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19CSE212 - Data Structures and Algorithms

Assignment 1: Asymptotic notations

Class: CSE E (2019 Batch) **Date: 08/01/2021**

1. Determine the time complexity of the following iterative functions using counting primitives:

A.
```
int f ( int A[SIZE][SIZE] , int n )
{
   int i, j, sum = 0;
   for (i=0; i<n; ++i) {
      if (i % 2 == 0)
         for (j=0; j<=i; j=j+1) sum = sum + A[i][j];
      else
         for (j=n-1; j>=i; j=j-1) sum = sum - A[i][j];
   }
}
```

B.
```
int g1(int n, int a[]) {
  s = 0;
  for (int i = 1; i < n; ++i)
       s = s + a[i] - a[i-1];
  return s;
  }
```

C.
```
int f2(int n, int a[]) {
     s = 0;
     for (int i = 0; i < n; ++i) {
         if (a[i]>n)
             for (int j = 0; j < i; ++j) {
                 s = s + a[I]*a[j];
              }
      }
      return s;
}
```

Answer Format should be as follows

Algorithm	Primitive operations	Frequency count	Total
Line 1	2	N	2 x n
Line 2	2	N - 1	2 (n - 1)
Line n	1	1	1

Total : 2n + 2(n - 1) + 1 = 4n -1

2. Write an algorithm *findMinMax(A, n)* that finds minimum and maximum in the array and prints the result in the function. Compute the time complexity of the function you had framed.

3. Find the asymptotic time complexities of the following functions.

    1. $f(n) = 3n^2 + 4n^{3/2}$
    2. $f(n) = (n-5)^2$