

This is a Python programming assignment. You will edit your ongoing copy of `qc.py` and submit it for grading. The grader will `import qc` and then run their own testing code against it. Probably the grader will also inspect your code.

**A.** Write a function according to the following specification.

```
def grover(n, f):  
    '''Implements the Grover core subroutine with known  $k = 1$ . The f parameter  
    is an  $(n + 1)$ -qbit gate representing an  $f : \{0, 1\}^n \rightarrow \{0, 1\}$  such that  
     $\sum_{\alpha} f(\alpha) = 1$ . Returns a list or tuple of  $n$  classical one-qbit  
    states (either ket0 or ket1), such that the corresponding  $n$ -bit string is  
    usually equal to the  $\alpha$  such that  $f(\alpha) = 1$ .'''
```

**B.** Write a function `groverTest`, which takes as input a value for  $n$ , randomly picks an instance of the Grover problem (with known  $k = 1$ ), runs `grover`, and gets an answer. Your `groverTest` should print both the true  $\delta$  and the one found by Grover's algorithm, so that the user can assess whether Grover's algorithm worked.