What is the rationale for the use of object oriented programming and which limitations are overcome by the use of functions in Java ？

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The object-oriented programming (OOP) is a programming paradigm based on the concept of “object”. The object contains data, field, code and method. It is a high-level language that we can write the program easily and readably.

The OOP is different with the procedure-oriented language. Procedure-oriented language can be represented as a collection of functions and a series of commends on computer. This language is harder to understand and difficult to find out if there is any mistake. Compared with the procedure-oriented language, the OOP take each part of the code as an object and each object is individual but relative. If there is any mistake on the code, it will be faster and easier to find out.

There are four characteristics of the OOP, which are Encapsulation, Abstraction, Polymorphism and Inheritance, and below is the brief concept of these characteristics:

1. Encapsulation:
   “ It is a mechanism of wrapping the data (instance variables) and code acting on the data (methods) together as a single unit.” It hides the data of the object. We can only get the attribute of the object or the method from the interface. The details of the date are hidden, without any access or allowance, we cannot revise the code.
2. Abstraction:
   Abstraction is to provide only the functionality for the user and hide the implementation details.
3. Inheritance:
   There will be a superclass and subclass. The subclass is inherited the attribute and method from the superclass, which means that in the subclass, there is not only the defined variable and method which is defined in this class first and we can use the attribute and method from the superclass.
4. Polymorphism:
   Polymorphism is talking about the overloading and overriding, which means that “the characteristic of being able to assign a different meaning or usage to something in different contexts.”
   - Overloading: In the same class, we can define many variables with same variable name but different parameter or argument. We can use these variables with various parameter or argument to call the relative method.
   - Overriding: The attribute or method are inherited from the superclass, but we can use the overriding to overwrite the method. Then the method in subclass still have some characteristics from the superclass but can have the own characteristics of the subclass

There are some advantages for the programmer to use the Object-Oriented program especially by using JAVA. Taking the inheritance as an example, we need to set the variable names several times in one program. Thanks to the inheritance in JAVA, we can only define the variable names in the superclass and extends these variables in subclass. We can modify the argument of variable of the superclass on subclass as well to make the object meeting our requirements. Therefore, it shortens our working times and all the variable in an object is reusable.

The encapsulation and abstraction are a good characteristic for the OOP. They make the programmer writing the program more effectively. We don't need to consider about the details of the object, and we can define our own method by using the defined variable name or method in the interface or abstraction. It can avoid the mistake making and increase the working efficiency.

In conclusion, the advantages of the JAVA as an Object-Oriented project are more than the procedure-oriented language and other machine language. It increases our working efficiency by offering a good coding environment and decrease the error making.

List of Reference

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