Exercícios Com a Linguagem Lua

Versão 0.1
16 de julho de 2014

1) Explique o motivo pelo qual os seguintes trechos de código *não* funcionam:

```
Print("zweitausendvierzehn")
```

```
pi = 3,14
print(pi^-5+-2)
```

```
x = 3
print(x^2 + 2x - 5)
```

```
data = {
    sides = {3, 2, 1}
    color = "blue"
}
```

```
t = {w = {t = 1, v = 2, x = 3}, x = 5, v = {x = 7, y = 5, z = 3}}
print(t.v.y + t.x + t.w.u)
```

```
x = {3, 0, 7, 9, 4, 2)
print(x[1] + x[3])
```

```
print(((1 + 2) * (2 + (3 * 4 * (9 - 3)) + 7))
```

```
function sum(a, b)
    return a+b
end
sum(5)
```

```
x = {4, 9, 0, 1, 8, 4, 2, 6, 3, 3, 2, 1, 7, 0, 9, 4, 2, 4, 1}
print(x(19) + 5)
```

```
x = {5, 7, 1, 4, 6, 9, 2}
print(x[x[2]] + x[x[6]])
```

```
x = {
    result = 7,
    to = 5,
    for = 4
}
```

```
automoblie = {u = 7, w = 5}
automoblie = {y = 5, t = 8}
automobile = {r = 3, w = 2}
print(automoblie.w + 2)
```

```
x = 3
if x = 3 then
    print("igual a 3")
end
```

```
x = {w = 2, t = "a", u = "b", z = 4, w = "c", v = 5}
print(-x.w^2^-1/4)
```

```
x = {a = "7", b = 4, b = "8", ,f = 4, d = "e", c = "5", b = 7,}
print(x.a + x.b + x.c)
```

```
function sum(a, b)
    c = a + b
    return c
    print(c)
end
sum(2, 4)
```

2) Dada a função *zoo* a baixo():

```
function zoo(a, b, c, d)
    if a > b and c > d then
        if a > d then
            if b > d then
                print("Found 1")
            elseif b == 4 and d == 5 then
                print("Found 2")
            end
        elseif c == 3 and a == b + 2 then
            print("Found 3")
        elseif d == 5 and a == 3 then
            print("Found 4")
        end
    elseif a == 3 * b + 2 - c and b == 5 and c > 3 then
        print("Found 5")
    elseif a == b + c - 4 * d and b == a + c + d then
        print("Found 6")
    else
        print("Found 7")
    end
end
```

Execute esta função várias vezes com diferentes valores para os argumentos de forma que todos os sete “founds” sejam executados. Por exemplo, se voce executar:

```
zoo(2, 1, 1, 0)
```

irá aparecer na tela “Found 1”.

3) Implemente a seguinte função contínua:

$$f(x) = \begin{cases} x^2 + 2x + 3 & \text{if } x < 0 \\ x + 3 & \text{if } 0 \leq x < 2 \\ x^2 + 4x - 7 & \text{if } 2 \leq x. \end{cases}$$

de tal forma que o código abaixo funcione corretamente:

```
print(f(-1))
print(f(1))
print(f(10))
```

4) Dada a tabela *data* abaixo:

```
data = {
    {x = 321, y = 453, t = 509},
    {x = 565, y = 904, t = 443},
    {x = 843, y = 398, t = 770},
    {x = 949, y = 809, t = 606},
    {x = 371, y = 740, t = 126},
    {x = 594, y = 943, t = 301},
    {x = 473, y = 765, t = 136},
    {x = 905, y = 301, t = 562},
    {x = 361, y = 257, t = 985},
    {x = 760, y = 231, t = 951},
    {x = 946, y = 663, t = 634}
}
```

a) Compute a soma de todos os valores de x, y e t separadamente.
b) Compute a soma dos três valores de cada uma das tabelas internas.
c) Compute a soma de todos os valores.

5) Dada a tabela *numbers* abaixo:

```
numbers = {3726, 21401, 12990, 15090, 6202, 1333, 19227, 19240,
26473, 10862, 14711, 23535, 980, 1515, 15003, 19009, 219, 10860,
1894, 11825, 19451, 16681, 26352, 23966, 14924, 2605, 18521, 11782,
19860, 25783, 21587, 7434, 1345, 20848, 9297, 17918, 21424, 28069,
10348, 6997, 27828, 20468, 21337, 18453, 2059, 17890, 25057, 7724,
12361, 21709, 13531, 6735, 7786, 10176, 4716, 13780, 25424, 25751,
1716, 25622, 14290, 14623, 9036, 27944, 13991, 7538, 2570, 26843,
2089, 14182, 10880, 7848, 25882, 15004, 13155, 26651, 1419, 21568,
21814, 23446, 3551, 450, 19499, 24591, 17830, 20852, 20546, 28307,
25167, 6605, 8676, 9942, 14537, 16742, 23960, 11671, 23834, 7628,
11765, 15218, 13253, 8135, 5051, 4354, 16191, 22726, 937, 15137,
14118, 27058, 21194, 15707, 25228, 17697, 23849, 4525, 6026, 20243,
3694, 2578, 7777, 85, 11734, 762, 20104, 26564, 6795, 5124, 8994,
25122, 18468, 4258, 19298, 10928, 10982, 14154, 4179, 16631, 23949,
16714, 27060, 15752, 4196, 27850, 11578, 4017, 16000, 7141, 13836,
13143, 27221, 3570, 5658, 9042, 17823, 3589, 18445, 17606, 22745,
7020, 13494, 11027, 5757, 804, 25538, 12080, 4023, 26835, 11621,
3716, 25084, 2611, 4594, 2013, 10348, 7168, 3827, 22181, 12896, 9900,
12811, 22911, 26387, 18456, 6097, 19248, 25743, 7085, 24382, 13348,
14330, 17005, 23155, 21408, 13092, 26945, 17921, 12443, 23358, 19514,
19888, 27958, 27031, 24110, 8195, 15221, 14570, 2930, 11727, 16334,
24827, 12463, 20668, 24620, 20269, 22679, 20011, 21007, 541, 25095,
14869, 13123, 1847, 20206, 13848, 18911, 19317, 5652, 25961, 24524,
25208, 15406, 3943, 12755, 28021, 6105, 12633, 8943, 14577, 24966,
12454, 13242, 22846, 10343, 5991, 28297, 4351, 17857, 17457, 17, 25,
21903, 20600, 9040, 11831, 19330, 19275, 5814, 23690, 20079, 23471,
2678, 2315, 21639, 17831, 6057, 6049, 2296, 11013, 26968, 26837,
11042, 7625, 19604, 8045, 22003, 22201, 11965, 7992, 5494, 321, 5433,
27848, 6913, 23217, 3865, 11277, 17022, 5010, 23461, 4468, 27981,
7284, 6616, 2879, 6215, 17977, 19713, 22510, 19719, 21325, 18963,
17941, 1599, 16943, 6430, 9029, 19821, 3327, 21598, 14901, 15688,
16654, 9337, 19911, 4052, 4580, 13746, 24364, 23034, 15771, 20930,
8950, 3833, 14970, 8801, 16657, 14674, 12203, 7331, 10486, 11132,
12657, 13479, 10985, 7911, 2217, 10472, 7192, 19027, 19153, 14556,
20636, 20414, 26758, 13048, 26628, 9108, 13041}
```

a) Encontre o maior e o menor valor.
b) Calcule o valor médio.
c) Calcule o desvio padrão.

6) Dada a tabela *data* abaixo, qual número ocorre mais vezes?

```
data = {3,6,6,3,2,5,8,8,4,8,2,3,4,5,3,7,1,8,7,2,8,9,3,5,3,9,5,2,1,
1,6,6,5,4,3,3,6,9,6,5,8,3,5,5,7,3,8,7,4,6,7,4,7,6,6,8,9,1,6,1,1,2,
2,8,9,6,9,5,7,1,8,7,2,3,6,4,5,6,7,3,3,2,8,7,3,4,3,9,8,3,1,5,2,9,5,
2,4,7,2,4,7,8,8,5,7,1,3,4,9,5,5,5,9,3,4,6,2,2,3,9,7,1,2,3,1,4,4,8,
2,8,5,5,8,8,8,9,5,8,5,9,5,6,5,8,1,4,6,5,8,6,6,3,9,2,3,3,5,2,1,5,7,
9,1,3,1,3,4,5,1,3,8,9,6,7,6,5,4,8,5,5,5,1,3,5,2,8,1,5,6,7,1,1,2,6,
6,5,3,4,3,9,1,8,5,5,9,4,2,1,2,7,7,4,3,7,2,1,1,4,2,8,3,6,6,2,9,7,8,
9,2,6,9,4,4,5,9,2,5,2,2,8,4,7,1,6,2,9,5,3,2,1,1,7,3,2,2,8,8,1,4,1,
3,9,8,6,3,2,2,8,8,5,5,9,7,9,8,7,8,3,8,9,2,9,8,4,2,4,9,1,7,3,6,8,6,
4,1,2,4,9,9,9,5,7,4,6,9,3,2,9,2,6,3,5,8,3,1,4,6,8,6,2,6,4,2,4,3,1,
8,2,3,6,7,9,5,7,8,8,8,7,5,7,7,2,3,2,5,6,4,2,6,2,6,1,1,8,5,7,4,4,3,
3,2,7,4,5,2,6,7,5,4,9,6,2,2,6,1,1,4,8,5,9,9,8,5,7,1,9,8,6,1,8,5,4,
1,8,2,7,4,9,2,8,3,6,1,4,8,2,7,8,1,1,1,2,7,2,5,7,6,3,9,5,8,6,2,5,5,
8,4,9,7,8,3,6,8,4,1,6,3,7,9,7,4,8,4,4,3,7,8,5,2,1,3,5,5,6,4,7,6,5,
3,2,9,5,6,9,5,6,6,2,1,2,5,1,7,9,3,8,8,7,4,3,7,3,8,9,7,4,5,6,7,9,5,
7,8,6,4,3,2,6,5,2,7,3,4,5,6,4,6,5,6,3,5,8,2,2,2,9,2,9,5,4,2,7,6,4,
7,7,3,5,4,1,7,7,4,6,5,7,3,3,6,2,1,4,7,3,3,2,7,7,6,4,9,9,4,1,6,4,5,
1,4,8,2,7,9,1,2,1,3,7,6,4,2,6,8,8,6,3,9,9,1,6,6,3,8,6,4,9,5,7,1,6,
5,9,1,3,4,3,3,1,3,5,4,5,7,6,2,3,2,1,9,9,1,9,6,2,8,1,3,4,7,6,7,5,4,
3,3,5,9,3,3,3,4,3,1,8,7,5,7,2,5,9,4,7,3,9,2,4,7,6,5,2,5,4,4,1,9,2,
3,6,6,2,7,4,9,3,9,7,5,6,4,2,2,8,8,7,3,9,6,2,7,9,3,3,3,1,3,2,1,3,2,
9,6,7,7,7,3,9,7,9,5,1,7,9,7,8,4,5,1,3,3,5,2,2,4,5,1,8,5,9,1,4,7,2,
8,5,9,1,8,8,1,4,7,1,8,1,3,4,4,2,9,8,2,8,2,3,3,4,9,5,5,1,4,7,6,8,5,
1,3,2,1,4,1,6,9,4,5,9,6,4,3,6,7,8,1,2,7,6,9,7,1,6,6,6,5,7,8,8,3,2,
5,1,6,2,9,2,1,7,7,7,3,1,2,6,7,7,8,9,2,3,4,2,8,5,8,4,9,4,2,8,7,1,8,
6,9,6,2,9,7,6,2,8,7,4,9,8,8,2,7,8,8,2,7,4,7,1,4,9,7,3,8,1,6,6,9,3,
7,9,8,5,9,4,3,1,5,1,8,7,1,4,6,4,9,3,9,4,7,4,8,3,7,8,1,3,5,7,9,9,1,
5,2,9,7,1,8,4,5,5,9,7,6,9,4,9,5,9,7,5,2,4,1,1,2,8,2,5,6,9,4,3,4,5,
6,7,6,6,6,2,9,6,8,2,2,2,2,4,3,6,7,5,7,1,6,3,3,4,9,8,6,4,9,7,6,3,5,
1,5,5,9,5,6,3,1,6,4,8,6,8,2,2,9,7,3,8,2,9,4,4,6,3,4,5,4,6,3,7,4,2,
7,5,2,2,4,6,3,3,4}
```

7) Dados os objetos geométricos abaixo:

```
square1 = {side = 5}
square2 = {side = 7}
rectangle1 = {width = 4, height = 6}
rectangle2 = {width = 8, height = 2}
circle1 = {radius = 3}
triangle1 = {side1 = 5, side2 = 4, side3 = 3}
```

Construa uma função *area* que recebe um objeto geométrico como argumento e retorna a área do mesmo, e outra função *perimeter* que também recebe um objeto geométrico como argumento e retorna o seu perímetro. Com estas duas funções implementadas, o código abaixo deve funcionar corretamente:

```
objects = {
    square1, square2, rectangle1,
    rectangle2, circle1, triangle1
}

for i = 1, #objects do
    print(i, area(objects[i]), perimeter(objects[i]))
end
```

Dica: primeiro teste com os objetos geométricos separadamente, assim:

```
print(area(square1))
print(perimeter(square1))

print(area(rectangle1))
print(perimeter(rectangle1))

-- ...
```

8) Dada a string abaixo, você conseguiria dizer o que esta escrito em português? Dica: use as funções string.byte(), string.char(), string.sub() e string.len().

```
gw gurgtq swg xqeg pcq vgpjc fguetkrvqitchcfq vqfc guvc uvtkpi
ocpwcnogpvg rqtswg cngo fg owkvq fgoqtcfq ugtkc vqvcnogpvg gpvgfkcpvg
```

9) Reimplemente os exercícios 3, 4 e 6 sem usar o comando *for*. Substitua este comando pela função do TerraME chamada *forEachElement*.