

(60–311) ASSIGNMENT 3

Due: 10:00am, Nov. 10, 2010

1. Construct a DFD for the following system. *It is required to start your construction from the level 0 diagram, and continue the design up to a level 2 diagram.*

A payroll system is to be developed for a company to determine the weekly salary of its employees. The system needs to calculate the gross pay of each employee according to the timecard, which maintains the employee's work hours in each week, and the employee record, which contains personal information such as employee name, address, identification number, maximum and minimum number of eligible hours, hourly rate, and employment history. The hourly rate of an employee will be adjusted every year according to the employee's work hours in the year, current hourly rate, and his/her employment history in the company.

The net pay that an employee can get, however, is subject to deductions such as taxes withheld and saving bonds purchased. Based up the calculation, the system prints a negotiable check for each of the employees and a check stub that shows the employee's pay and deductions from the pay. Meanwhile, an accounting report is prepared for the finance department. This report contains information on tax and social security withholdings that need to be sent to the government, among other things. The paycheck and the accounting report must follow the respective format as specified by the company and the government.

2. (*optional 11.8, p. 265*) Discuss their advantages and disadvantages as far as distributability is concerned of the data-flow model and the object model. Assume that both single machine and distributed versions of an application are required.
3. **15.3** (p. 359) *Construct* a state machine model of the control software for a compact disk player by *following the procedure as discussed in class to identify components and build a table before drawing the diagram.*
4. **14.1** (p. 337) Explain why adopting an approach to design that is based on loosely coupled objects that hide information about their representation should lead to a design that may be readily modified.
5. (*optional 14.3, p. 337*) Under what circumstances might you develop a design where objects execute concurrently?
6. In Questions 7 and 8 of Assignment 2 you completed requirement definition and specifications for a function in your software system. *Derive* the objects that are involved in providing this function.
7. Using the UML graphical notation for object classes, construct an object model to illustrate attributes and operations of the objects identified in Question 7, and to show their relationships as well.