

CSE246

Section 4

Fall 2023

### Lab Task - 03

**Topic:** Basic Prime Checking

Finding the Pattern's occurrences

Calculate Prefix Function of a String

Submitted By

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## Problem 1

### Solution:

```
#include<bits/stdc++.h>

using namespace std;

const long long N = 1e9+5;

int main()
{
    int t;
    cin>>t;
    while(t--)
    {
        int n;
        cin>>n;
        if(n==1)
        {
            cout<<"NOT PRIME\n";
            continue;
        }
        int flag = 1;
        for(int i = 2; i*i<=n; i++)
        {
            if(n%i==0)
            {
                flag=0;
                break;
            }
        }
        if(flag==1 || n==2)cout<< "PRIME" <<endl;
        else cout<< "NOT PRIME" <<endl;
```

```
}  
    return 0;  
}
```

### OUTPUT:

```
3  
2  
PRIME  
3  
PRIME  
12  
NOT PRIME  
  
Process returned 0 (0x0)   execution time : 3.351 s  
Press any key to continue.
```

### Problem 2

#### Solution:

```
#include<bits/stdc++.h>  
  
using namespace std;  
  
#define d 26  
  
#define q 101
```

```
void search( string pattern, string text) {  
    int M = pattern.length();  
    int N = text.length();  
    int p = 0;  
    int t = 0;  
    int h = 1;
```

```

for (int i = 0; i < M - 1; i++)
    h = (h * d) ;

for (int i = 0; i < M; i++) {
    p = (d * p + pattern[i]) %q;
    t = (d * t + text[i]) %q ;
}

for (int i = 0; i <= N - M; i++) {

    if (p == t) {
        int j;

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

        if (j == M) {
            cout << i << " " << i + M - 1 << endl;
        }
    }

    if (i < N - M) {
        t = (d * (t - text[i] * h) + text[i + M]) % q;
        if (t < 0)
            t = t + q;
    }
}
}

```

```

int main()
{
    string T, P;
    cin >> T >> P;
    search(P, T);
    return 0;
}

```

### OUTPUT

```

AABABABCABABABABBABAB
ABAB
1 4
3 6
8 11
10 13
12 15
17 20

Process returned 0 (0x0)   execution time : 15.868 s
Press any key to continue.

```

### Problem 3

#### Solution:

```

#include<bits/stdc++.h>
using namespace std;

vector<int> prefix_pattern(string P)
{
    int n = P.length();

```

```

vector<int> pi(n);
for (int i=1; i<n; i++)
{
    int j = pi[i-1];
    while (j>0 && P[i]!=P[j])
    {
        j= pi[j-1];
    }
    if (P[i]==P[j])
    {
        j++;
    }
    pi[i]=j;
}
return pi;
}

int main()
{
    string P;
    getline(cin, P);
    vector<int> pi = prefix_pattern(P);

    for (int i = 0; i < pi.size(); i++)
    {
        cout << pi[i] << " ";
    }
    return 0;
}

```

# OUTPUT:

```
ABABABABABABABABCA
0 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 0 1
Process returned 0 (0x0)   execution time : 9.676 s
Press any key to continue.
```