ASYMPTOTIC ANALYSIS OF FUNCTION GENERATING PRIME NUMBERS

The function gen_prime has five levels of nested loops. The outer most loop check whether the input is of type integer. If that condition executed to true, then the next loop check if the integer is greater than one since prime numbers are positive numbers greater than zero. If that condition is met, the function then goes through all numbers starting from 1 to n (inclusive; which is why n+1 is used as an upper limit), in the outer for loop. then in the inner for loop it checks that the current number of the outer for loop is only divisible by 1 and itself. The function then appends the appropriate prime numbers to a list called prime_numbers [], which was originally initialized as an empty list.

Each of those loops takes O(n) time to execute because the time taken depends on the number that user wants to use as the upper limit. All loops combined and nested in this way gives a total quadratic efficiency of $O(n^5)$