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**Lecture Name: Dr L Tinarwo**

**Assignment III: Saving for a Dream**

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## **Planning:**

For this program, the inputs that I will need are; 1. The initial amount (principal amount) that he invests in the bank

2. The interest that the bank pays him at a rate per year (annual interest rate)

3. I need to calculate how long it will take for his investment to reach the price of his dream house

4. And lastly, I will need to know the final amount (the price of the house that he wants).

After breaking the problem down, I realized that I will have to use the compound interest calculator formula:  $A = P(1+i)^n + 5000$ , to find the output.

Where: **A** is the Final amount (price of the house)

**P** is the Initial amount that he invests

**i** is the annual interest rate

**n** is the number of times the interest is compounded per year

And lastly, **R5000** is the extra investment he makes at the end of each year.

Since I am required to create a program that asks the user to enter a starting investment amount, an interest rate and the price of the house from a keyboard. Apparently, I will have to calculate how long the investment will take to reach the price of the house. Okay, so to calculate the years that it will take for the investment to reach the price of the house, I will use the compound interest formula  $A = P(1+i)^n + 5000$ . And to calculate the years I will have to make **n** subject of the formula,  $n = \log_{10}((A-5000)/P) / \log_{10}(1+i)$ .

## **The variables that I will use for my program:**

	Description	Type	Variable name
INPUT	The initial amount	double	principalAmount
	Price of the house	double	theBalance
	Annual interest rate	double	interestRate
OUTPUT	Price of the house	double	theBalance
	The initial amount	double	principalAmount
	Annual interest rate	double	interestRate
	Number of years it is going to take	int	numberMonths

### **IPO CHART:**

INPUT	PROCESSING	OUTPUT
principalAmount	Prompt for input values Enter principalAmount Enter the theBalance Enter interestRate  Calculate output values Display output	theBalance principalAmount interestRate numberMonths

### **ALGORITHM:**

```
CalculateYears
~ Prompt for and enter the input values
  First line, display "Enter the initial amount"
  Enter principalAmount ~ Display on the first line
  Second line, display "Enter the price of the house"
  Enter theBalance ~ Display on second line
  Third line, display "Interest rate"
  Enter interestRate ~ Display on third line and end the line

~ Calculate number of years it is going to take
  numberMonths = log10((theBalance - 5000) / principalAmount) / log10(1 + interestRate)

~ Show the outputs on the screen
  Display "Price of the house " , theBalance ~ Display on new line
  Display "Initial deposit " , principalAmount ~ Display on new line
  Display "Interest rate " , interestRate ~ Display on new line
  Display "Number of years it is going to take", numberMonths ~ Display on new line
end
```