Primality Tester Write Up – Thomas Molina

A screenshot of a cell phone

Description automatically generatedThe time complexity for Miller-Rabin is O(n^4) because you do k iterations of modular exponentiation, then another inner N-1 iteration of modular exponentiation, giving n^2 \* n^2 in runtime. The space complexity is constant.

For prime test, not including the space complexity for the functions that it contains, the total space complexity is constant, and the time complexity is O(n^4)

Modular exponentiation time complexity is O(n^2) and its space complexity is constant because it only needs 3 variables.

fprobability has an explanation attached to the function.

A screenshot of a cell phone

Description automatically generated

Fermat’s theorem had a time complexity of O(n^2) because of modular exponentiation, and a space complexity of constant.

A screenshot of a cell phone

Description automatically generated

The rest of my code is either attached, or in these images:

A screenshot of a cell phone

Description automatically generated

For an n bit number (a) and m bit number (b) it would take O(log m \* n) operations to complete the gcd, and would need O(m\*n) space.

A screenshot of a cell phone

Description automatically generated