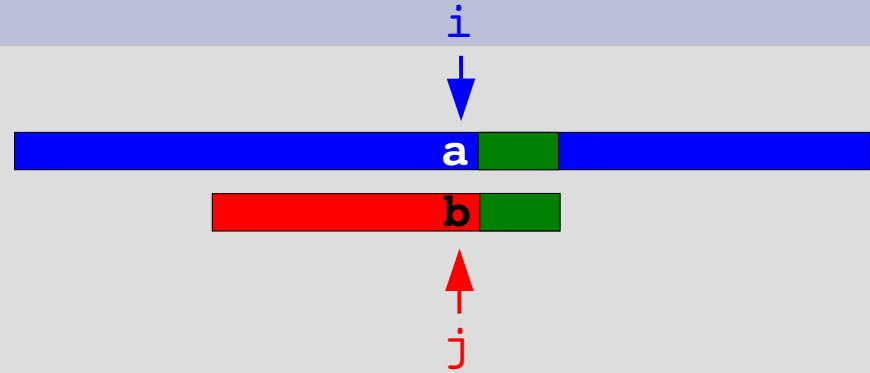
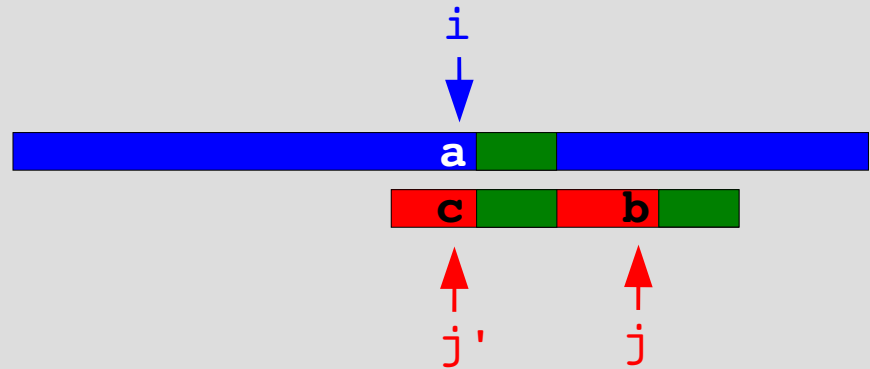


Calculating the “suffix” skip-table

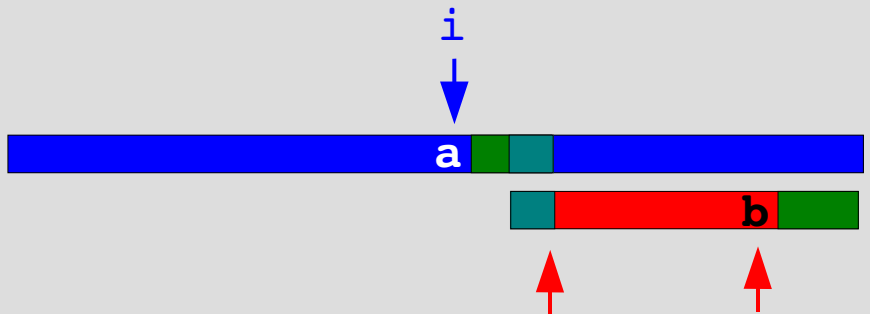
If we have a mismatch at $p[j]:x[i]$:



then either there is rightmost $j' < j$, where $p[j'] \neq p[j]$ and $p[j'..h] = p[j..|p|]$



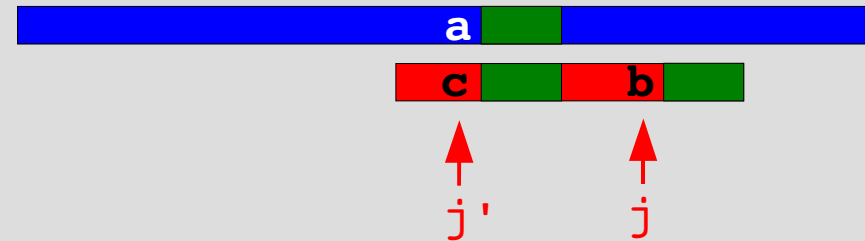
or rightmost $j' < |p|$ where $p[1..j']$ is a prefix of $p[j..|p|]$:



Two Cases:

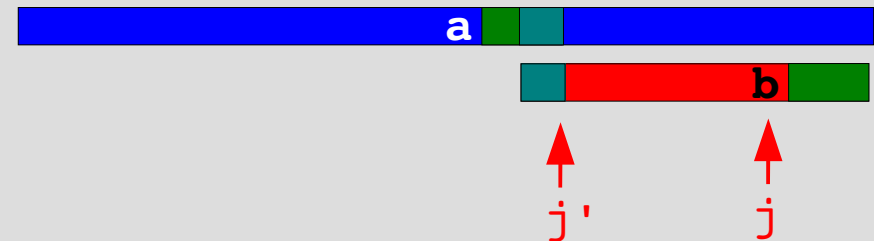
Case I:

Define $S_1[j] = j'$ from
if it exists, and $S_1[j] = 0$ otherwise



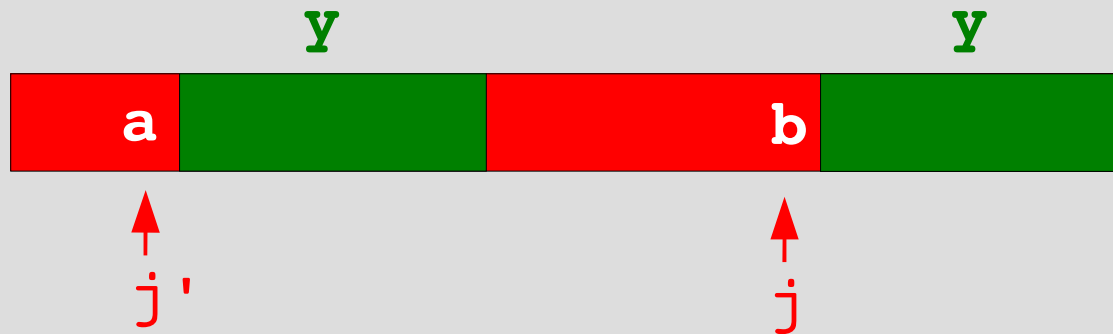
Case II:

Define $S_2[j] = j'$
if it exists, or $S_2[j] = 0$ otherwise



Case I

For each j , j' is the rightmost index where y is a border of $p[j'+1..m]$ ($m=|p|$) and $p[j']y$ is not a border of $p[j'..m]$.

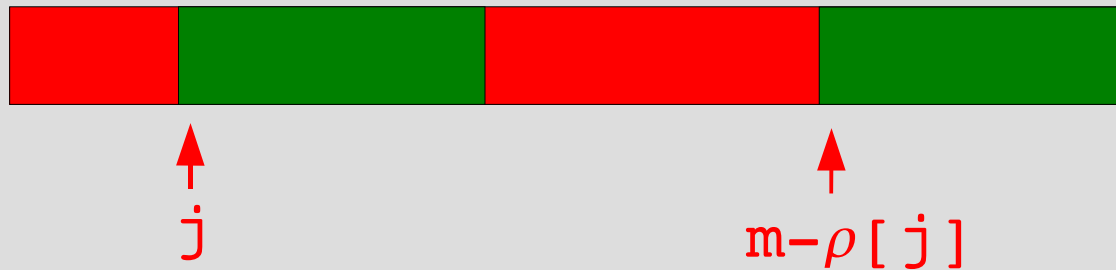


Case I

Let ρ be the “reverse” border array, i.e.:

$\rho[j]$ is the length of the longest border of $p[j..m]$

(ρ can be calculated similarly to the border array).



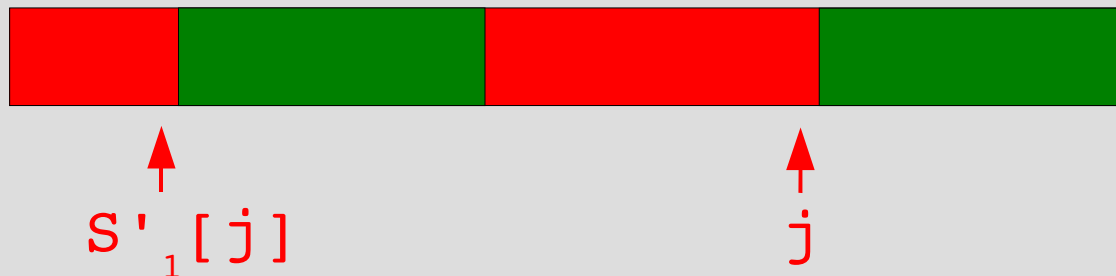
Case I

If we calculate S'_1 by:

for $i=1..m$:

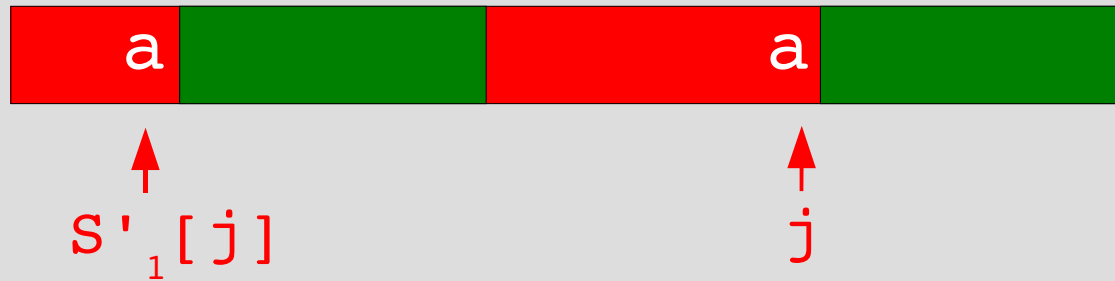
$$S'_1[m-\rho[i]-1] = i-1$$

then $S'_1[j]$ is the rightmost index j' such that $p[j'+1..j'+m-\rho[j]+1]$ is a border of $p[j'+1..m]$.



Case I

Array S'_1 is almost, but not quite, what we need...

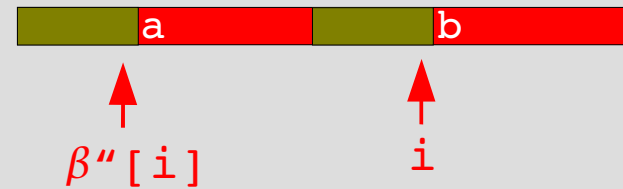


To get S_1 we must make sure that $p[j'] \neq p[j]$

Case I

We can build an array β'' similarly to β , but where:

$\beta''[i]$ is the length of the longest border of $p[1..i]$ such that $p[\beta''[i]+1] \neq p[i]$

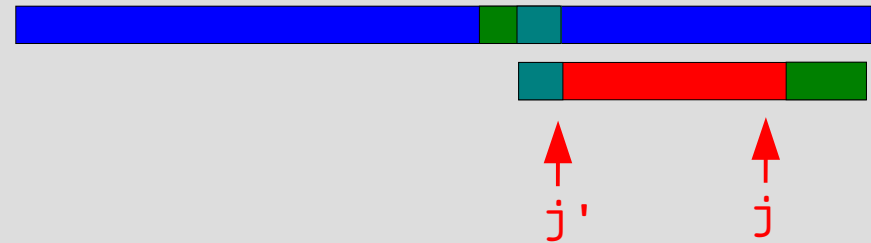


(See exercise 7.1.9)

Using the corresponding ρ'' instead of ρ
we can build the correct S_1 array

Case II

For each j , the corresponding j' is the length of the longest border of \mathbf{p} shorter than $|\mathbf{p}|-j$.



Given the border array β , the borders of \mathbf{p} are (in decreasing length):

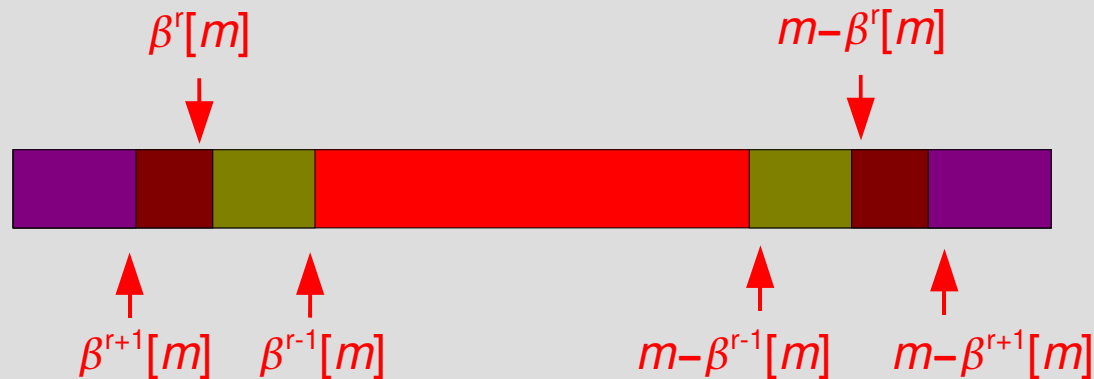
$$\beta[m], \beta^1[m], \beta^2[m], \dots, \beta^k[m]=0$$

for $m=|\mathbf{p}|$ and some k .

Given the border array, this sequence of borders of \mathbf{p} can easily be calculated in linear time.

Case II

Consider a border, $\beta^r[m]$, of p .



In the interval $m - \beta^{r-1}[m] + 1 .. m - m - \beta^r[m]$, $\beta^r[m]$ is the longest border with length less than $m - j$. The next border, $m - \beta^{r-1}[m]$ is too long.

Below $m - \beta^{r-1}[m]$, $\beta^{r-1}[m]$ is a longer border less than $m - j$.
Above $m - \beta^r[m]$, $\beta^r[m]$ is longer than $m - j$.

Building Case II

```
j = 1 ; r = 0
while j <= m:
    while j <= m -  $\beta^r[m]$ :
         $\mathbf{S}_2[j] = \beta^r[m]$ 
        j += 1
    r += 1
```