

**Instructions:** Name your file `hw1.py` and submit on CCLE. Add comments to each function.

- **Problem 1:**

Write a function `largerIndex(c)` that takes as input a list `c` of numbers, and returns a new list `k`, such that  $k[i] = 1$  if  $c[i] > i$ ,  $k[i] = 0$  if  $c[i] = i$ ,  $k[i] = -1$  if  $c[i] < i$ .

Test cases:

`l1 = [1,2,0,4,2,1,40,-5]`

`l2 = [0,3,2,1,32,3,4,0]`

`largerIndex(l1)` should return `[1, 1, -1, 1, -1, -1, 1, -1]`.

`largerIndex(l2)` should return `[0, 1, 0, -1, 1, -1, -1, -1]`.

- **Problem 2:**

Write a function `squareUpTo(n)` that takes as input a positive integer `n`, and returns a list of all the square numbers up to (and possibly including) `n`.

Test cases:

`squareUpTo(10)` should return `[0, 1, 4, 9]`.

`squareUpTo(100)` should return `[0, 1, 4, 9, 16, 25, 36, 49, 64, 81, 100]`.

- **Problem 3:**

Write a function `flip1in3()` that uses only “fair coins” to generate a “biased coin” with success probability  $1/3$ . That is, this function returns `False` with probability  $2/3$  and returns `True` with probability  $1/3$ .

- **Problem 4:**

Write a function `duplicates(c)` that takes as input a list `c` of integers. Some elements appear twice and others appear once. The function outputs all the elements as a list that appear twice in the list `c`. The elements in the output should preserve the original order.

Test cases:

`l3 = [1,2,5,3,6,2,4,5]`

`l4 = [1,3,5,5,1,4,3]`

`duplicates(l3)` should return `[2,5]`.

`duplicates(l4)` should return `[1,3,5]`.