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## **Assignment No 4**

### **Study and implementation of Vigenere Cipher Technique**

**Code:**

```
#include<bits/stdc++.h>
using namespace std;
string generateKey(string str, string key)
{
    int x = str.size();
    for (int i = 0; ; i++)
    {
        if (x == i)
            i = 0;
        if (key.size() == str.size())
            break;
        key.push_back(key[i]);
    }
    return key;
}
string encrypt(string str, string key)
{
    string cipher_text;
    for (int i = 0; i < str.size(); i++)
    {
        char x = (str[i] + key[i]) % 26;
        x += 'A';
        cipher_text.push_back(x);
    }
    return cipher_text;
}
string decrypt(string cipher_text, string key)
{
    string text;
    for (int i = 0 ; i < cipher_text.size(); i++)
    {
        char x = (cipher_text[i] - key[i] + 26) % 26;
        x += 'A';
        text.push_back(x);
    }
    return text;
}
```

```

int main()
{
    string str = "GOODMORNINGALL";
    string keyword = "MONARCHY";

    string key = generateKey(str, keyword);
    string cipher_text = encrypt(str, key);

    cout << "\n(Encrypted)Cipher Text: " << cipher_text << "\n";
    cout << "\n(Decrypted)Plain Text: " << decrypt(cipher_text, key);

    return 0;
}

```

### Output:

```

71 + 77 = 148 (18) S
79 + 79 = 158 (2) C
79 + 78 = 157 (1) B
68 + 65 = 133 (3) D
77 + 82 = 159 (3) D
79 + 67 = 146 (16) Q
82 + 72 = 154 (24) Y
78 + 89 = 167 (11) L
73 + 77 = 150 (20) U
78 + 79 = 157 (1) B
71 + 78 = 149 (19) T
65 + 65 = 130 (0) A
76 + 82 = 158 (2) C
76 + 67 = 143 (13) N

(Encrypted)Cipher Text: SCBDDQYLUBTACN

(Decrypted)Plain Text: GOODMORNINGALL

```

### Logic:

#### Encryption

The plaintext(P) and key(K) are added modulo 26.

$$E_i = (P_i + K_i) \bmod 26$$

#### Decryption

$$D_i = (E_i - K_i) \bmod 26$$