5NTCM003W Network Software Engineering

Coursework 1

Module Leader: Dr. David Huang
Date Set: 30th Oct, 2017
Date Due: 7th, Dec 2017 by 10.a.m GMT

Design and implement an object-oriented program describing an Employee Payroll System.

Consider the following (simplified) situation.

A company's employees are categorised as full time and part time. Part-time staff receive a weekly wage based upon the number of days worked and have no entitlement to holiday pay.

Full timers are permitted holidays at a fixed rate per year (subject to length of service) and are paid a monthly salary. The holiday entitlement is 20 days plus one extra day per 3 full year's service. (Statutory holiday entitlement is handled separately, as the company is simply `closed for business' during these periods).

Each week the payroll is run to produce a payment slip for each employee for whom pay is due on that week. To simplify matters, monthly workers are paid in lunar months (every four weeks). Weekly paid workers are paid every week. Therefore the payment of monthly paid workers occurs every fourth `pay week'.

Some workers are paid a bonus subject to productivity. This bonus is only available to full time employees and is expressed as a percentage of their normal pay (this percentage being determined by the manager). The manager also has to agree to employees taking holidays.

The payroll clerk receives holiday notification forms. If these forms are signed by the manager, then the holiday is agreed and the employee receives full pay. Holiday forms which are not signed by both manager and employee are returned to the employee.

The manager may also submit bonus forms to the personnel office. These forms indicate a bonus percentage to be paid to an employee. Each form is valid for one four week pay period only and must be counter-signed by the head of personnel.

The payroll clerk must keep track of the remaining days each worker is entitled to.

Each week, the payroll clerk also receives `days worked' slips from the personnel department. These list the name, employee number and number of days worked for part time workers.

Write a program in Java to assist the payroll clerk in his or her duties. The principal task of the program is to produce a weekly pay slip for each employee to whom pay is due that week.

Your program should provide a feature which allows the clerk to create new employee records. This will mean that the payroll clerk must enter the type of employee, the appropriate pay rate and where applicable, the number of years worked.

Your program should also provide a feature which allows the payroll clerk to keep track of part time hours worked and holiday and bonus entitlements.

Finally your program should allow the pay roll clerk to print a weekly report of employees' name, address, employee number, and weekly pay. Of course, for monthly paid employees, their pay should only occur in the output once every four weeks.

Where sensible to do so, your solution should take advantage of inheritance. You should also seek to achieve a high degree of encapsulation for each of the data types you create.

Good solutions will also be well presented with suitable source code comments. You are also free to add additional features to the payroll system should you think of any which might be useful to the payroll clerk.

Your solution should comprise the following.

1. Analysis and Design: (i) a class diagram outlining the class structure for your proposed solution. (ii) a set of summary tables describing the fields, constructors and methods for each class you intend to create.

2. Implementation: A print out of the Java source code of your complete program. That is - each of the account classes, the application class and the test class.

3. Test Results: A print out of the output from your test program with evidence of data validation. Also a set of proposed test cases presented in tabular format.

Submission

You should submit your code both on paper and on a CD/USB (hand in the assignment to **the Registry office** in the normal way with a disk or USB containing only the *.java source code).

Write a report on the design and implementation of your solution, showing code and results: (i) a class diagram outlining the class structure for your proposed solution. (ii) a set of summary tables describing the fields, constructors and methods for each class. (iii) a print out of the Java source code of your complete program.