

1. (a) ^① There is a list store all unvisited vertices V_u and another visited list V_v , and count C

② Randomly pick a vertex from V_u ($\mathcal{O}(1)$)

③ Do DFT or BFT, ($\mathcal{O}(1) \cdot m$)

for each passed vertex,
{ remove from unvisited list V_u ($\mathcal{O}(1) \cdot n$)
& add into visited list V_v ($\mathcal{O}(1) \cdot n$)

④ count number $C = C + 1$ ($\mathcal{O}(1)$)

⑤ repeat ②~④ until V_u is empty

(b) * For remove and add vertices we do it n times | $\mathcal{O}(2n)$

* For each connected component, we pass m edges | $\mathcal{O}(m)$

$T(f) = 2n + m + \text{constant}$ ~~✗~~ #

-4

(c) $\mathcal{O}(f) = \mathcal{O}(n+m)$ #