



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment 10

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Subject Name: DAA Lab

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1. Aim/Overview of the practical:

Code and Analyze to find all occurrences of a pattern P in a given string S.

2. Task to be done/which logistics used:

In this problem we will solve the pattern problem using rabin-karp algorithm .

3. Algorithm/Flowchart:

$n = t.length$ $m =$

$p.length$ $h =$

$dm-1 \bmod q$

$p = 0$ $t0 = 0$ for $i = 1$

to m $p = (dp + p[i])$

$\bmod q$ $t0 = (dt0 +$

$t[i]) \bmod q$ for $s = 0$

to $n - m$ if $p = ts$

if $p[1.....m] = t[s + 1s + m]$

print "pattern found at position" s If

$s < n-m$

$ts + 1 = (d (ts - t[s + 1]h) + t[s + m + 1]) \bmod q$

4. Steps for experiment/practical/Code:

```
#include <bits/stdc++.h> using
namespace std;
#define d 10
void rabinKarp(char pattern[], char text[], int
q)
{
    int m =
    strlen(pattern);    int
    n = strlen(text);    int
    i, j;    int p = 0;    int
    t = 0;    int h = 1;
    for (i = 0; i < m - 1;
i++)
        h = (h * d) % q;
    for (i = 0; i <
m; i++)
    {
        p = (d * p +
pattern[i]) % q;        t = (d *
t + text[i]) % q;
    }    for (i = 0; i <= n -
m; i++)
    {
        if
(p == t)    {
            for (j = 0; j < m; j++)
            {
                if (text[i +
j] != pattern[j])
break;
            }    if
(j == m)
                cout << "Pattern is found at position: " << i + 1 << endl;
            if (i < n - m)    {
                t =
(d * (t - text[i] * h) + text[i + m]) % q;
                if (t < 0)
                    t = (t + q);
            }
        }
    }
}
```

```
int main() {    char text[] =  
"ABCCADDAEFGCDD";    char  
pattern[] = "CDD";    int q =  
13;    rabinKarp(pattern, text,  
q);    return 0;  
}
```

5. Observations/Discussions/ Complexity Analysis:

```
PS D:\CB DSA> cd "d:\CB DSA\DAA\" ; if ($?) { g++ rabin_karp.cpp -o rabin_karp } ; if ($?) { .\rabin_karp }  
Pattern is found at position: 12  
PS D:\CB DSA\DAA>
```