# Libraries needed

from abc import ABCMeta, ABC, abstractmethod

from contextlib import contextmanager

# Defines the basic functions a quantum computing program must have

class QuantumDevice(metaclass=ABCMeta):

possibility to allocate a single qubit for the user

@abstractmethod

  def allocate\_qubit(self) -> Qubit:

    pass

  Possibility to make the deallocation after using it

  @abstractmethod

  def deallocate\_qubit(self) -> Qubit:

    pass

We can define a context manager too simplify the process of allocation and deallocation of a qubit

Even if an exception is thrown up, the method allows to reset the qubit state and deallocate it immediately after.

  @contextmanager

  def using\_qubit(self):

    qubit = self.allocate\_qubit()

    try:

      yield qubit

    finally:

      qubit.reset()

      self.deallocate\_qubit()