

String Matching

0 1 2 3 4 5 6 7 8 9
a b a c da ba d
↑ ↑ ↑ ↑ ↑
- - - - -

0 1 2 3 4
a b a d
↑ ↑ ↑
- - -

$n = s_1.size()$, $m = s_2.size()$

for($i=0$; $i < n-m$; $i++$) {

 first = i , second = 0 ;

 while (second < m) {

 if ($s_1[first] \neq s_2[second]$) {

 break;

 }

 else {

 first++, second++;

 }

 if (second == m) {

 return first - second;

 }

return -1;

$O(nm)$

$O(1)$

^{0 1 2 3 4 5 6 7 8 9 10}
 a b c a b c a b d a b
 ↑ ↑

return first-sec

9 - 6

val 3

^{0 1 2 3 4 5 6}
 a b c a b d
^{0 0 0 1 2 0}
 ↑
 5


```
vector<int> lps ( needle, size(), 0);
```

```
lps.find ( lps, needle);
```

```
int first = 0, second = 0;
```

```
while ( second < needle.size() &&  
       first < haystack.size())
```

```
{ if (needle[second] == haystack[first])
```

```
{ second++, first++;
```

```
} else {
```

```
if (second == 0) {
```

```
first++;
```

```
} else {
```

```
second = lps[second-1]
```

```
} }
```

```
if (second == needle.size())
```

```
    return first - second
```

```
return -1
```


