

Lab 5

Exercise 1: Implement Karatsuba's algorithm in Python.

Exercise 2: Implement a function `fibonacci(n)` for computing the n th Fibonacci number, using repeated squaring.

Exercise 3: Recall the *Trionacci* sequence defined in lab 3:

$$T_i = \begin{cases} 1 & \text{if } i = 0 \text{ or } i = 1 \text{ or } i = 2 \\ T_{i-1} + T_{i-2} + T_{i-3} & \text{otherwise} \end{cases}$$

Implement a function `trionacci(n)` which returns the n th Trionacci number. Your function should only require $O(\log_2 n)$ integer multiplications.