

3)

$$(n - m + 1) \frac{1 - \frac{1}{|S|}^m}{1 - \frac{1}{|S|}} \leq (n - m + 1) \frac{1}{1 - \frac{1}{|S|}} \leq$$

$$\leq (n - m + 1) \frac{1}{1 - \frac{1}{2}} = (n - m + 1) \cdot 2 \in O(n)$$

4)

~~Naive Search~~

~~function~~ ~~for~~ ~~if~~ ~~return~~
 but what diff = true
~~if (n[i] == m[i])~~

~~NaiveSearch()~~

~~index = 0;~~
~~for (i < m.length) {~~
 ~~if (n[i] == m[i]) {~~

~~NaiveSearch()~~

~~index = 0;~~
~~count = 0;~~
~~for (i < m.length) {~~
 ~~if (index != (m.length - 1)) {~~
 ~~if (n[i] == m[index]) {~~
 ~~index += 1;~~
 ~~continue;~~

~~} else {~~

~~index = 0;~~
 ~~continue;~~

~~}~~~~} else {~~ ~~count;~~ ~~count += 1;~~ ~~index = 0;~~

~~i --;~~
 ~~continue;~~

~~}~~ ~~count;~~