

ADVANCED ALGORITHMS

AIM: To perform string matching using brute force approach and Horspool's algorithm.

ROLL NO: CE056

LAB NO: 01

❖ BRUTEFORCE APPROACH:

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

void find_matching_pattern_index(string text,string pattern)
{
    int text_length = text.length(),pattern_length =
pattern.length();

    cout << "Pattern string matches the text string at
indices: ";

    for(int i=0;i <= text_length-pattern_length;i++)//Looping
for every index
    {
```

```

        int j=0,k=0;

        while(k <= pattern_length-1 && text[i+j] ==
pattern[k])    //Checking every alphabet of pattern string
        {

            j++;

            k++;

        }

        if(k == pattern_length) //Checking whether every
character of pattern string is matched
        {

            cout << i << "\t";    //Printing indices of
matching string

        }

    }

    cout << endl;
}

```

```

int main()
{

    string text,pattern;

    cout << "Please enter text string:";

    getline(cin,text);    //Scanning a line of input text
pattern

```

```

        cout << "Please enter pattern string:";

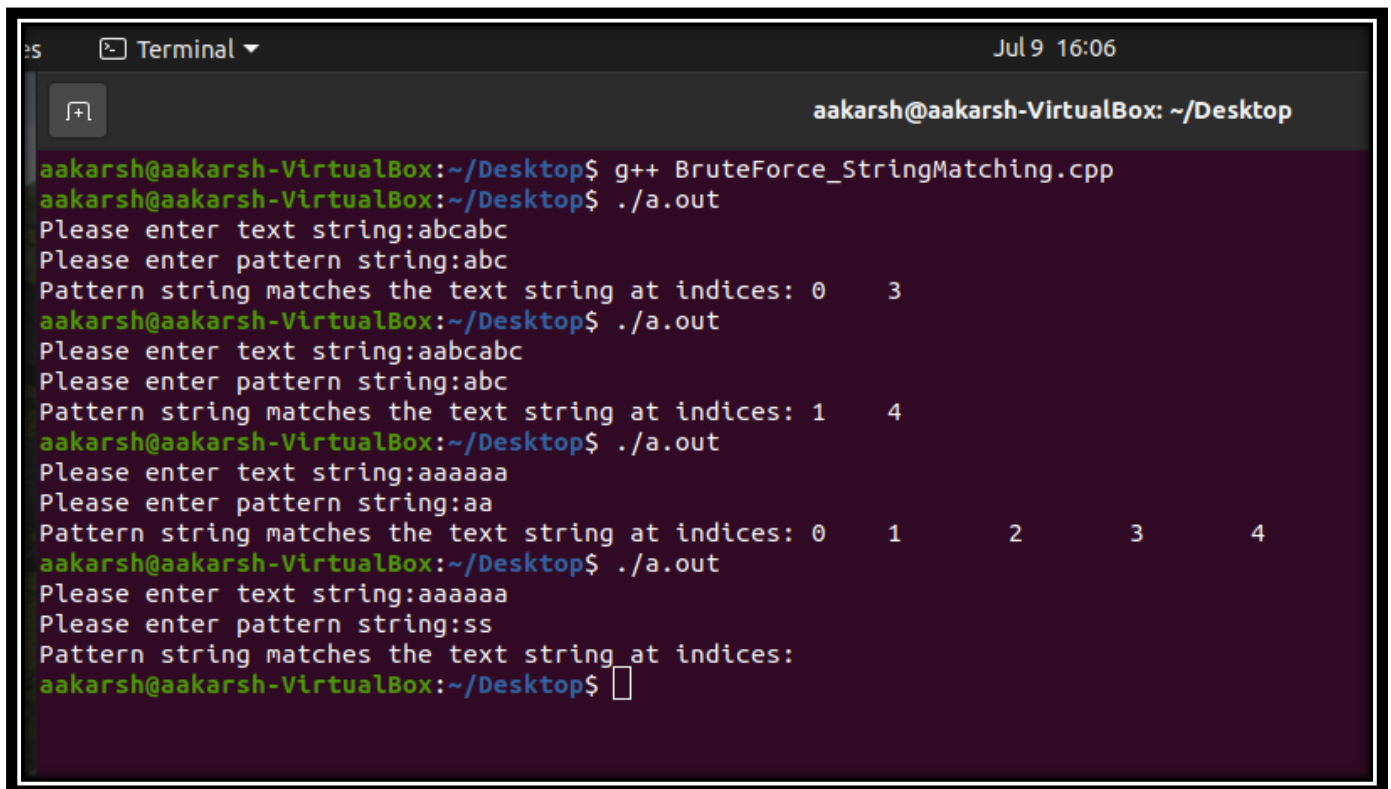
        getline(cin,pattern);    //Scanning a line of pattern
input
        find_matching_pattern_index(text,pattern); //function
to find matching pattern

        return 0;

}

```

➤ INPUT-OUTPUT:



The screenshot shows a terminal window titled "Terminal" with the date and time "Jul 9 16:06". The user is logged in as "aakarsh" on a system named "aakarsh-VirtualBox" at the directory "~/Desktop". The terminal displays the following sequence of commands and outputs:

```

aakarsh@aakarsh-VirtualBox:~/Desktop$ g++ BruteForce_StringMatching.cpp
aakarsh@aakarsh-VirtualBox:~/Desktop$ ./a.out
Please enter text string:abcabc
Please enter pattern string:abc
Pattern string matches the text string at indices: 0      3
aakarsh@aakarsh-VirtualBox:~/Desktop$ ./a.out
Please enter text string:aabcabc
Please enter pattern string:abc
Pattern string matches the text string at indices: 1      4
aakarsh@aakarsh-VirtualBox:~/Desktop$ ./a.out
Please enter text string:aaaaaa
Please enter pattern string:aa
Pattern string matches the text string at indices: 0      1      2      3      4
aakarsh@aakarsh-VirtualBox:~/Desktop$ ./a.out
Please enter text string:aaaaaa
Please enter pattern string:ss
Pattern string matches the text string at indices:
aakarsh@aakarsh-VirtualBox:~/Desktop$ 

```

❖ HORSPPOOL'S ALGORITHM:

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

using namespace std;

void Horspool_Alg(string text,string pattern)
{
    int
text_length=text.length(),pattern_length=pattern.length();
    map<char,int> shift;
    for(int i=97;i<123;i++)    //Initializing ascii characters
from a-z

        shift.insert(pair<char,int>(i,pattern_length));
    shift.insert(pair<char,int>(' ',pattern_length));
    //Adding space
    for(int i=0;i<pattern_length-1;i++)
        shift[pattern[i]]=pattern_length-i-1;
    int j=0;
    while ((j+pattern_length)<=text_length)
    //checking string matching
    {
        if (pattern[pattern_length-1]==t[j+pattern_length-1])
        //Checking last character
```

```

        {
            int i=pattern_length-2;
            while (i>=0 && pattern[i]==text[j+i])    //Checking
whole pattern
                i--;
            if(i== -1)        //pattern matched
                cout << j << "\t";
        }
        j+=shift[text[j+pattern_length-1]];
    }
    cout << endl;
}

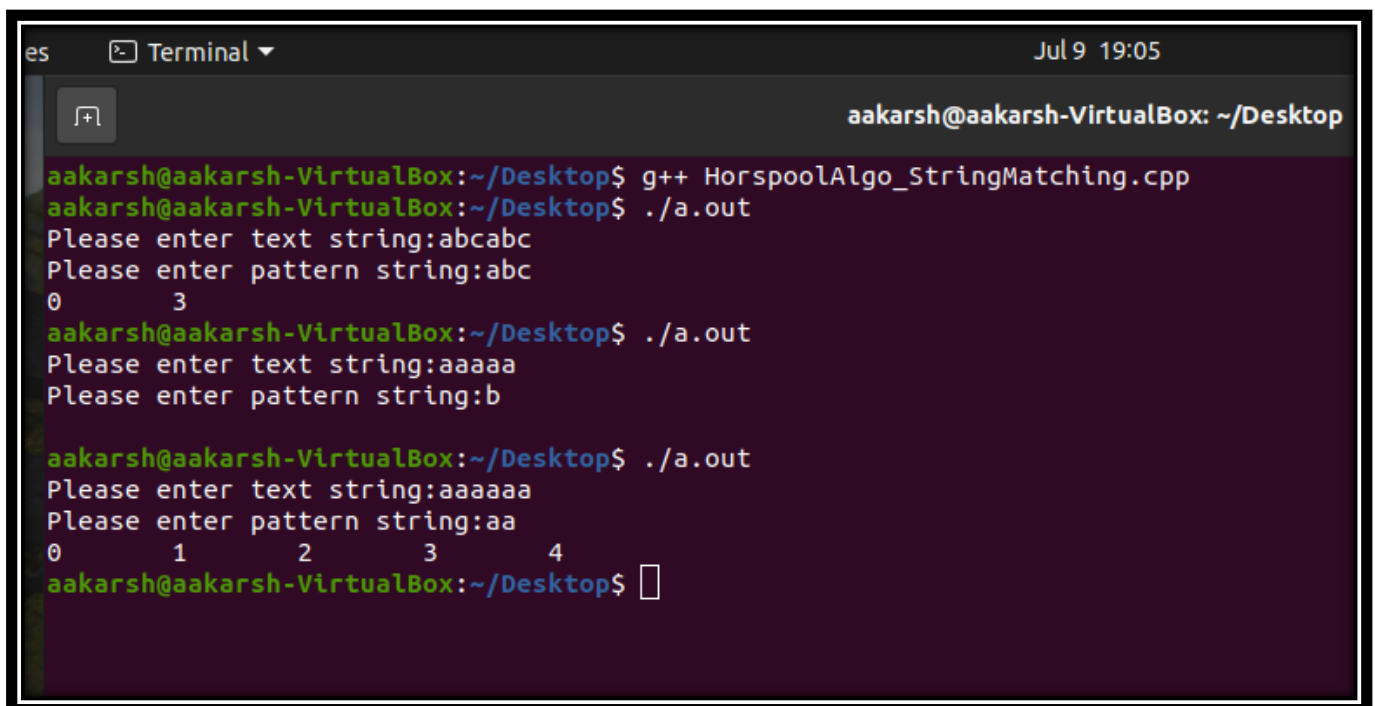
int main()
{
    string text,pattern;

    cout << "Please enter text string:";
    getline(cin,text);    //Scanning a line of input text
pattern
    cout << "Please enter pattern string:";
    getline(cin,pattern);    //Scanning a line of
pattern input

```

```
Horspool_Alg(text,pattern); //function to find  
matching pattern  
  
return 0;  
  
}
```

➤ INPUT-OUTPUT:



```
es Terminal Jul 9 19:05  
aakarsh@aakarsh-VirtualBox: ~/Desktop  
aakarsh@aakarsh-VirtualBox:~/Desktop$ g++ HorspoolAlgo_StringMatching.cpp  
aakarsh@aakarsh-VirtualBox:~/Desktop$ ./a.out  
Please enter text string:abcabc  
Please enter pattern string:abc  
0      3  
aakarsh@aakarsh-VirtualBox:~/Desktop$ ./a.out  
Please enter text string:aaaaa  
Please enter pattern string:b  
  
aakarsh@aakarsh-VirtualBox:~/Desktop$ ./a.out  
Please enter text string:aaaaaa  
Please enter pattern string:aa  
0      1      2      3      4  
aakarsh@aakarsh-VirtualBox:~/Desktop$
```