**Question 1**

**Assuming result is not the maximum value in the input, which means that there is a number called k in inputs which is not equal to result and larger than result.**

**In the loop, m > result so we can get result = m.**

**However, the prerequisite is that m ≠ result, so we found the contradiction.**

**Question 2**

**Github:** <https://github.com/YoeYang>

**Stackoverflow:** <https://stackoverflow.com/users/12744268/yueyi-yang>

**Question 3**

**Code is in the file named Question3Medium**

**Runtime: O(n)**

**Runtime for calculate the length of input is O(n) and identify the medium number is O(1)**

**Question 4**

**Code is in the file named Question4Introduce**

**3a. What do -r and -f do for rm command?**

**-r, --recursive: Use recursion in deleting contents**

**-f, --force: This is applicable if you have defined a list of separate <FILE> entries and one (or more) among them does not exist. The removal will continue without prompting you.**

**Question 5**

**Example1: O(n)**

**Let R1 be runtime of example1**

**(1)**

**Example2: O(logn)**

**Question 6**

**Code is in the file named Question6Factorial**

**4. Runtime of non-recursive version: O(n)**

**Runtime of recursive version: O(n)**

**5.**

**To prove the correctness of factorial solution using induction**

**Which means to prove**

(2)

**Base: when n = 0, f(n) = 1**

**Induction:**

**Assume when n = k**

**(3)**

**According to factorial solution, we have**

**(4)**

**So equation above is the factorial equation of k+1 as (2)**