Core Java 8

Lesson 01: Introduction to Object-Oriented Technology

Capgemini

Lesson Objectives

In this lesson, you will learn:

- ▪ What is Object-Oriented Programming?

- ▪ Why Object-Oriented Programming?

- Object-Oriented Programming versus traditional software development methodologies

- Benefits of Object-Oriented technology

Example: Scenario from Banking System

Geetha and Mahesh hold accounts in Bank XYZ Ltd. Geetha has a savings as well as a current account with the bank. Mahesh only has a current account. As customers of the bank, Geetha and Mahesh can deposit or withdraw money from their accounts as per the norms and policies defined by the bank on savings and current accounts.

Bank XYZ Ltd. continuously adds new customers to its existing customer base. Of course, some its customers may also want to close their accounts due to changing needs of the customer.

What is Object-Oriented Programming

OOP is a paradigm of application development where programs are built around objects and their interactions with each other.

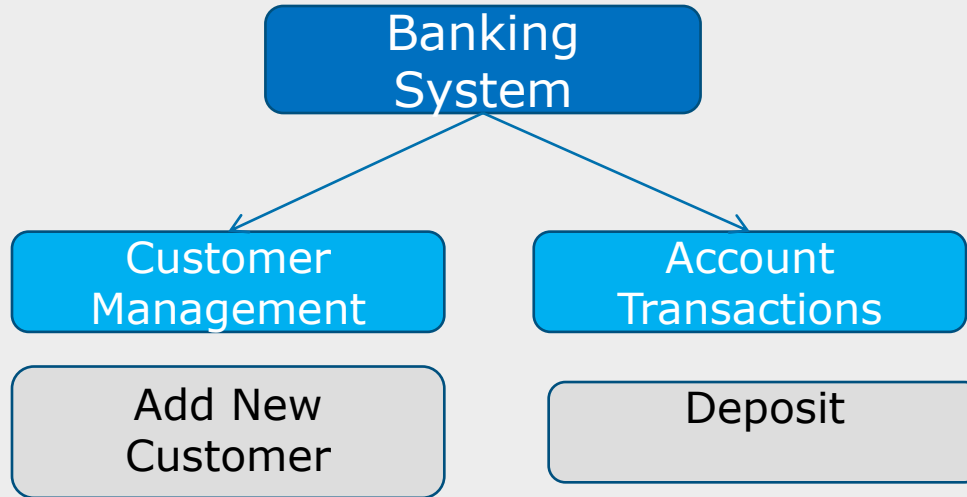- An Object Oriented program can be viewed as a collection of co-operating objects.

Can you think of a collection of co-operating objects in the scenario from Banking System?
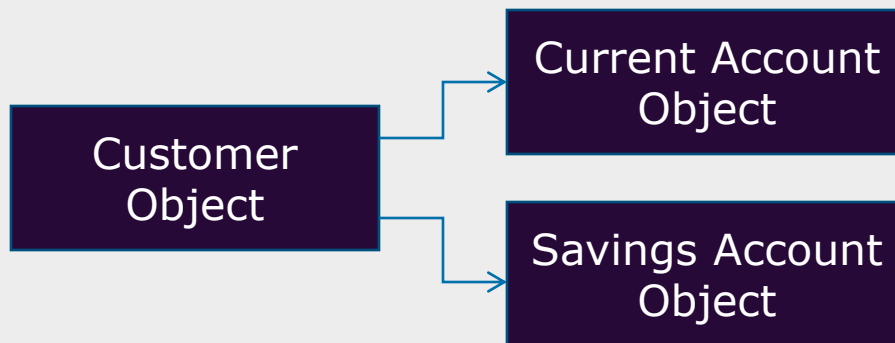
Example: Comparing Procedural with OO

```
            ┌──────────────┐
            │   Banking    │
            │    System    │
            └──────────────┘
              ╱          ╲
   ┌──────────────┐  ┌──────────────┐
   │   Customer   │  │   Account    │
   │  Management  │  │ Transactions │
   └──────────────┘  └──────────────┘
   ┌──────────────┐  ┌──────────────┐
   │   Add New    │  │   Deposit    │
   │   Customer   │  │              │
   └──────────────┘  └──────────────┘
```

Procedures and Functions are central to the Procedural Approach

```
                      ┌────────────────┐
                      │ Current Account│
                 ┌───▶│     Object     │
   ┌──────────┐  │    └────────────────┘
   │ Customer │──┤
   │  Object  │  │    ┌────────────────┐
   └──────────┘  └───▶│ Savings Account│
                      │     Object     │
                      └────────────────┘
```

Objects are building blocks in Object Oriented Approach

Why Object-Oriented Programming

There are problems associated with structured language, namely:

- Emphasis is on doing things rather than on data

- Most of the functions share global data which lead to their unauthorized access

- More development time is required

- Less reusability

- Repetitive coding and debugging

- Does not model real world well

Why Object-Oriented Programming (contd.)

Increasing need for applications which are:

- Reliable and Robust

- Extensible and Maintainable

- Faster to develop

Object-Oriented environment provides all this and more:

- Data bound closely with functions that operate on it

- Features to extend code and reuse code

- Closely modeling the real world

What is Object-Oriented Programming

Some of the major advantages of OOP are listed below:

- Simplicity

- Modularity

- Modifiability

- Extensibility

- Maintainability

- Re-usability

Features of OOP

OO Technology is based on the concept of building applications and programs from a collection of "reusable entities" called "objects".

- Each object is capable of receiving and processing data, and further sending it to other objects.

- Objects represent real-world business entities, either physical, conceptual, or software.

  - For example: a person, place, thing, event, concept, screen, or report

Summary

In this lesson, you have learnt:

- The Object-Oriented Programming approach for software development

- How Object-Oriented technology is used to design and develop stable and dynamic systems

- Advantages of Object-Oriented Programming

Review Question

Question 1: Which of the following are features of
   Structured programming:

- Option 1: Based on Data structure

- Option 2: Emphasis on data

- Option 3: Reusability

- Option 4: Produces a design unique to the problem

Question 2: Objects can be grouped together in different
   ways to form new programs.

- True / False

Question 3 : ____ methodology specifies the steps to be sequentially followed by a computer to execute a program.

Review Question: Crossword