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String Matching

Major Slides Content: Anany Levitin

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Brute – Force String Matching

String Matching - Terms

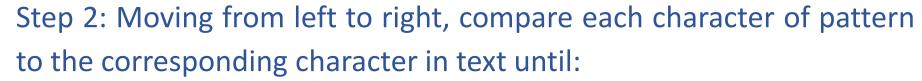
- pattern:
 - a string of m characters to search for
- text:
- a (longer) string of n characters to search in
- problem:

find a substring in the text that matches the pattern



String Matching Idea

Step 1: Align pattern at beginning of text



- all characters are found to match (successful search); or
- a mismatch is detected

Step 3: While pattern is not found and the text is not yet exhausted, realign pattern one position to the right and repeat Step 2

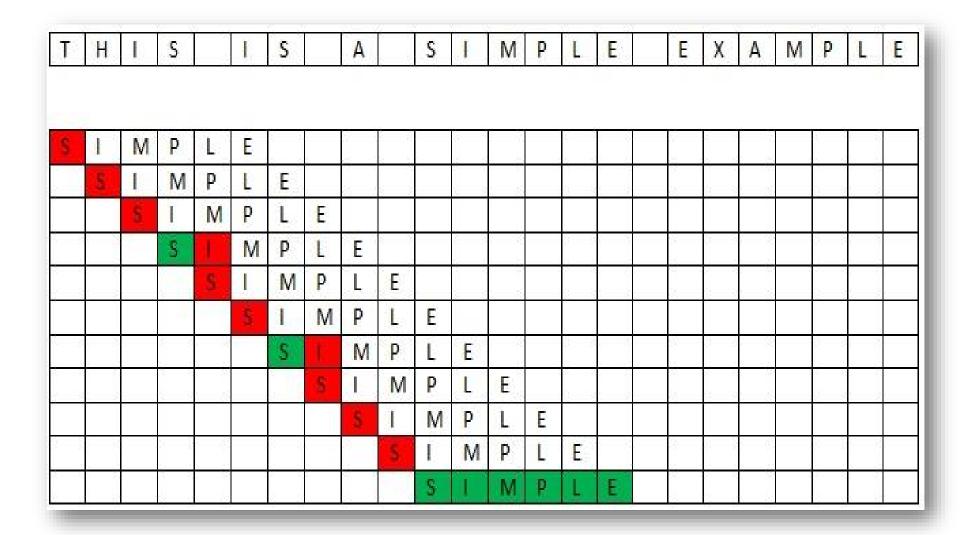


String Matching

```
ALGORITHM BruteForceStringMatch(T[0 .. n -1], P[0 .. m -1])
//Implements brute-force string matching
//Input: An array T[0 .. n - 1] of n characters representing a text
// and an array P[0 .. m - 1] of m characters representing a pattern
//Output: The index of the first character in the text that starts a
//matching substring or -1 if the search is unsuccessful
for i \leftarrow 0 to n-m do
 i \leftarrow 0
  while j < m and P[j] = T[i + j] do
       j ←j+1
  if j = m return i
return -1
```



String Matching Example





String Matching Analysis

Worst Case:

- The algorithm might have to make all the 'm' comparisons for each of the (n-m+1) tries
- Therefore, the algorithm makes m(n-m+1) comparisons
- Brute Force String Matching is a O(nm) algorithm





THANK YOU

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