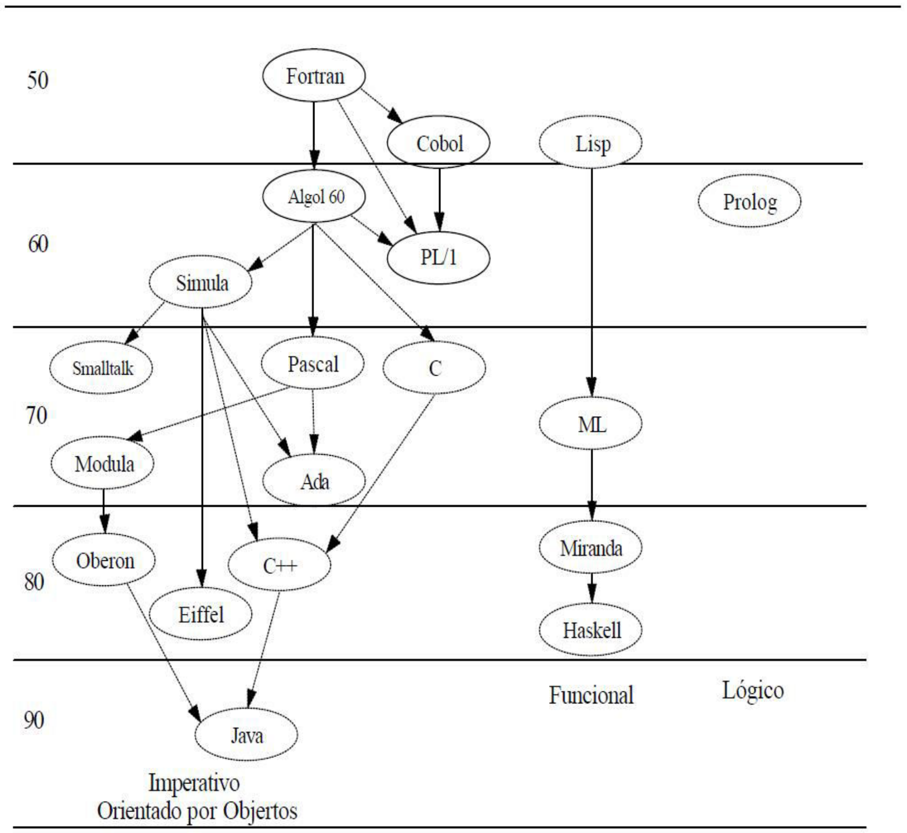
Linguagem de Programação Haskell

Origem

- Final dos anos 80
- Linguagem Miranda

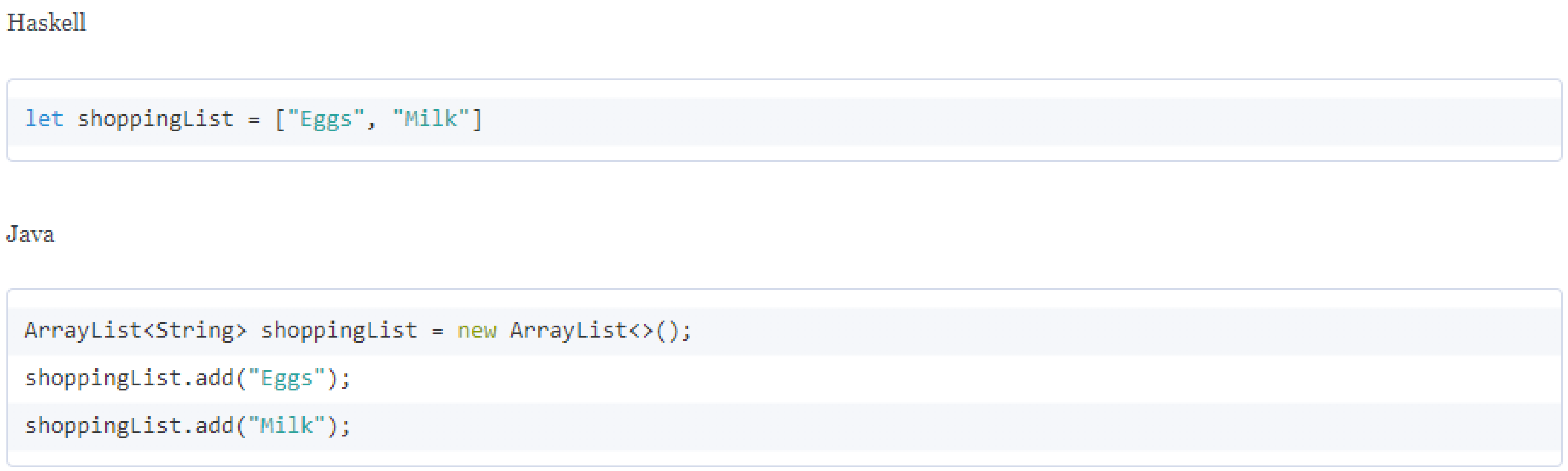


Classificação

- Funcional
- Estática

Writability

- Haskell vs Java



Haskell

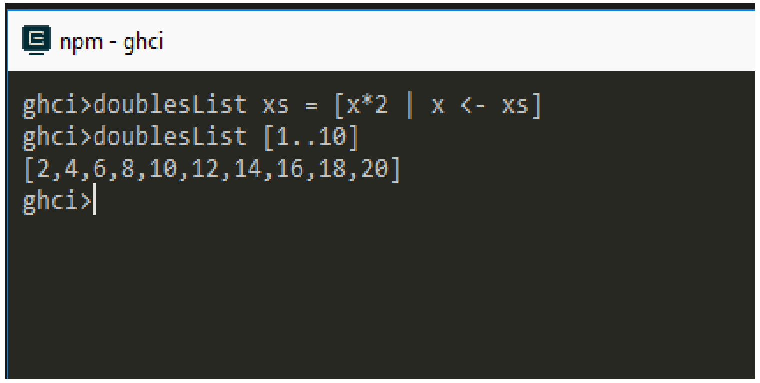
```
let shoppingList = ["Eggs", "Milk"]
```

Java

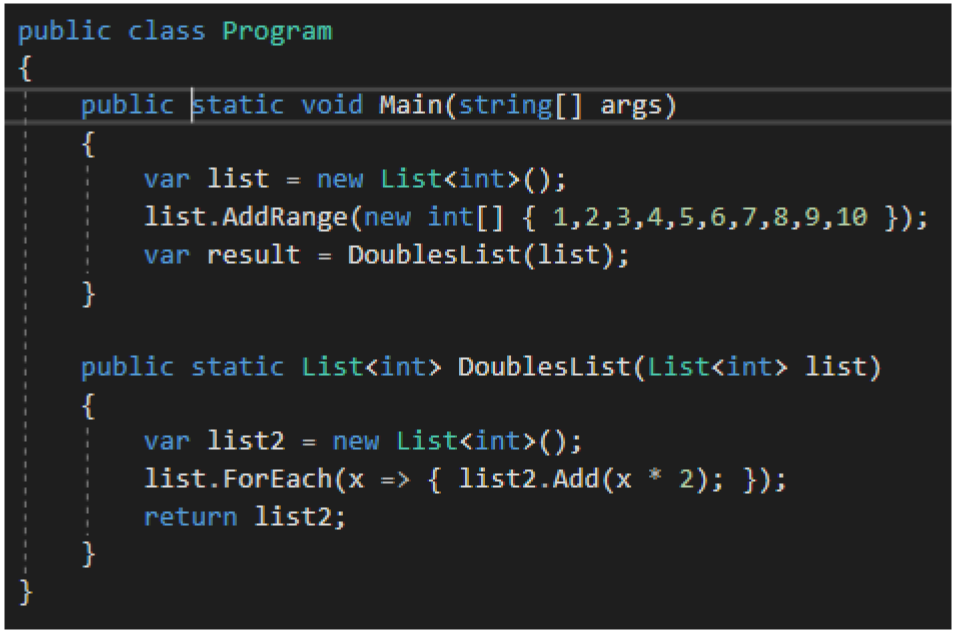
```
ArrayList<String> shoppingList = new ArrayList<>();
shoppingList.add("Eggs");
shoppingList.add("Milk");
```

Compreensão de listas

- Haskell vs C#



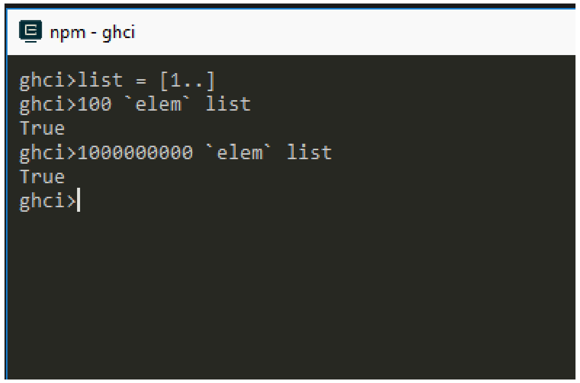
```
ghci>doublesList xs = [x*2 | x <- xs]
ghci>doublesList [1..10]
[2,4,6,8,10,12,14,16,18,20]
ghci>
```



```
public class Program
{
    public static void Main(string[] args)
    {
        var list = new List<int>();
        list.AddRange(new int[] { 1,2,3,4,5,6,7,8,9,10 });
        var result = DoublesList(list);
    }

    public static List<int> DoublesList(List<int> list)
    {
        var list2 = new List<int>();
        list.ForEach(x => { list2.Add(x * 2); });
        return list2;
    }
}
```

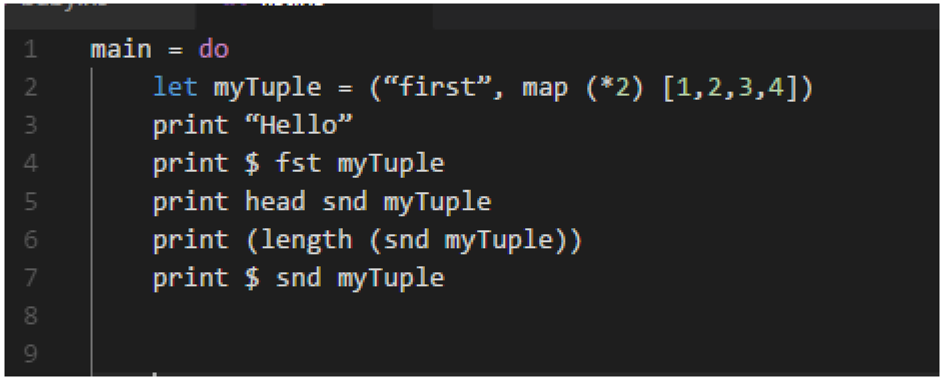
Lazy Evaluation

```
Positives = [0..]
```

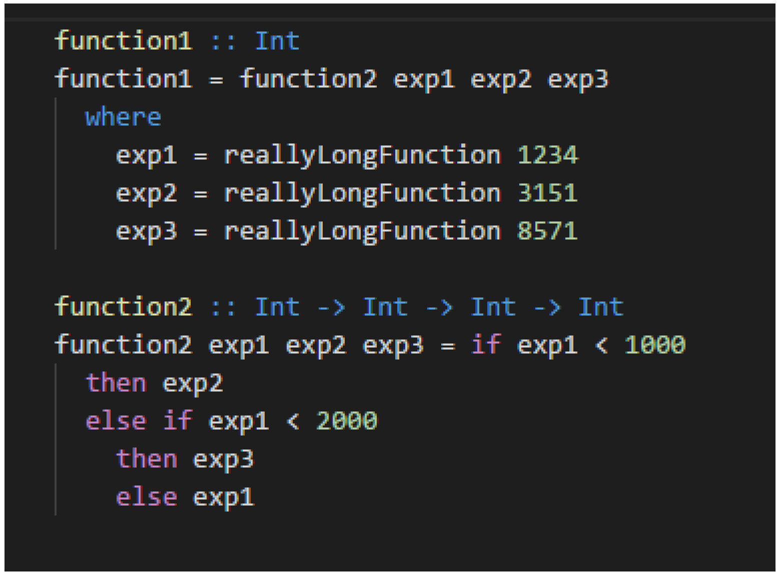


npm - ghci

```
ghci>list = [1..]
ghci>100 `elem` list
True
ghci>1000000000 `elem` list
True
ghci>
```

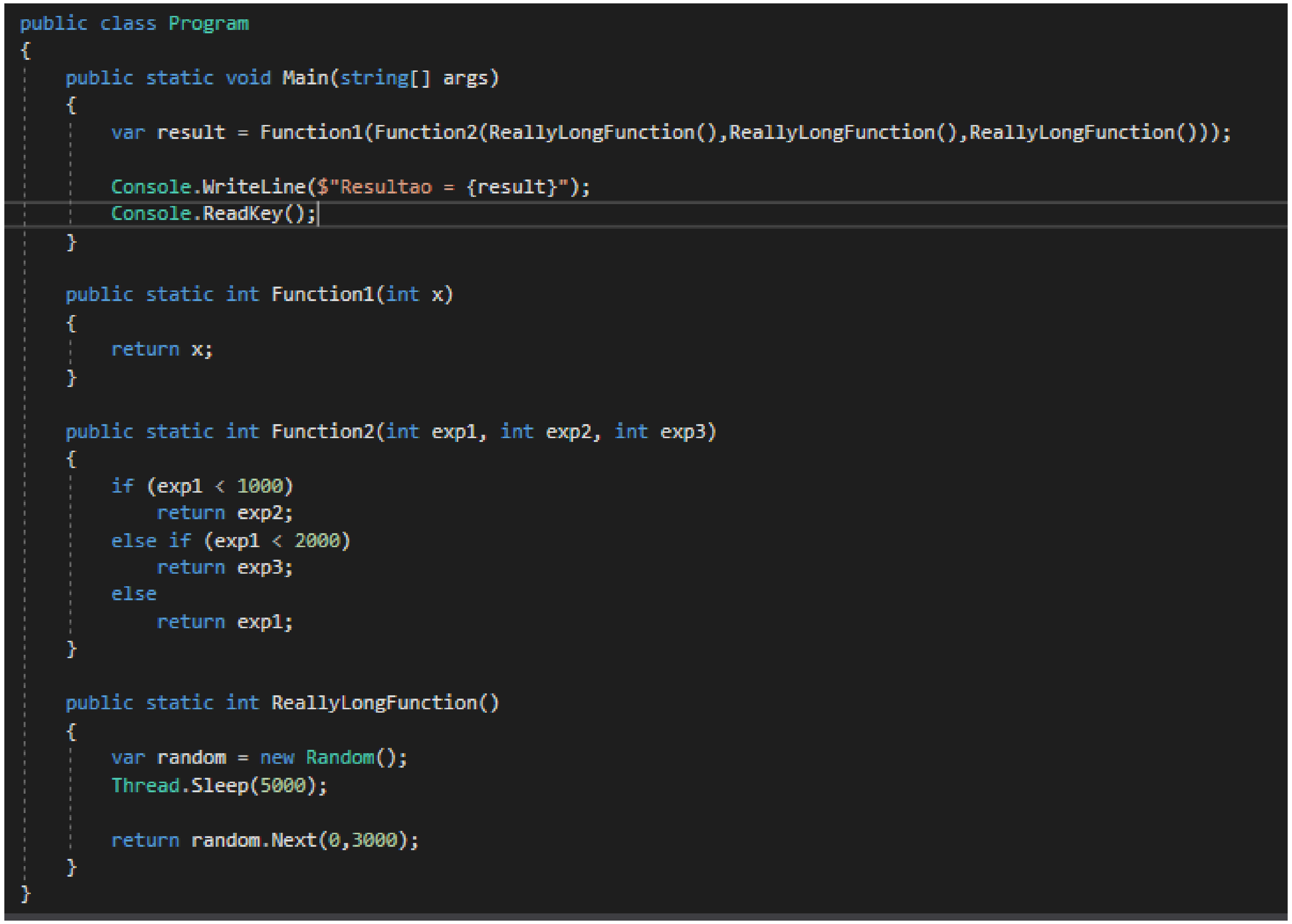


```haskell
main = do
    let myTuple = (“first”, map (*2) [1,2,3,4])
    print “Hello”
    print $ fst myTuple
    print head snd myTuple
    print (length (snd myTuple))
    print $ snd myTuple
```



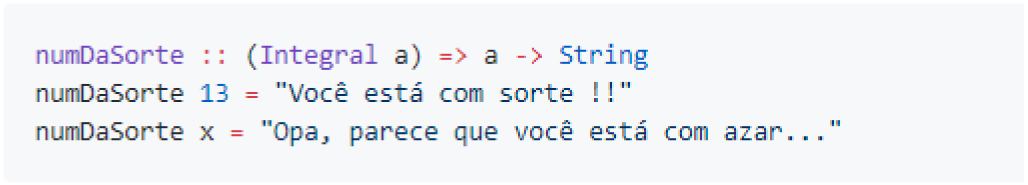
```haskell
function1 :: Int
function1 = function2 exp1 exp2 exp3
  where
    exp1 = reallyLongFunction 1234
    exp2 = reallyLongFunction 3151
    exp3 = reallyLongFunction 8571

function2 :: Int -> Int -> Int -> Int
function2 exp1 exp2 exp3 = if exp1 < 1000
  then exp2
  else if exp1 < 2000
    then exp3
    else exp1
```

Lazy Evaluation



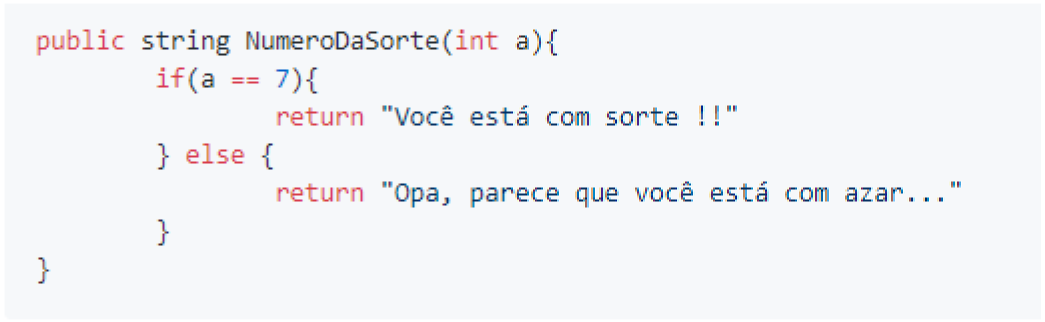
```
public class Program
{
    public static void Main(string[] args)
    {
        var result = Function1(Function2(ReallyLongFunction(),ReallyLongFunction(),ReallyLongFunction()));

        Console.WriteLine($"Resultao = {result}");
        Console.ReadKey();
    }

    public static int Function1(int x)
    {
        return x;
    }

    public static int Function2(int exp1, int exp2, int exp3)
    {
        if (exp1 < 1000)
            return exp2;
        else if (exp1 < 2000)
            return exp3;
        else
            return exp1;
    }

    public static int ReallyLongFunction()
    {
        var random = new Random();
        Thread.Sleep(5000);

        return random.Next(0,3000);
    }
}
```

Pattern Matching



```haskell
numDaSorte :: (Integral a) => a -> String
numDaSorte 13 = "Você está com sorte !!"
numDaSorte x = "Opa, parece que você está com azar..."
```

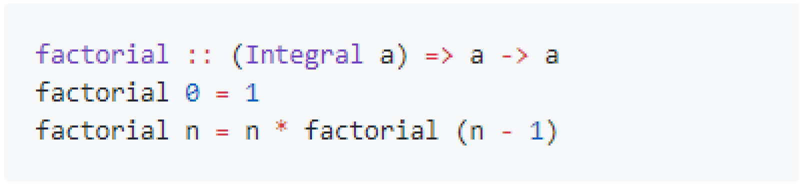
Haskell



```java
public string NumeroDaSorte(int a){
        if(a == 7){
                return "Você está com sorte !!"
        } else {
                return "Opa, parece que você está com azar..."
        }
}
```

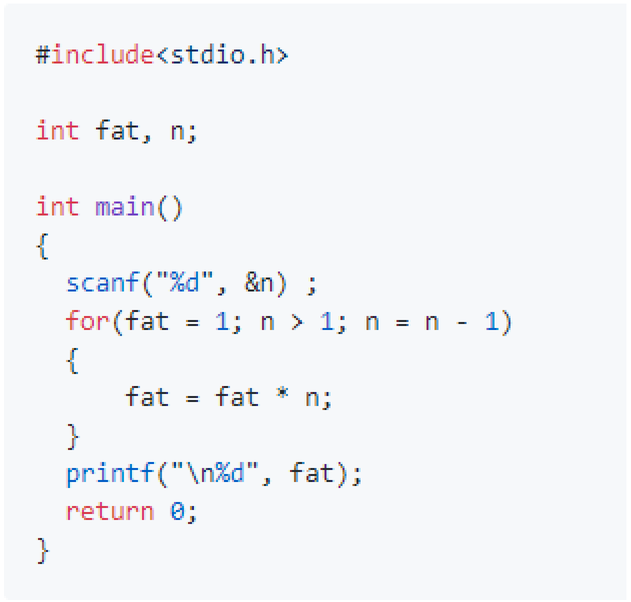
Java

Pattern Matching



```haskell
factorial :: (Integral a) => a -> a
factorial 0 = 1
factorial n = n * factorial (n - 1)
```

Haskell

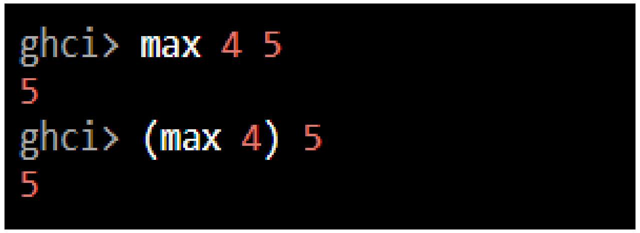


```c
#include<stdio.h>

int fat, n;

int main()
{
  scanf("%d", &n) ;
  for(fat = 1; n > 1; n = n - 1)
  {
      fat = fat * n;
  }
  printf("\n%d", fat);
  return 0;
}
```

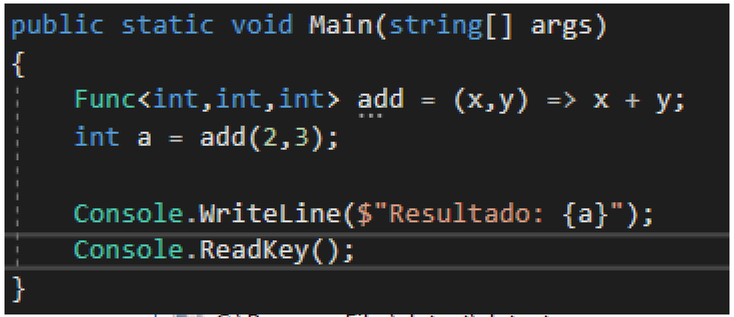
C

Currying Functions

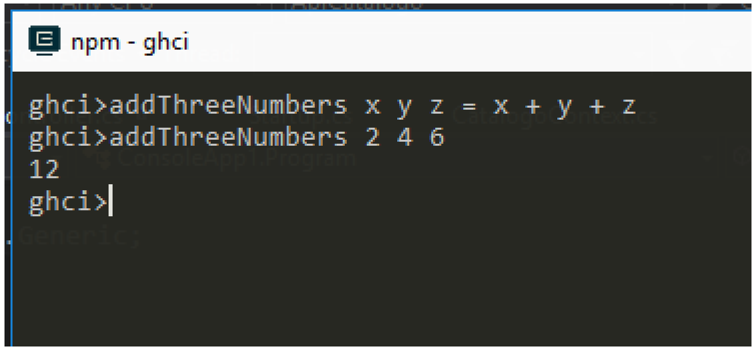
Haskell VS C#



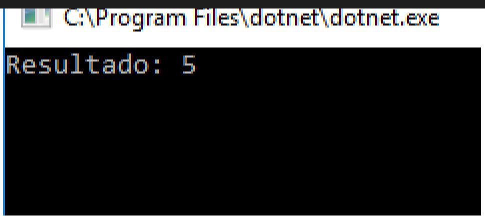
```
ghci> max 4 5
5
ghci> (max 4) 5
5
```



```
public static void Main(string[] args)
{
    Func<int,int,int> add = (x,y) => x + y;
    int a = add(2,3);

    Console.WriteLine($"Resultado: {a}");
    Console.ReadKey();
}
```



```
ghci>addThreeNumbers x y z = x + y + z
ghci>addThreeNumbers 2 4 6
12
ghci>
```



```
Resultado: 5
```