Object Oriented Programming – SCJ2153

Procedural Programming vs Object Oriented Programming

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Procedural Programming

• Traditional programming languages were procedural.
  – C, Pascal, BASIC, Ada and COBOL

• Programming in procedural languages involves choosing data structures (appropriate ways to store data), designing algorithms, and translating algorithm into code.
Procedural Programming

• In procedural programming, data and operations on the data are separated.
• This methodology requires sending data to procedure/functions.
Procedural Programming

Data Elements

Function A

Function B
Object-Oriented Programming

- Object-oriented programming is centered on creating **objects** rather than procedures/functions.
- Objects are a melding of **data** and **procedures** that manipulate that data.
- Data in an object are known as **attributes**.
- Procedures/functions in an object are known as **methods**.
Object-Oriented Programming

Objects

Attributes (data)

Methods
(behaviors / procedures)
Object-Oriented Programming

• Object-oriented programming combines data and behavior (or method). This is called **encapsulation**.

• **Data hiding** is the ability of an object to hide data from other objects in the program.

• Only an object’s **methods** should be able to directly manipulate its **attributes**.

• Other objects are allowed to manipulate an object’s attributes via the object’s methods.

• This indirect access is known as a **programming interface**.
Object-Oriented Programming

- **Objects**
- **Attributes (data)**: Typically private to this object
- **Methods** (behaviors / procedures)

**Other Objects**

Programmable Interface
Benefits of Object-oriented programming

• Save development time (and cost) by reusing code
  – once an object class is created it can be used in other applications
• Easier debugging
  – classes can be tested independently
  – reused objects have already been tested
Object-Oriented Programming Languages

• Pure OO Languages
  Smalltalk, Eiffel, Actor, Java

• Hybrid OO Languages
  C++, Objective-C, Object-Pascal