2A) **Algorithm**: merge(A, B)
Input: Two integer arrays A and B which are sorted
Output: A merged array of A and B which is sorted

```
lenAB ←sizeofA +sizeofB
indexA ←0
indexB ←0
C ← new Array(lenAB)
for i ← 0 to lenAB – 1 do
        if indexA < sizeofA AND indexB < sizeofB then
                if A[indexA] < B[indexB] then
                        C[i] ← A[indexA]
                        indexA ← indexA + 1
                else
                        C[i] ← B[indexB]
                        indexB ← indexB + 1
        else
                if indexA ≥ sizeofA then
                        C[i] ← B[indexB]
                        indexB ← indexB + 1
                else
                        C[i] ← A[indexA]
                        indexA ← indexA + 1
return C
```

2B) Let

T = running time of merge
O(n) initialization + O(n) Single for loop of size n
⇨ T(n) = 2 * O(n) = O(n)
Therefore the running time of the merge algorithm is O(n).