Final Year B. Tech., Sem VII 2022-23

Cryptography And Network Security

PRN: 2020BTECS00206

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Batch: B4

Assignment No. 6

1. **Aim:**
   Given the plain text, encrypt it using Railfence Encryption Algorithm.

2. **Theory:**
   Rail fence Cipher Encryption Algorithm:
   - In the rail fence cipher, the plain-text is written downwards and diagonally on successive rails of an imaginary fence.
   - When we reach the bottom rail, we traverse upwards moving diagonally, after reaching the top rail, the direction is changed again. Thus, the alphabets of the message are written in a zig-zag manner.
   - After each alphabet has been written, the individual rows are combined to obtain the cipher-text.

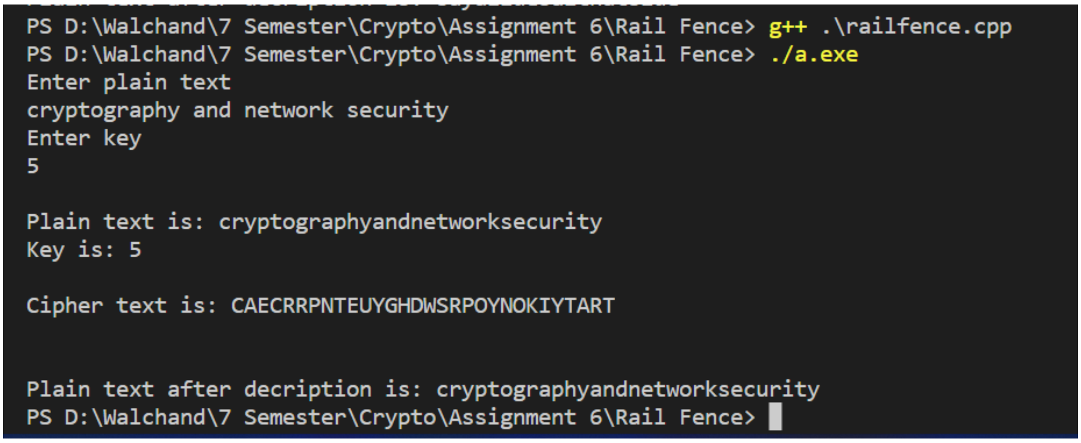
3. **Code:**

```
#include<bits/stdc++.h>
using namespace std;
int main()
{
      string s;
   cout << "Enter plain text" << endl;
   getline(cin, s);
   string x;
   for (int i = 0; i < s.length(); i++)
   if (s[i] != ' ')
   x += s[i];
   s = x;
   int k;
   cout << "Enter key" << endl;
   cin >> k;
   cout << "\nPlain text is: " << s << endl;
   cout << "Key is: " << k << endl;
```

```
int n = s.length();
vector<vector<char>> mat(k);
int row = 0;
int flg = 1;
for (int i = 0; i < s.length(); i++)
{
mat[row].push_back(s[i]);
row += flg;
if (row == (k - 1))
{
flg = -1;
}
if (row == 0)
flg = 1;
}
string cip = "";
for (int i = 0; i < k; i++)
{
for (int j = 0; j < mat[i].size(); j++)
cip += mat[i][j];
}
s = cip;
transform(cip.begin(), cip.end(), cip.begin(), ::toupper);
cout << "\nCipher text is: " << cip;
int tp = 1;
vector<vector<int>> matd(k);
row = 0;
flg = 1;
for (int i = 1; i <= n; i++)
{
matd[row].push_back(i);
row += flg;
if (row == (k - 1))
{
flg = -1;
}
if (row == 0)
flg = 1;
}
vector<int> dd;
for (int i = 0; i < k; i++)
{
for (int j = 0; j < mat[i].size(); j++)
dd.push_back(matd[i][j]);
```

```
    }
    cout << endl;
    map<int, char> m;
    for (int i = 0; i < n; i++)
    m[dd[i]] = s[i];
    string plain = "";
    for (int i = 1; i <= n; i++)
    plain += m[i];
    cout << "\n\nPlain text after decription is: " << plain;
}
```

4. Output:



```
PS D:\Walchand\7 Semester\Crypto\Assignment 6\Rail Fence> g++ .\railfence.cpp
PS D:\Walchand\7 Semester\Crypto\Assignment 6\Rail Fence> ./a.exe
Enter plain text
cryptography and network security
Enter key
5

Plain text is: cryptographyandnetworksecurity
Key is: 5

Cipher text is: CAECRRPNTEUYGHDWSRPOYNOKIYTART


Plain text after decription is: cryptographyandnetworksecurity
PS D:\Walchand\7 Semester\Crypto\Assignment 6\Rail Fence> █
```

5. Conclusion:

Successfully encrypted plain text using rail fence cipher.