Assignment 4

In this question you have to design a banking system consisting of four classes: An account class, a `joint-account` class, a `credit-card` class and a `timer` class. Their behaviour is illustrated by the following commentary.

```
(define this-timer (new timer%))
```

There is only one `timer%` object called `this-timer`. The purpose of the timer is to trigger certain activities at designated points of time called *ticks*. For instance, on a `process-accounts-tick`. interests are paid to all accounts. Similarly, uncleared dues on a credit card are penalized on a `process-credit-card-tick`.

```
(define my-account (new account% (passwd "amitabha") (balance 1000)
(interest-rate 0.05)))
```

```
(define my-card (new credit-card% (acct my-account)(passwd "amitabha")))
```

```
(define another-account (new account% (passwd "abcd") (balance 5000)
(interest-rate 0.1)))
```

```
(define another-card (new credit-card% (acct another-account)
(passwd "abcd")))
```

```
(define jnt-account (new joint-account% (account my-account)
(passwd "amitabha") (new-passwd "xyz")))
```

The meanings of these are obvious. Two accounts and two credit cards are created. Apart from `withdraw`, an account should also have a method called `deposit` and other methods appearing in the commentary. Each credit card is tied to an account. Each credit card has a password. A joint account is also created.

```
(send my-account withdraw 200 "amitabha")
(send my-account show "amitabha")
> 800
```

```
(send jnt-account withdraw 200 "amitabha")
>"Incorrect Passwd"
```

The joint-account cannot be operated using the original password.

```
(send jnt-account show "xyz")
>800
```

```
(send my-account pay-interest)
send: no such method: pay-interest for class: account%
```

There is a method `pay-interest` in the `account%` class. But it cannot be accessed from outside the class.

```
(send this-timer process-accounts-tick)
(send my-account show "amitabha")
>840.0
```

The time has come to pay interest of 5% on outstanding balance. Ideally the timer should generate the tick. But to keep things simple, we generate the tick from outside and inform the timer.

```
(send my-card make-purchase 100)
```

I make a purchase of 100 rupees.

```
(send this-timer process-credit-card-tick)
```

Oops. I have not cleared my credit card dues. And the `process-credit-card` tick has arrived. So I have to pay a penalty. Let me try to clear my dues quickly and see whether this works.

```
(send my-card clear-outstanding-amount)
(send my-account show "amitabha")
>720.0
```

No luck. I had to pay the penalty of 20% on my credit-card dues of 100 rupees.

```
(send my-card make-purchase 50)
(send another-card make-purchase 1000)
(send another-card clear-outstanding-amount)
(send this-timer process-credit-card-tick)
(send my-account show "amitabha")
>720.0
```

Once again I have made a purchase and did not clear my dues on time unlike the other credit-card holder. But the penalty will only show in my account when I clear my dues and my fine.

```
(send my-card clear-outstanding-amount)
(send another-account show "abcd")
>4500.0
(send my-account show "amitabha")
>660.0
```

To be continued...