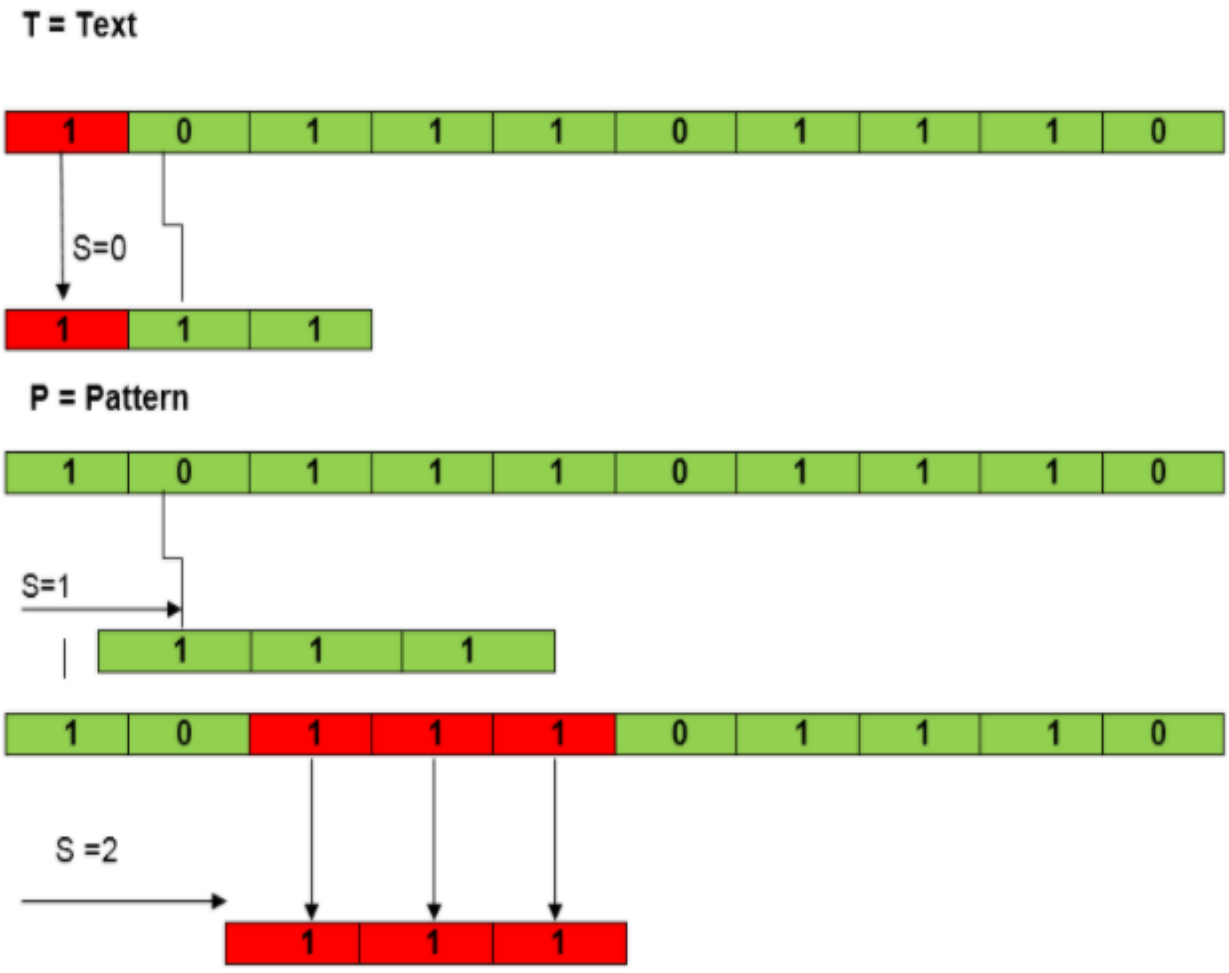
String-Matching Algorithm

Naïve String-Matching Algorithm

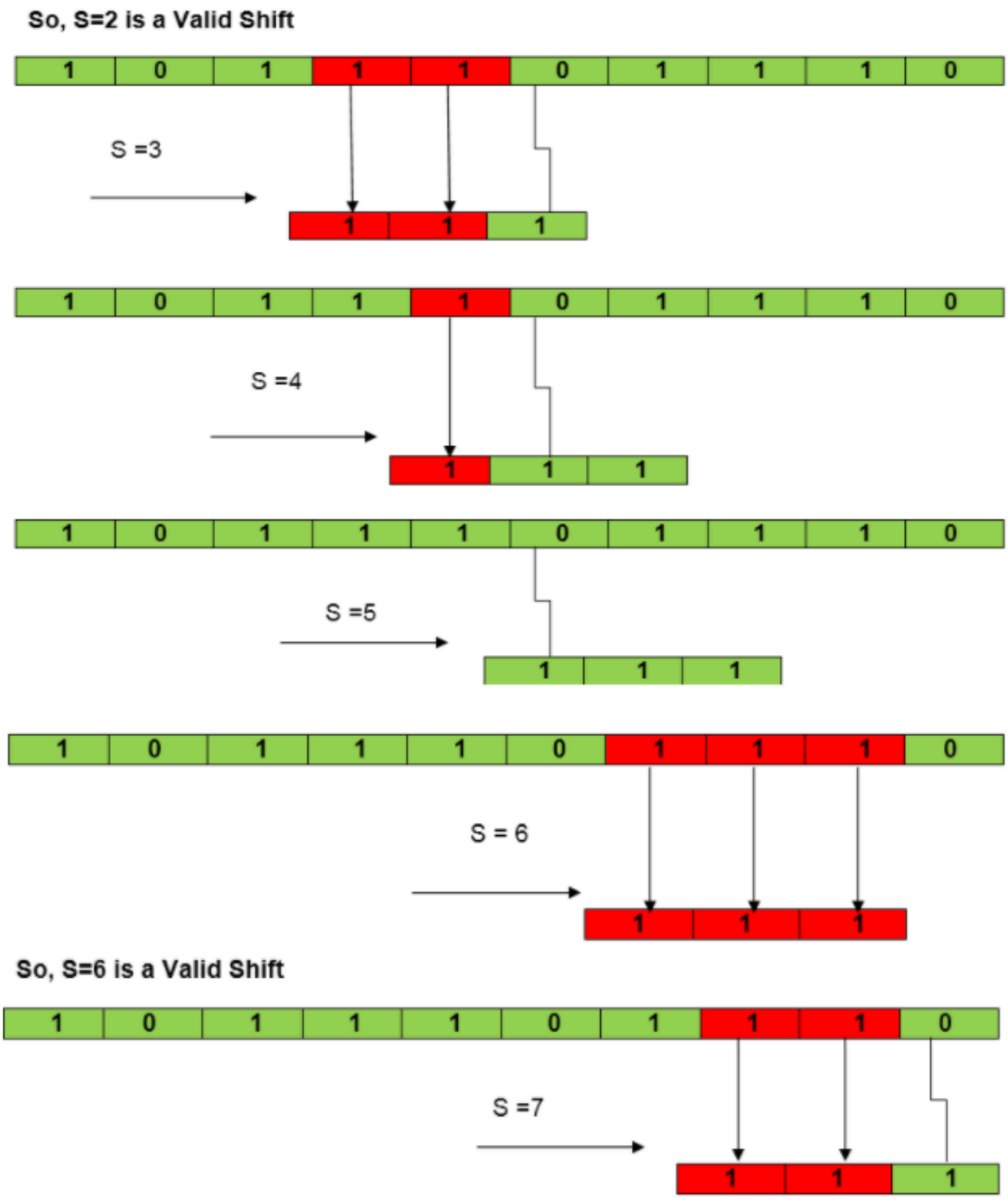
- Naïve pattern searching is the simplest method among other pattern searching algorithms. It checks for all character of the main string to the pattern.
- This algorithm is helpful for smaller texts.
- It does not need any pre-processing phases.
- The naïve approach tests all the possible placement of Pattern P [1.....m] relative to text T [1.....n]. We try shift s = 0, 1.....n-m, successively and for each shift s. Compare T [s+1.....s+m] to P [1.....m].

Example:

Suppose T = 1011101110
P = 111



String-Matching Algorithm



Algorithm:

NAIVE-STRING-MATCHER (T, P)

1. n ← length [T]
2. m ← length [P]
3. for s ← 0 to n -m

4. do if P [1.....m] = T [s + 1....s + m]
5. then print "Pattern occurs with shift" s

Rabin-Karp Algorithm

The Rabin-Karp string matching algorithm calculates a hash value for the pattern, as well as for each M-character subsequence of text to be compared. If the hash values are unequal, the algorithm will determine the hash value for next M-character sequence. If the hash values are equal, the algorithm will analyse the pattern and the M-character sequence. In this way, there is only one comparison per text subsequence, and character matching is only required when the hash values match.

Example:

T = 31415926535.....

P = 26

Here T. Length =11 so Q = 11

And P mod Q = 26 mod 11 = 4

Now find the exact match of P mod Q...

String-Matching Algorithm

15 mod 11 = 4 equal to 4 SPURIOUS HIT

59 mod 11 = 4 equal to 4 SPURIOUS HIT

92 mod 11 = 4 equal to 4 SPURIOUS HIT

26 mod 11 = 4 EXACT MATCH

65 mod 11 = 10 not equal to 4

53 mod 11 = 9 not equal to 4

35 mod 11 = 2 not equal to 4

The Pattern occurs with shift 6.