Problem Statement :

Task 2: Create a Quantum Multiplier that takes two integers of unit digits as input and outputs their product.

Proposed solutions :

Possible methods for encoding :

1. QFT based encoding (encoding the states in their relative phases)
2. Amplitude amplification encoding

Algorithms for multiplication :

1. QFT (QFT itself is not directly used, but an adder is built out of QFT which is then implemented for the controlled rotations in the multiplication circuit)
2. Phase Estimation
3. Grover’s Algorithm

Curated Papers :

* [Addition on a Quantum Computer by Thomas G. Draper](https://arxiv.org/abs/quant-ph/0008033v1)
* [Quantum Arithmetic with QFT by Lidia Perez and Juan Garcia](https://arxiv.org/abs/1411.5949v2)
* [Quantum Networks for Elementary Arithmetic Operations by Artur Ekert et al.](https://arxiv.org/abs/quant-ph/9511018v1)

Other resources :

<https://medium.com/@sashwat.anagolum/arithmetic-on-quantum-computers-multiplication-4482cdc2d83b>