

AOA Assignment 4

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Aim: Write a program to perform String Matching using Knutt Morris Pratt Algorithm

Problem statement: Write a program to implement Knutt Morris Prat string matching algorithm and display the valid shifts. Also display the prefix array.

Input:

Text= "ABABAABAABCAABAABCCABC"
Pattern: "AABAABC"

Code:

```
def KMPSearch(pat, txt):
    M, N, j, k, c = len(pat), len(txt), 0, 0, 0
    lps = [0]*M
    KMP_prefix(pat, M, lps)
    i = 0 # index for txt[]
    while i < N:
        if pat[j] == txt[i]:
            i += 1
            j += 1
        if j == M:
            print ("\nPattern found at index " + str(i-j))
            c+=1
            j = lps[j-1]
        elif i < N and pat[j] != txt[i]:
            if j != 0:
                j = lps[j-1]
            else:
                i += 1
        print("\nValid shifts: ",c)
def KMP_prefix(pat, M, lps):
    i, len = 1, 0
    lps[0]
    while i < M:
        if pat[i] == pat[len]:
            len += 1
            lps[i] = len
            i += 1
        else:
            if len != 0:
                len = lps[len-1]
            else:
```

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```
        lps[i] = 0
        i += 1
    print("\nPrefix array")
    print(*lps, sep=' ')
if __name__ == '__main__':
    txt = input("\nEnter text: ")
    pat = input("Enter pattern: ")
    KMPSearch(pat, txt)
```

Output:

```
Enter pattern: AABAABC

Prefix array
0  1  0  1  2  3  0

Pattern found at index 4

Pattern found at index 11

Valid shifts:  2
```