Problem Set 0

Name: Heejin, Chae

Problem 0-1.

(a) $A = 1, 6, 12, 13, 9, B = 3, 6, 12, 15, A \cap B = \{6, 12\}$

(b) $|A \cup B| = 7$

(c) $|A - B| = 3$

Problem 0-2.

(a)

(b)

(c)

Problem 0-3.

(a)

(b)

(c)

Problem 0-4. Prove it for n = 1 and k and k+1

$$
\begin{aligned}
1^3 &= \left(\frac{(1)(1+1)}{2}\right)^2 \\
\sum k^3 &= \sum (k-1)^3 + k^3 \\
&= \left(\frac{(k-1)(k)}{2}\right)^2 + k^3 \\
&= \frac{(k-1)^2(k)^2 + 4k^3}{4} \\
&= \frac{(k+1)^2(k)^2}{4}
\end{aligned}
$$

Problem 0-5.

Problem 0-6. Submit your implementation to `alg.mit.edu`.

```
def count_long_subarray(A):
    '''
    Input:  A     | Python Tuple of positive integers
    Output: count | number of longest increasing subarrays of A
    '''
    count = 0
    ##################
    # YOUR CODE HERE #
    ##################
    return count
```