HOMEWORK 2

COMP3121 - ALGORITHM DESIGN

QUESTION 1

PUNEETH KAMBHAMPATI

z5164647

PSEUDO-CODE:

```
DEF power(M , n):
    # Base case for the recursive function
    # RETURN 1 because anything to the power of 0 is 1
    IF n is 0:
        RETURN 1

    # Divide the number of power multiplications in HALF
    # Repeat the calculations
    temp = power(M, n/2)
    IF y is even:
        RETURN temp^2
    ELSE:
        RETURN (temp^2)*M
```

EXPLANATION:

For an example, M = 3 & n = 5,
Calculating power(M, n) would look like:

$$3 * 3 * 3 * 3 * 3 = 243$$

This Brute force solution is O(n).

The main approach to the solution involves doing approximately only half of the calculations required for a brute force and hence gives us O(logn)