

Question 3

part b2

Running time complexity of the recursive exponentiation by squaring algorithm is $O((\log n) + 1)$

part b3

Some base raised to the exponent 63 using this method would need 6 multiplication operations. This is because multiplication operations need to be carried out only for every 1 in the base 2 representation of the exponent. Since $\text{bin}(63) = 111111$, we can do some simple addition. $1+1+1+1+1+1=6$.