SE116 – LAB#8 2014-2015 SPRING

Aim: Run time polymorphism and the use of abstract base class.

Suppose that you are trying to do homework, particularly for SE116 course. You want to get a high grade from this homework. If you complete the whole work before the deadline, you're done. However, while studying you may be exhausted and may fall asleep.

You have a total of 10 hours left to submit your homework and you have limited energy. There are 3 certain actions which will affect your energy, time and completion percentage of your homework:

1. When you study you complete a certain portion of your homework on one side; on the other side you get tired. If you get so tired that you have no energy left to study you will fall asleep and cannot continue doing your homework.
2. If you get tired you can rest for a certain amount of time to increase your energy.
3. When you are tired you can also eat something to get energy.

Create an application that simulates the situation with the following steps:

1. Define two global variables in your application, an integer **completionPercantage** and a double **timeLeft**. Initialize completionPercantage as 0 and timeLeft as 10.0.

2. Define an **abstract base class Activity**. This class will have a **protected static integer data member Energy**, which will be initialized as 100. The class has also a **public static get method** to return the value of data member Energy. Add a **pure virtual done()** method to the class. This method will be defined later in concrete classes.

3. Derive three **concrete classes** from **Activity**: **Study**, **Rest** and **Eat**. Implement done() method for each class by defining the following actions in:

   A. Study: Decrease timeLeft by 1.5 hours, decrease Energy by 25, increase completionPercentage by 20.
   B. Rest: Decrease timeLeft by 1 hour and increase Energy by 25. Resting doesn't affect the completionPercentage.
   C. Eat: Decrease timeLeft by 0.5 hours and increase Energy by 10. Eating doesn't affect the completion_percentage.

4. In your **main** function, define a base class pointer. Then, in a infinite loop;
   - display the current values (completionPercentage, timeLeft and Energy);
   - ask user to select an action (studying, resting, or eating), create an appropriate concrete class object dynamically, make the base class point to that object;
   - call done() method using polymorphism;
   - break out of the loop when you run out of time or energy (using **break** keyword), or when you complete the whole homework.
   - Finally, display completionPercentage of your homework.