**Part A: Algorithm Writing & Analysis**

1. Write algorithms (pseudo-code) for the following problems:
2. Find the maximum and minimum element in a list of n integers.
   1. array[1..n]
   2. max = array[0]
   3. min = array[0]
   4. For i=1 to n , i++
      1. If array[i] > max ;
         1. max = array[i]
      2. If array[i] < min;
         1. min = array[i]
   5. return max , min
3. Count Number of Odd and Even Numbers in an Array
   1. Array <- A[n]
   2. Odd <- 0
   3. even <- 0
   4. for i=1 to n ,i++
      1. if A[i] mod(%) 2 = 0 then
         1. even += 1
      2. else
         1. odd += 1
   5. return even , odd
4. Reverse a Given Array
   * 1. Algorithm ReverseArray(A[1..n])
     2. Input: Array A of n integers
     3. Output: Reversed array A

1. left ← 1

2. right ← n

3. while left < right do

4. temp ← A[left]

5. A[left] ← A[right]

6. A[right] ← temp

7. left ← left + 1

8. right ← right - 1

9. return A

| **Algorithm** | **Time Complexity** | **Space Complexity** | **Optimality** |
| --- | --- | --- | --- |
| Find Max and Min | O(n) | O(1) | Optimal (single pass) |
| Count Odd and Even | O(n) | O(1) | Optimal (single pass) |
| Reverse Array | O(n) | O(1) | Optimal (in-place reversal) |