In this half-done code I basically used the algorithm published in this paper [Factoring with n+2 clean qubits and n-1 dirty qubits](https://arxiv.org/abs/1706.07884) to solve factorization problem with only total 2n+1 qubits.

At a high-level view of the circuit for period finding, which is the most important part of the algorithm, we used R as the modulus and B, a random number as base. Then the circuit is divided into multiple parts: Modular Bimultiply, Modular scale-addition, Modular Negation and Pivot-Flips. The flow chart is shown below. To ensure all the parts, I encoded each parts with pyqpanda. For example, to make the modular scale addition algorithm, I need to write a pyqpanda program to create offset qubit in the circuit.

A picture containing diagram

Description automatically generated

Diagram

Description automatically generated