

LESSON3-- INTEREST-RATE- CALCULATIONS- USING- RECURSION.JS

INTEREST CALCULATIONS

One application of functions is to perform various complicated (tedious) tasks for us. For example a mortgage calculation is a complicated to do by hand, but we can make the computer do the calculation for us using `JavaScript`.

DEFINITIONS

Consider a mortgage payment calculation.

EXAMPLE CALCULATIONS

For a loan of 1000 the money owed after zero months:

After one month has passed, and a payment of 100 has been made:

After two months, you owe:

MONTHLY PAYMENT CALCULATION

```
// n = number of years    # not used

// k = number of months
// S = initial sum borrowed
// P = monthly payment amount
// I = monthly interest rate (= 1/12-th of the nominal annual percentage rate (I=0.05 for nAPR of 6%))
// Zr(k,S,I,P) = amount owed after k-th payment P on a monthly loan of initial amount S at interest rate I

Zr = function (k, S, I, P) {
  if (k == 0) { return S };
  return Zr(k-1,S,I,P)*(1+I)-P;
}
```

```
Zr(0,1000,0.005,100) // 6% nAPR = 0.005% monthly
1000
```

```
Zr(1,1000,0.005,100) // 6% nAPR = 0.005% monthly
905.00
// the interest for one month was $5 but a payment of $100 cut the sum down a bit
```

```
Zr(2,1000,0.005,100)
809.5249999999997
```

Assuming a 25 year mortgage of \$315000, we can manually plug different values of the payment until we find the payment amount P which reduces the amount owed to zero after 25*12 months.

The monthly payment for a 3% nominal annual percentage rate is \$1497.77

The monthly payment for a 4% nominal annual percentage rate is \$1662.69

The monthly payment for a 5% nominal annual percentage rate is \$1841.54

The monthly payment for a 6% nominal annual percentage rate is \$2029.55

```
Zr(25*12,315000,0.0025,1493.76) // 3% nAPR = 0.0025% monthly  
2.514882748763739
```

```
I = 0.04/12  
Zr(25*12,315000, I,1662.69)  
-2.0323859706841176
```

```
I = 0.05/12 // = 0.004166666666666667  
Zr(25*12, 315000, I, 1841.54)  
-4.739123044493454
```

```
I = 0.06/12 // = 0.005  
Zr(25*12,315000, I,2029.55)  
-0.4056236855105908
```

EXERCISE

Ajouter condo fees ?? et taxes ville de montreal + taxes scolaires.

THIRD-OF-A-MILLION DOLLAR QUESTION

Assuming interest rate goes up to 5%, condo fees + taxes of 300, can your rent that condo for 2141.54 par mois pour couvrir les fais.