

### 39 Minimal Rotation:

```

40 // the lexicographically minimal rotation of a string
41 // the rotation is shift left
42 // acab → caba → abac → baca
43 int minimal_rotation(string s) {
44     int n = s.length();
45     vector<int> f(2 * n, -1);
46     int k = 0;
47     for (int j = 1; j < 2 * n; j++) {
48         int i = f[j - k - 1];
49         while (i != -1 && s[j % n] != s[(k + i + 1) % n]) {
50             if (s[j % n] < s[(k + i + 1) % n]) {
51                 k = j - i - 1;
52             }
53             i = f[i];
54         }
55         if (i == -1 && s[j % n] != s[(k + i + 1) % n]) {
56             if (s[j % n] < s[(k + i + 1) % n]) {
57                 k = j;
58             }
59             f[j - k] = -1;
60         } else {
61             f[j - k] = i + 1;
62         }
63     }
64     return k;
65 }

```

### 68 Longest Regular Bracket substring in string in O(n):

```

69 string s;
70 int dp[1000100]; //fill with zero
71
72 int LRBSubstring(){
73     int ans = 0;
74     for (int i = 1; i < s.size(); i++)
75     {
76         if(s[i]==')'){
77             if(s[i-1]=='(')
78                 dp[i] = (i ≥ 2 ? dp[i-2] : 0) + 2;
79             else if(i-dp[i-1] > 0 && s[i-dp[i-1]-1]=='(')
80                 dp[i] = dp[i-1] + (i-dp[i-1] ≥ 2 ? dp[i - dp[i-1] - 2] : 0) + 2;
81             ans = max(ans , dp[i]);
82         }
83     }
84     return ans;
85 }

```