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SUBJECT	Design and Analysis of Algorithms
EXPERIMENT NO:	10
AIM:	To implement Naive and Rabin Carp string matching algorithms
Algorithm:	**Naive string matching Algorithm** 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 string matching Algorithm** 1. n ← length [T] 2. m ← length [P] 3. h ← d^{m-1} mod q 4. p ← 0 5. t_0 ← 0 6. for i ← 1 to m

	7. do p ← (dp + P[i]) mod q 8. t_0 ← (dt_0+T [i]) mod q 9. for s ← 0 to n-m 10. do if p = t_s 11. then if P [1.....m] = T [s+1.....s + m] 12. then "Pattern occurs with shift" s 13. If s < n-m 14. then t_{s+1} ← (d (t_s-T [s+1]h)+T [s+m+1])mod q

Code	**Naive string matching algorithm**
	
	Source Code
	
	#include <iostream>
	#include <string>
	
	using namespace std;
	
	void naiveSearch(string pattern, string text)
	{
	int patternLength = pattern.length();
	int textLength = text.length();
	int i, j;
	
	for (i = 0; i <= textLength - patternLength; i++) {
	for (j = 0; j < patternLength; j++) {
	if (text[i + j] != pattern[j])
	break;
	}
	if (j == patternLength)
	cout << "\nPattern found at index " << i << endl;

```
        }
}

int main()
{
        string text;
        string pattern;

  cout<<"\nEnter the string :";
  getline(cin, text);

  cout<<"\nEnter the pattern you want to search :";
  getline(cin, pattern);
        naiveSearch(pattern, text);
        cout<<endl;
        return 0;
}
```

Output 1:

```
students@students-HP-280-G3-SFF-Business-PC:~/Desktop/daa$ g++ naiveString.cpp
students@students-HP-280-G3-SFF-Business-PC:~/Desktop/daa$ ./a.out

Enter the string :My name is Shubham

Enter the pattern you want to search :Shubham

Pattern found at index 11

students@students-HP-280-G3-SFF-Business-PC:~/Desktop/daa$
```

Code Part 2:

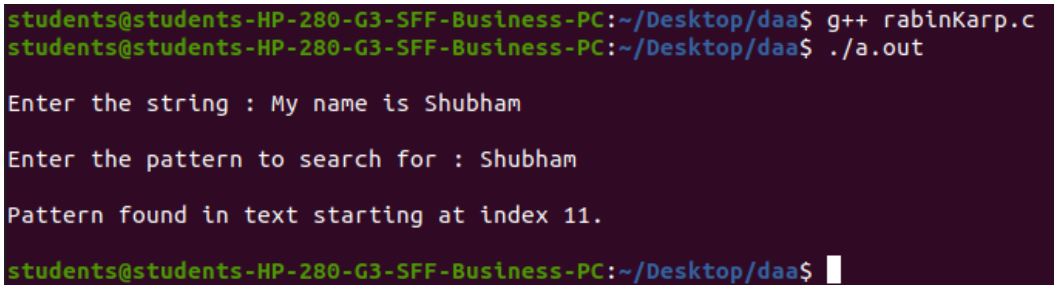
Rabin Karp Algorithm

Source Code

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

#define d 256
#define q 101

int rabin_karp(char* text, char* pattern) {
```

```
int text_length = strlen(text);
int pattern_length = strlen(pattern);
int i, j;
int pattern_hash = 0;
int text_hash = 0;
int h = 1;


for (i = 0; i < pattern_length - 1; i++) {
h = (h * d) % q;
}


for (i = 0; i < pattern_length; i++) {
pattern_hash = (d * pattern_hash + pattern[i]) % q;
text_hash = (d * text_hash + text[i]) % q;
}


for (i = 0; i <= text_length - pattern_length; i++) {

if (text_hash == pattern_hash) {

for (j = 0; j < pattern_length; j++) {
        if (text[i+j] != pattern[j]) {
        break;
        }
}


if (j == pattern_length) {
        return i;
}
}


if (i < text_length - pattern_length) {
text_hash = (d * (text_hash - text[i] * h) +
text[i+pattern_length]) % q;
```

```
        if (text_hash < 0) {
                text_hash += q;
        }
        }
        }


        return -1;
}

int main() {
        char text[1000], pattern[1000];


        printf("\nEnter the string : ");
        fgets(text, 1000, stdin);

        printf("\nEnter the pattern to search for : ");
        fgets(pattern, 1000, stdin);


        text[strcspn(text, "\n")] = 0;

        pattern[strcspn(pattern, "\n")] = 0;


        int result = rabin_karp(text, pattern);

        if (result == -1) {
        printf("\nPattern not found in text.\n");
        } else {
        printf("\nPattern found in text starting at index %d.\n\n",
result);
        }


        return 0;
```

	}
Output 2:	
Conclusion:	Thus we have implemented Naive and Rabin Karp String matching algorithms