1. Fibonacci:

In [mathematics](http://en.wikipedia.org/wiki/Mathematics), the **Fibonacci numbers** are the numbers in the following [integer sequence](http://en.wikipedia.org/wiki/Integer_sequence):

0,1,1,2,3,5,8,13,21,34,..

By definition, the first two Fibonacci numbers are 0 and 1, and each subsequent number is the sum of the previous two.

In mathematical terms, the sequence *Fn* of Fibonacci numbers is defined by the [recurrence relation](http://en.wikipedia.org/wiki/Recurrence_relation)

Fn = Fn-1 + Fn-2; with initial values F0 = 0 and F1 = 1.

### **Objective:**

Understand how to write a recursive function.

### **Problem Statement:**

Write a method calculateFibonacci that takes some integer as a parameter and returns the nth Fibonacci number, where we think of the first 1 as the first Fibonacci number. Thus, an invocation of calculateFibonacci (6) should return 8, and in invocation of calculateFibonacci (10) should return 55

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Nth Fibonnaci | 0 | 1 | 1 | 2 | 3 | 5 | 8 | 13 | 21 | 34 | 55 |

1. Compound interest:

**Compound interest** arises when [interest](http://en.wikipedia.org/wiki/Interest) is added to the [principal](http://en.wikipedia.org/wiki/Principal_sum), so that from that moment on, the interest that has been added *also itself* earns interest. This addition of interest to the principal is called *compounding*. A bank account, for example, may have its interest compounded every year: in this case, an account with $1000 initial principal and 20% interest per year would have a balance of $1200 at the end of the first year, $1440 at the end of the second year, and so on.

### **Objective:**

Understand which type of loop to use.

### **Problem Statement:**

You deposit Rs 1000.00 in the bank account at 5% annual compound interest. The interest is paid once at the end of the year. What if you are interested in becoming a millionaire (Rs 1000000.00)? How long will it take to reach one million?

|  |  |  |
| --- | --- | --- |
| Year | Interest for the year | End of the year amount |
| 1 | 1000\*0.05=50 | 1050.00 |
| 2 | 1050\*0.05=52.5 | 1102.50 |
| 3 | 1102.50\*0.05=55.125 | 1157.625 |

* 1. Credit card bill:

### **Objective:**

Understand which type of loop to use.

### **Problem Statement:**

You owe the credit card company 1000.00 rupee. The company charges you 1.5% per month on the unpaid balance. You have decided to stop using the card and to pay off the debt by making a monthly payment of N rupee a month. Write a program that asks for the monthly payment, the program writes out the balance and total payments so far for every succeeding month until the balance is zero or less.

Sample Input:

Enter the monthly payment: 100

Sample Output:

Month: 1 balance: 915.0 total payments: 100.0

Month: 2 balance: 828.725 total payments: 200.0

Month: 3 balance: 741.155875 total payments: 300.0