**Problem 1 – Compound interest**

You really want a new TV, however you are a little short on money right now. You have a couple of options. You can **get a loan from a bank** or **get a loan from a friend**. Since you want to become the best programmer who ever lived, you decided to make a program to help you out.

Bank loans have **interest rate** and a **term** (**number of years** you have until you are required to pay the money back). Assume the bank loan will be for more than one year and the interest will be accrued on a yearly basis. Use this formula to calculate the amount of money you will have to pay back -   
'**FV = PV \* (1 + i)n**'. Where '**FV'** (future value) **is the money owed at the end of the period**. '**PV'** (present value) **is the money you want to withdraw today**, '**i'** **is the interest rate and 'n' is the term of the loan.** Your friend is a really nice dude and he will loan you the money, however he wants a percentage of the money in return.

You will be given the price of the TV, the term and yearly interest rate for the loan from the bank, and the percentage your friend will ask for.

Your task is to write a program that calculates **the best (cheapest) option to buy the TV**. If the options are the same, choose your friend’s offer - you are a nice guy after all. Check the example to get a better understanding of the task.

**Input**

The input data should be read from the console. It consists of four input values, each at a separate line:

* The number **p** – **price** of **the TV**.
* The number **n** – number of **years you have until you must pay the bank back (term)**.
* The number **i** – the yearly interest rate for the bank’s loan.
* The number **f** – interest rate for your friend’s loan.

The input data will always be valid and in the format described. There is no need to check it explicitly.

**Output**

* The output data must be printed on the console.
* On the only output line you must print **the best loan price to the second digit after the decimal mark and the lender separated by a single space.**

**Constraints**

* The number **y is** an integer in the range [0 ... 2 147 483 647].
* The numbers **p, i, f are** floating-point numbers in the range [0 … 7.9 x 1028].
* Allowed working time for your program: 0.25 seconds.
* Allowed memory: 16 MB.

**Examples**

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| 2600  2  0.07  0.4 | 2976.74 Bank | 2600 leva is needed. Bank loan = 2600 \* (1 + 0.07) **2**= 2600 \* 1.07 **2** = 2600 \* 1.1449 = 2976.74. Friend loan = 2600 \* (1 + 0.4) = 2600 \* 1.4 = 3640. 2976.74 < 3640 |

**Solution explanation**

**Input**

Firstly we need to correctly read the input from the console. We need to save the given information in the correct data type variable.

* The **price** comes as a floating point. So we **declare** one **double variable** and we **save** the first line of input in it (double.Parse)
* The **number of years** is an **integer** number as we are working with whole years. So we need to **declare** one **integer** **variable** and **save** the next line of input in it (int.Parse)
* The **interest** is a floating pointnumber. So we need to **declare** another **double** **variable** and **save** the next line of input in it.
* The **friend interest** is also a floating point number. So we need to **declare** another **double** **variable** and **save** the next line of input in it.

For now the code should look like this:

|  |
| --- |
| double price = double.Parse(Console.ReadLine());  int years = int.Parse(Console.ReadLine());  double bankInterest = double.Parse(Console.ReadLine());  double friendInterest = double.Parse(Console.ReadLine()); |

**Program logic**

Now we need to write the program logic. For this program we need to calculate the final price for the bank loan and the friend loan.

* To calculate the **bank** **loan final price** we need first to **declare** a **double variable** that will hold the result. Then we need to **calculate** the final value using the formulae  
   *Hint: use Math.Pow to calculate the final interest.*

For now the code should look like this:

|  |
| --- |
| double bankPrice = price \* Math.Pow((1 + bankInterest), years); |

* To calculate the **friend loan final price** we need first to **declare** a **double** **variable** that will hold the result. Then we need to **calculate** the final value using the formulae

For now the code should look like this:

|  |
| --- |
| double friendPrice = price + price \* friendInterest; |

**Output**

Finally we need to print out the correct information.

* We use an **if** **operator** to check if the **bank** **loan** is **lower** *if(bankPrice < friendPrice)*. Then we **print** on the **console** "{0:F2} Bank" and the **price** should be **rounded** **up** to the 2nd digit after the decimal mark.
* Then we use an **else operator** for the situation where the prices are equal or our friend has the better offer. Then we **print** on the **console** "{0:F2} Friend" and the **price** should be **rounded** **up** to the 2nd digit after the decimal mark.

For now the code should look like this:

|  |
| --- |
| if (bankPrice < friendPrice)  {  Console.WriteLine("{0:F2} Bank", bankPrice);  }  else  {  Console.WriteLine("{0:F2} Friend", friendPrice);  } |