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1. 快速排序的伪代码.

```
QuickSort(a, lo, hi)
  if lo < hi
    p = Partition(a, lo, hi)
    QuickSort(a, lo, p-1)
    QuickSort(a, p+1, hi)
```

```
Partition(a, lo, hi)
  pivot = a[hi]
  i = lo
  for j = lo to hi-1
    if a[j] <= pivot
      swap a[i] with a[j]
      i = i+1
  swap a[i] with a[hi]
  return i
```

2. BCD

3. a. 需要 N^2 次复数乘法运算. 每一次复数乘法是 4 次实数乘法和 2 次实数加法. 则共需 $4N^2$ 次实数乘法

b. $T(n) = 2T(\frac{n}{2}) + n$

$$\begin{aligned} \text{则 } T(n) &= 2(2T(\frac{n}{4}) + \frac{n}{2}) + n \\ &= 4T(\frac{n}{4}) + 2n \end{aligned}$$

\vdots

$$T(n) = \log_2 n + n$$