Chapter 4 Homework

Deadline: 2021/10/6 10:10 a.m.

1. Give asymptotic upper bound for $T(n)$

   $T(n) = T(\mathrm{n}/4) + T(n/2) + cn^2$

2. Give asymptotic upper and lower bounds for $T(n)$

   $T(n) = 4T(n/2) + n^2\sqrt{n}$

3. show that the solution of $T(n)$ is $O(nlog^2 n)$

   $T(n) = 2T\left(\left\lfloor\frac{n}{2}\right\rfloor\right) + n\log n \quad , with\ T(1) = 1$

4. Given a positive integer *N*, please write a persudocode to find an array *A* that consists of *N* numbers: 1, 2, … *N*, and satisfies 2 * *A*[*k*] $\neq$ *A*[*i*] +*A*[*j*] , for every possible index *i*,*j*,*k* where 1 $\leq$ *i* < *k* < *j* $\leq$ *N*.

   Please note that the number of valid arrays may be more than one, while you just need to return one valid array.

   For example:

   If *N* == 4, then you should find an array consists of 1,2,3,4.

   A valid array is [2, 1, 4, 3].

   If *N* == 2, then you should find an array consists of 1,2.

   A valid array is [1,2].