirements (problem statement) as a simple, descriptive English text. This basically corresponds to the use-case diagram for the problem statement.
2. Identify and mark the nouns, pronouns and noun phrases from the above problem statements
3. List of potential classes is obtained based on the category of the nouns (details given later). For example, nouns that direct refer to any person, place, or entity in general, correspond to different objects. And so does singular proper nouns. On the other hand, plural nouns and common nouns are candidates that usually map into classes.

Advantages

This is one of the simplest approaches that could be easily understood and applied by a larger section of the user base. The problem statement does not necessarily be in English, but in any other language.

Disadvantages

The problem statement always may not help towards correct identification of a class. At times it could give us redundant classes. At times the problem statement may use abbreviations for large systems or concepts, and therefore, the identified class may actually point to an aggregate of classes. In other words, it may not find all the objects.

Using Generalization

In this approach, all potential objects are classified into different groups based on some common behaviour. Classes are derived from these groups.

Using Subclasses

Here, instead of identifying objects one goes for identification of classes based on some similar characteristics. These are the specialized classes. Common characteristics are taken from them to form the higher level generalized classes.

Steps to Identify Domain Classes from Problem Statement

We now present the steps to identify domain classes from a given problem statement. This approach is mostly based on the “Grammatical approach using nouns” discussed above.

1. Make a list of potential objects by finding out the nouns and noun phrases from narrative problem statement
2. Apply subject matter expertise (or domain knowledge) to identify additional classes
3. Filter out the redundant or irrelevant classes
4. Classify all potential objects based on categories. We follow the category table as described by Ross.

Categories	Explanation
People	Humans who carry out some function
Places	Areas set aside for people or things
Things	Physical objects
Organizations	Collection of people, resources, facilities and capabilities having a defined mission
Concepts	Principles or Ideas not tangible
Events	Things that happen (usually at a given date and time), or as a steps in an ordered sequence

5. Group the objects based on similar attributes. While grouping we should remember that
 - Different nouns (or noun phrases) can actually refer to the same thing (examples: house, home, abode)

- Same nouns (or noun phrases) could refer to different things or concepts (example: I go to school every day / This school of thought agrees with the theory)
- 6. Give related names to each group to generate the final list of top level classes
- 7. Iterate over to refine the list of classes

Advanced Concepts

Identification of domain classes might not be a simple task for novices. It requires expertise and domain knowledge to identify business classes from plain English text. The concepts presented here have been kept simple in order to make a student familiarize with the subject. A lot of work has been done in this area, and various techniques have been proposed to identify domain classes. Interested readers may look at the following paper for an advanced treatment on this subject matter.

Domain class :

- Registered user.
- Unregister user.
- Admin user.
- Staff member.
- Log in to the account .
- Check the details of all the orders till present date and time.
- Check the current inventory/warehouse details .
- Change the menu items.
- Change the price of already existing food items.
- Cancel any order.
- View Profit/Loss till present date and time
- Create an account
- Log in to the account
- Place order
- Cancel order
- Payment method.

- successful order.
- Waiting time show.
- View order history.
- Give feedback on the food delivered.
- CPU usage.
- Memory usage.
- Keyboard and mouse usage
- Network communication.
- Operating system required is Windows XP and above.
- Chrome or any other browser of preference can be used to access the web-app.
- Any android or ios phone can access the web-app.
- Suitable internet connection with any browser is supported.