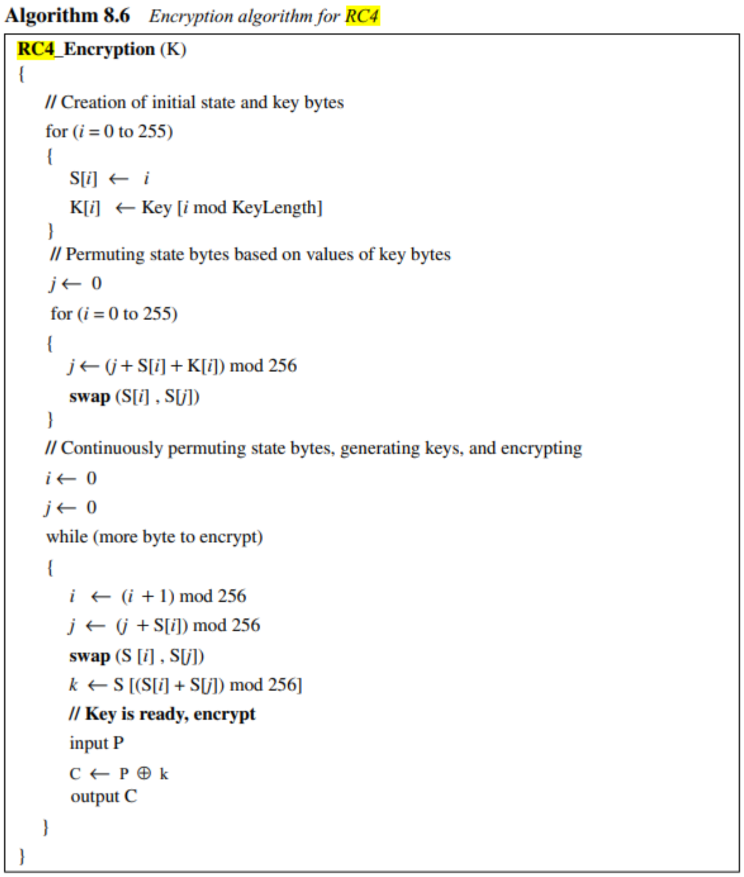
St. Vincent Pallotti College of Engineering & Technology, Nagpur
Department of Computer Engineering
Session 2024-25
CNS Practical Details
7th Semester (A & B)

Practical 7:

Problem Statement: Design and implement a secure and efficient implementation of the RC4 stream cipher method.

(Reference: "Cryptography & Network Security" e-book, by Forouzan, Pg no. 264 onwards).



Algorithm 8.6 *Encryption algorithm for RC4*

```
RC4_Encryption (K)
{
    // Creation of initial state and key bytes
    for (i = 0 to 255)
    {
        S[i] ← i
        K[i] ← Key [i mod KeyLength]
    }
    // Permuting state bytes based on values of key bytes
    j ← 0
    for (i = 0 to 255)
    {
        j ← (j + S[i] + K[i]) mod 256
        swap (S[i] , S[j])
    }
    // Continuously permuting state bytes, generating keys, and encrypting
    i ← 0
    j ← 0
    while (more byte to encrypt)
    {
        i ← (i + 1) mod 256
        j ← (j + S[i]) mod 256
        swap (S [i] , S[j])
        k ← S [(S[i] + S[j]) mod 256]
        // Key is ready, encrypt
        input P
        C ← P ⊕ k
        output C
    }
}
```

Example to be executed:

1. Let S = [0,1,2,3,4,5,6,7] , PT = [1,2,2,2] and Key = [5,1,0,1]. Perform encryption and decryption using RC4 method.
2. Class example.

Note the following regarding practical record:

1. **For Theory, only related Algorithms or Pseudocodes should be written for the same.**
2. **Code printout should be attached.**
3. **Flowchart for the same should be drawn.**
4. **Student need to write RC4 analysis as conclusion.**

Prof. Reema Roychaudhary
Practical In-charge