The Payroll System

This exercise is taken from *Agile Principles, Patterns and Practices in C#* by Robert Martin.

Below is the specification of a batch payroll system. The system consists of a database of the company's employees, and their associated data, such as time cards. The system must pay all employees the correct amount, on time, by the method that they specify. Also, various deductions must be taken from their pay.

- There are three kinds of employees:
    - Some employees work by the hour. They are paid an hourly rate that is one of the fields in their employee record. They submit daily time cards that record the date and the number of hours worked. If they work more than 8 hours per day, they are paid 1.5 times their normal rate for those extra hours. They are paid every Friday.
    - Some employees are paid a flat salary. They are paid on the last working day of the month. Their monthly salary is one of the fields in their employee record.
    - Some of the salaried employees are also paid a commission based on their sales. They submit sales receipts that record the date and the amount of the sale. Their commission rate is a field in their employee record. They are paid every other Friday.
- Employees can select their method of payment. They may have their paychecks mailed to the postal address of their choice, have their paychecks held by the paymaster for pickup, or request that their paychecks be directly deposited into the bank account of their choice.
- Some employees belong to the union. Their employee record has a field for the weekly dues rate. Their dues must be deducted from their pay. Also, the union may assess service charges against individual union members from time to time. These service charges are submitted by the union on a weekly basis and must be deducted from the appropriate employee's next pay amount.
- The payroll application will run once each working day and pay the appropriate employees on that day. The system will be told what date the employees are to be paid to, so it will generate payments for records from the last time the employee was paid up to the specified date.

Some Use-Case scenarios are given below.

Use Case 1: Add New Employee

A new employee is added by the receipt of an `AddEmp` transaction. This transaction contains the employee's name, address, and assigned employee number. The transaction has three forms:

```
1. AddEmp <EmpID> "<name>" "<address>" H <hrly-rate>
2. AddEmp <EmpID> "<name>" "<address>" S <mtly-slry>
3. AddEmp <EmpID> "<name>" "<address>" C <mtly-slry> <comm-rate>
```

The employee record is created with its fields assigned appropriately.

Use Case 2: Deleting an Employee
Employees are deleted when a `DelEmp` transaction is received. The form of this transaction is as follows:

```
DelEmp <EmpID>
```

When this transaction is received, the appropriate employee record is deleted.

Use Case 3: Post a `Time Card`
On receipt of a `TimeCard` transaction, the system will create a time card record and associate it with the appropriate hourly employee.

```
TimeCard <empid> <date> <hours>
```

Use Case 4: Posting a `Sales Receipt`

On receipt of the `SalesReceipt` transaction, the system will create a new sales-receipt record and associate it with the appropriate commissioned employee.

```
SalesReceipt <EmpID> <date> <amount>
```

Use Case 5: Posting a Union Service Charge

On receipt of this transaction, the system will create a service-charge record and associate it with the appropriate union member:

```
ServiceCharge <memberID> <date> <amount>
```

Use Case 6: Changing Employee Details

On receipt of this transaction, the system will alter one of the details of the appropriate employee record. This transaction has several possible variations:

`ChgEmp <EmpID> Name <name>`	Change employee name
`ChgEmp <EmpID> Address <address>`	Change employee address
`ChgEmp <EmpID> Hourly <hourlyRate>`	Change to hourly
`ChgEmp <EmpID> Salaried <salary>`	Change to salaried
`ChgEmp <EmpID> Commissioned <salary> <rate>`	Change to commissioned
`ChgEmp <EmpID> Hold`	Hold paycheck
`ChgEmp <EmpID> Direct <bank> <account>`	Direct deposit
`ChgEmp <EmpID> Mail <address>`	Mail paycheck
`ChgEmp <EmpID> Member <memberID> <rate>`	Put employee in union
`ChgEmp <EmpID> NoMember`	Cut employee from union

Use Case 7: Run the Payroll for Today

On receipt of the payday transaction, the system finds all those employees who should be paid on the specified date. The system then determines how much they are owed and pays them according to their selected payment method. An audit-trail report is printed showing the action taken for each employee:

```
Payday <date>
```