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Subject	Design and Analysis of Algorithms (DAA)
Experiment No.	10
Aim	To implement string matching using Knuth-Morris-Pratt algorithm.
Code:	

```c
#include <stdio.h>
#include <string.h>

void computeLPSArray(char *pat, int M, int *lps) {
    int len = 0;
    lps[0] = 0;

    int i = 1;
    while (i < M) {
        if (pat[i] == pat[len]) {
            len++;
            lps[i] = len;
            i++;
        } else {
            if (len != 0) {
                len = lps[len - 1];
            } else {
                lps[i] = 0;
                i++;
            }
        }
    }
}

void KMPSearch(char *pat, char *txt) {
    int M = strlen(pat);
    int N = strlen(txt);
```

```
    int lps[M];
    computeLPSArray(pat, M, lps);

    int i = 0;  // index for txt[]
    int j = 0;  // index for pat[]
    while (i < N) {
        if (pat[j] == txt[i]) {
            j++;
            i++;
        }

        if (j == M) {
            printf("Pattern found at index %d\n", i - j);
            j = lps[j - 1];
        } else if (i < N && pat[j] != txt[i]) {
            if (j != 0)
                j = lps[j - 1];
            else
                i = i + 1;
        }
    }
}

int main() {
    char txt[100], pat[100];

    printf("Enter the text: ");
    fgets(txt, sizeof(txt), stdin);
    txt[strcspn(txt, "\n")] = '\0';  // Remove newline
character

    printf("Enter the pattern to search: ");
    fgets(pat, sizeof(pat), stdin);
    pat[strcspn(pat, "\n")] = '\0';  // Remove newline
character

    printf("Text: %s\n", txt);
```

```
    printf("Pattern: %s\n", pat);
    KMPSearch(pat, txt);
    return 0;
}
```

Output

```
PS D:\Manish\SPIT> cd 'd:\Manish\SPIT\4th SEM\DAA\Exp10\output'
PS D:\Manish\SPIT\4th SEM\DAA\Exp10\output> & .\'stringmatching.exe'
Enter the text: AABAACAADAABAABA
Enter the pattern to search: AABA
Text: AABAACAADAABAABA
Pattern: AABA
Pattern found at index 0
Pattern found at index 9
Pattern found at index 12
PS D:\Manish\SPIT\4th SEM\DAA\Exp10\output>
```

Conclusion

Hence, by completing this experiment I came to know about implementation of string matching using Knuth-Morris-Pratt algorithm.