EXERCISES: FUNCTIONAL PROGRAMMING

- consider a list of first n terms in arithmetic progression $A(a, d)$:

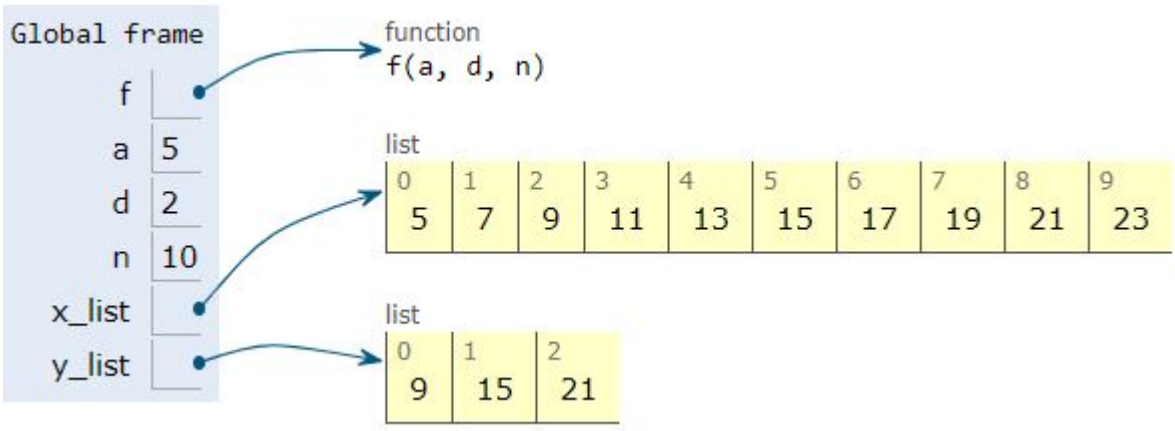
  $x = [a, a+d, a+2d, \ldots, a+(n-1)d]$

- compute a sub-list of x with elements divisible by 3

Solution:

```
def f(a,d,n):
    last = a + (n-1)*d
    return list(range(a, last+1, d))

a, d, n = 5, 2, 10
x_list  = f(a, d, n)  # for visualization
y_list = list(filter(lambda x:(x%3==0), x_list))
```



- consider a list of first n terms in geometric progression $G(b, q)$:

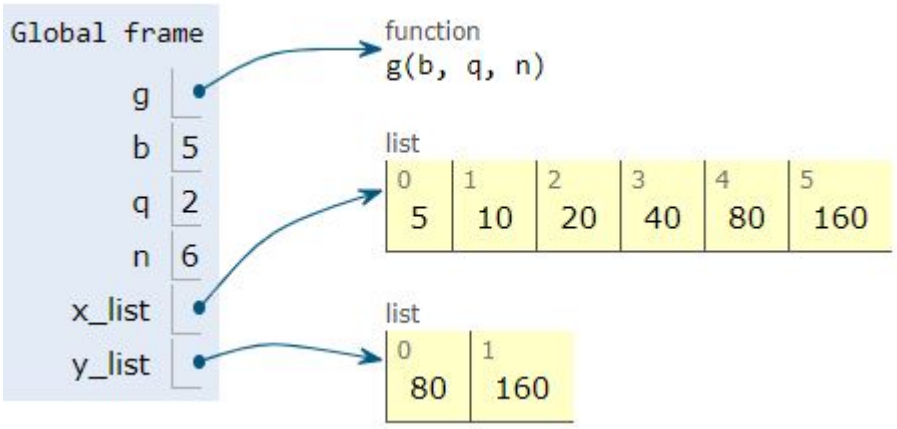
$$x = [b, bq, bq^2, \ldots, bq^{n-1}]$$

- compute a sub-list of x with elements divisible by 16

Solution:

```
def g(b, q, n):
    result = [b*q**(i-1) for i in range(1,n+1)]
    return result

b,q,n  = 5, 2, 6
x_list = g(b, q, n)
y_list = list(filter(lambda x:(x%16==0), x_list))
```



- consider a list of first n terms in arithmetic progression $A(a, d)$:

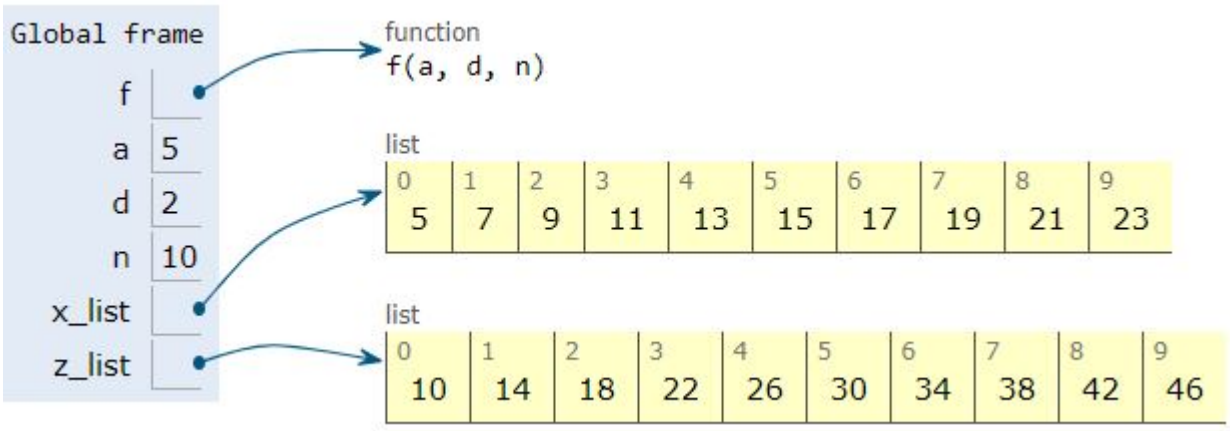
  $x = [a, a+d, a+2d, \ldots, a+(n-1)d]$

- double each element in x

Solution:

```
def f(a,d,n):
    last = a + (n-1)*d
    return list(range(a, last+1, d))

a, d, n = 5, 2, 10
x_list  = f(a, d, n)  # for visualization
z_list  = list(map(lambda x: 2*x, x_list))
```



- consider a list of first n terms in geometric progression $G(b, q)$:

$$x = [b, bq, bq^2, \ldots, bq^{n-1}]$$

- increment each element in x by 5

Solution:

```
def g(b, q, n):
    result = [b*q**(i-1) for i in range(1,n+1)]
    return result

b, q, n = 5, 2, 6
x_list  = g(b, q, n)
z_list  = list(map(lambda x: x+5, x_list))
```