Java Programming assignment #3: Class hierarchy & interface

due by April 30th, 2019

Introduction

In the first homework, we built Base64 encoding program. The encoding process has the following sub-procedures. First, input data bytes are changed into multiple code words. For example, in Base64, three-bytes input data is changed into four 6-bits code words. Second, the code words are looked up in the symbol map, and finds the symbol used in the coding system. If your input data is longer than single code word, then repeat the job until all the input data is translated.

Extending the Base64, we will build encoding library for Hex, Decimal, ASCII, Binary encoding system. They all have the similar implementation, so that we can have class hierarchy. Think about the minimizing the redundant implementation by introducing the class inheritance.

In Java programming language, ‘extends’ keyword presents the class inheritance relationship in two classes.

In addition, we can think of user program that changes encoding system, according to our need. All the encoding class can have a common interface. Then, regardless of the object type, (even without knowing the original type of the object) we can call the interface!

So, the goal of this program is to make encoding library; practicing class inheritance and interface. The followings are requirements for the program assignment #3.

Req1. Design and implement 5+ encoding classes:

a. Base64

b. ASCII

c. Hex

d. Binary

e. Decimal

Req2. Make class hierarchy. Design a parent class. Show how you can reduce the implementation.

Req3. Make interface. Design interface for user; explain how the interface can help the class users.

Req4. Introduce abstract class/method. Explain how abstract method mandates the programming interface.

Req5. Test your classes with the following input bytes: 0x12, 0x34, 0x56, 65, 66, 67

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