

3)

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

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

4)

~~Naive Search {~~
~~for (i = 0; i < n; i++) {~~
~~if (u[i] == m[0]) {~~
~~return true;~~
~~}~~
~~}~~
~~Naive Search () {~~
~~index = 0;~~
~~for (i = 0; i < m.length; i++) {~~
~~if (u[i] == m[index]) {~~
~~return true;~~
~~}~~
~~}~~
~~return false;~~
~~}~~

Naive Search () {

```

index = 0;
count = 0;
for (i = 0; i < m.length; i++) {
    if (index == (m.length - 1)) {
        if (u[i] == m[index]) {
            index += 1;
            continue;
        } else {
            index = 0;
            continue;
        }
    } else {
        if (u[i] == m[index]) {
            count += 1;
            index = 0;
            i--;
            continue;
        }
    }
}
return count;

```