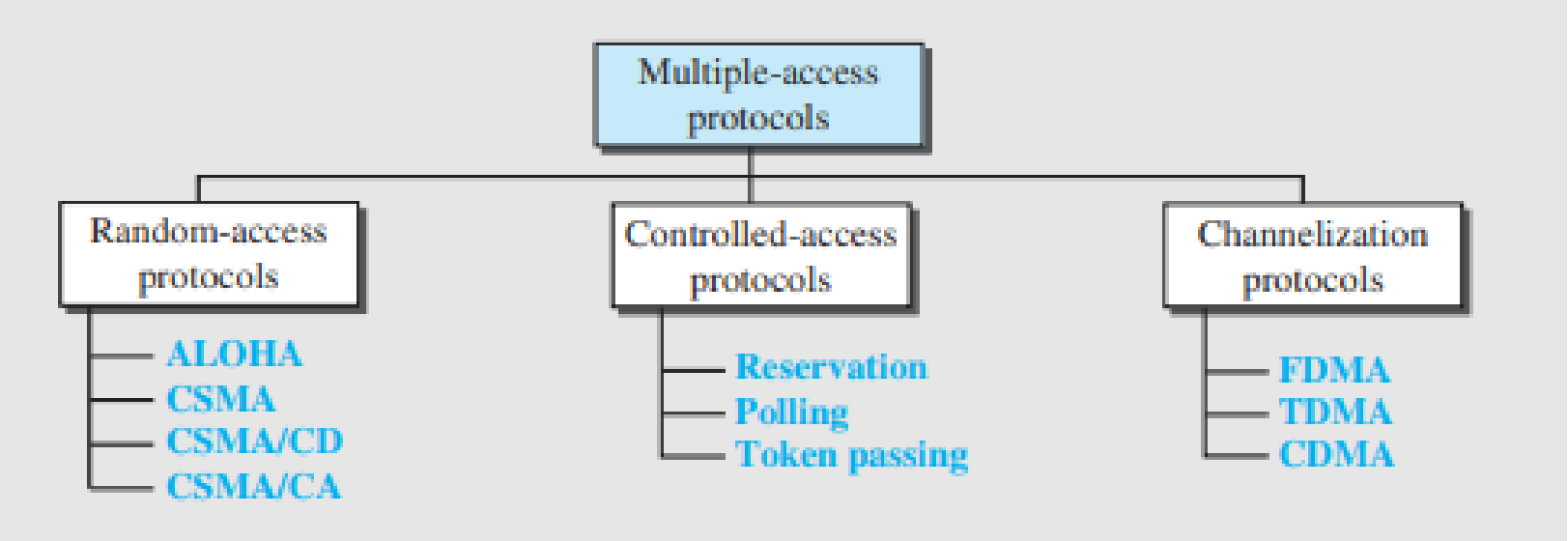
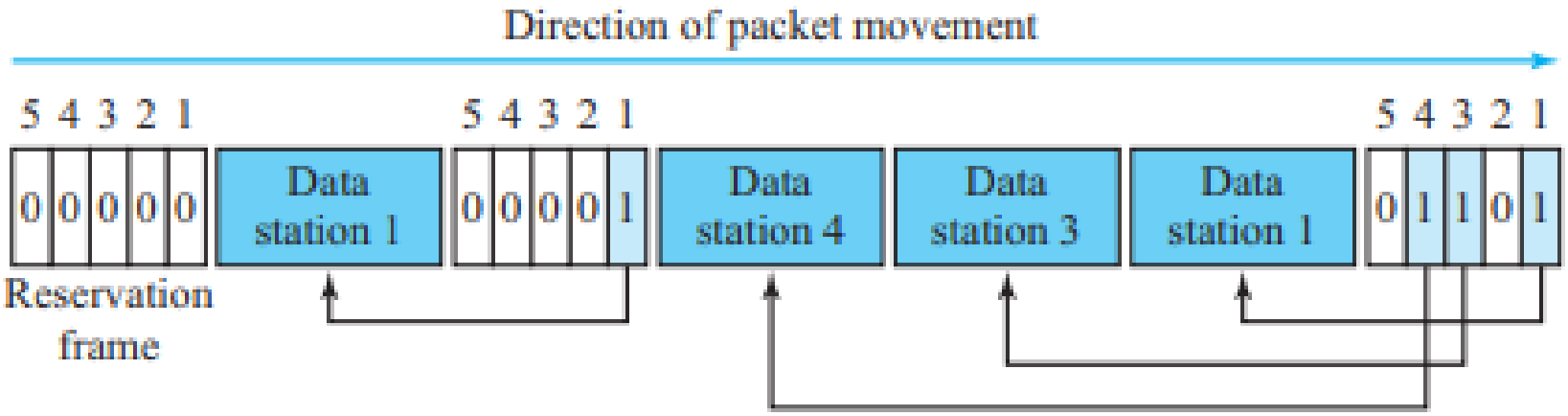
DATA LINK LAYER

MAC Protocol Classification

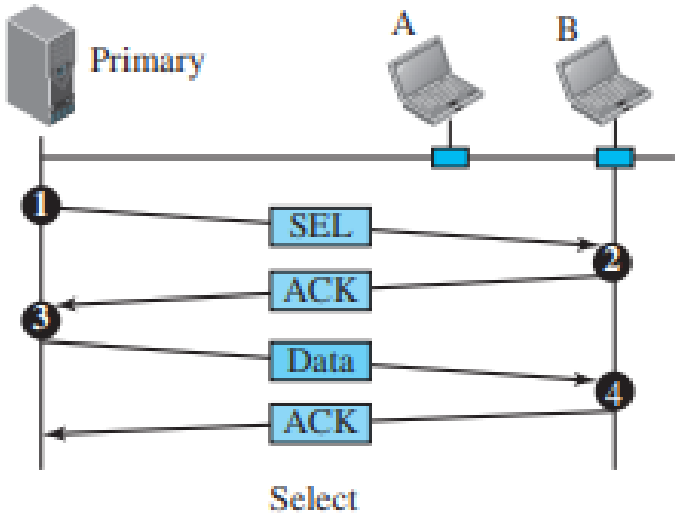


CONTROLLED ACCESS

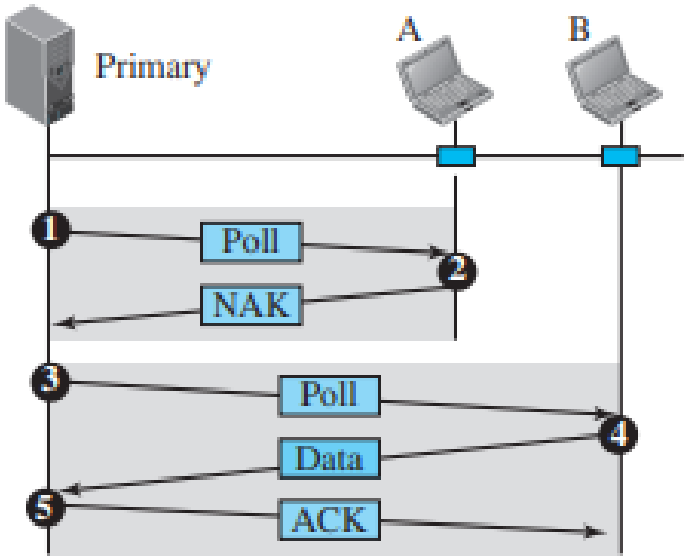
Reservation



CONTROLLED ACCESS
Polling

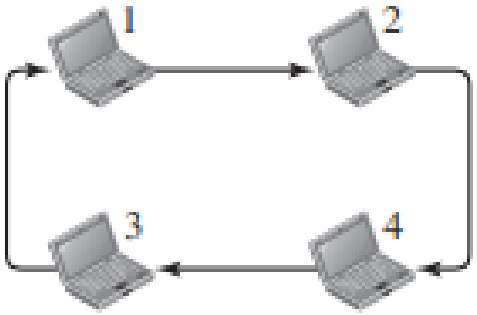


Select

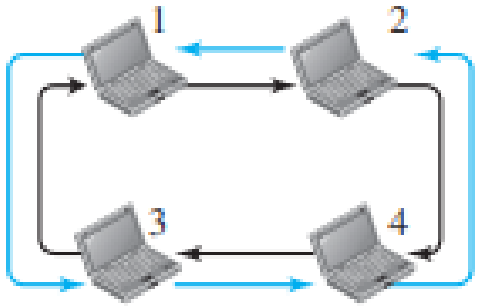


Poll

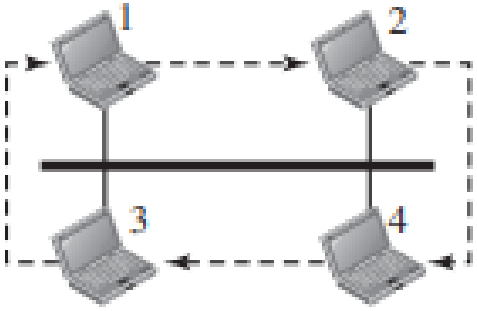
CONTROLLED ACCESS
Token Passing



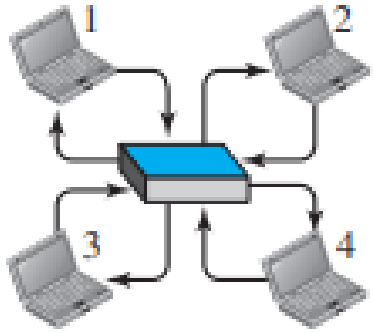
a. Physical ring



b. Dual ring

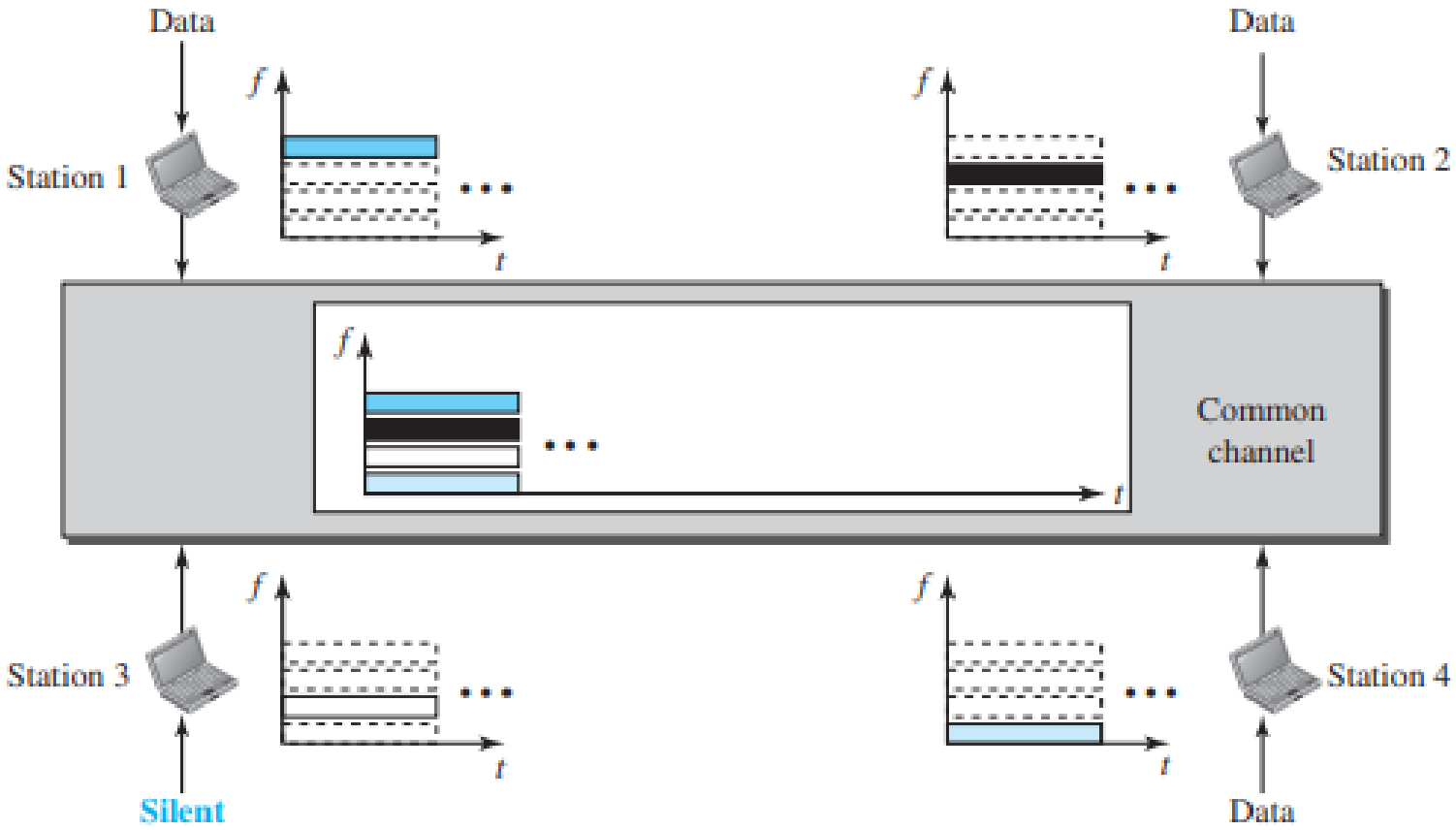


c. Bus ring

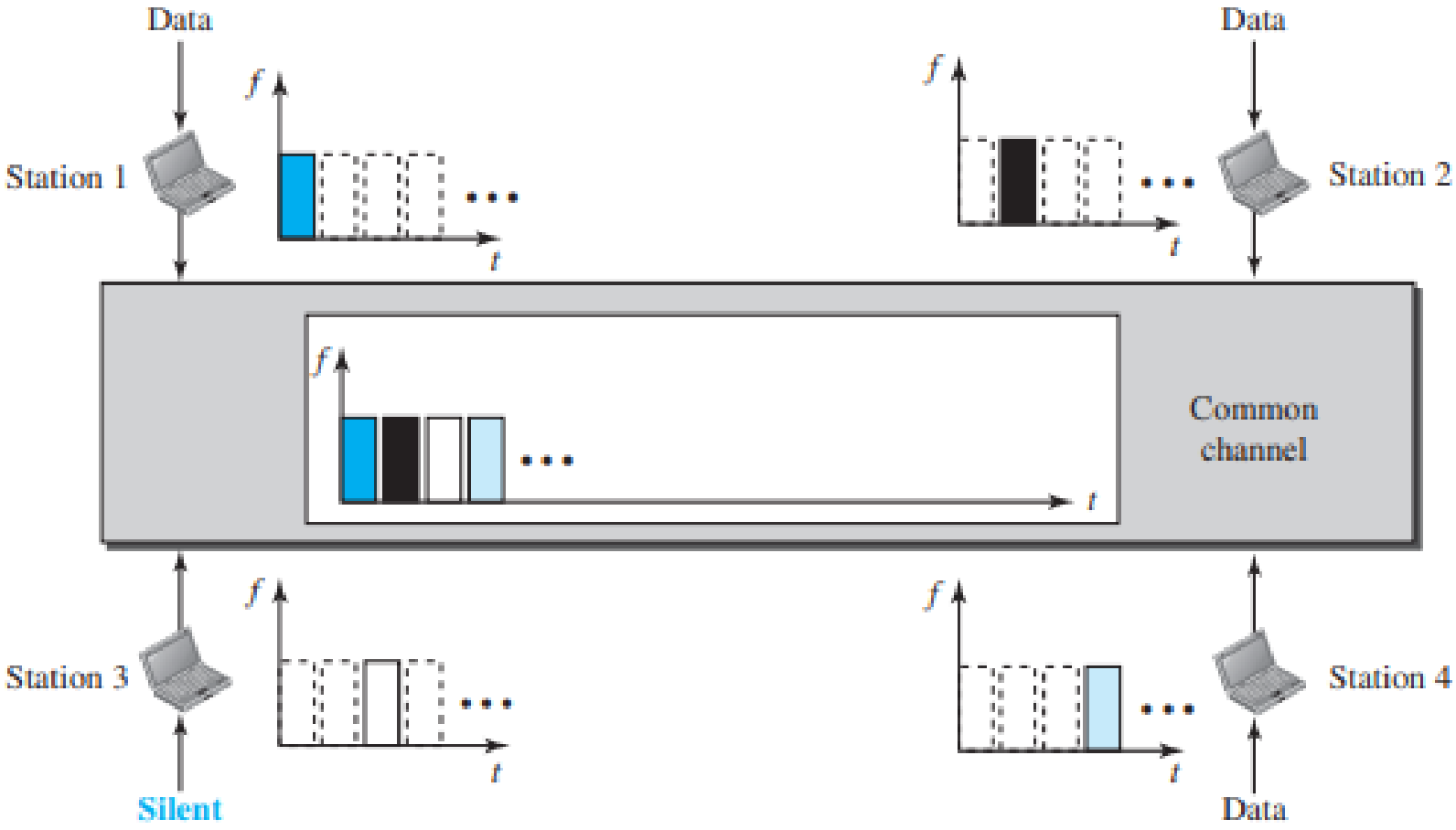


d. Star ring

CHANNELIZATION - FDMA



CHANNELIZATION- TDMA



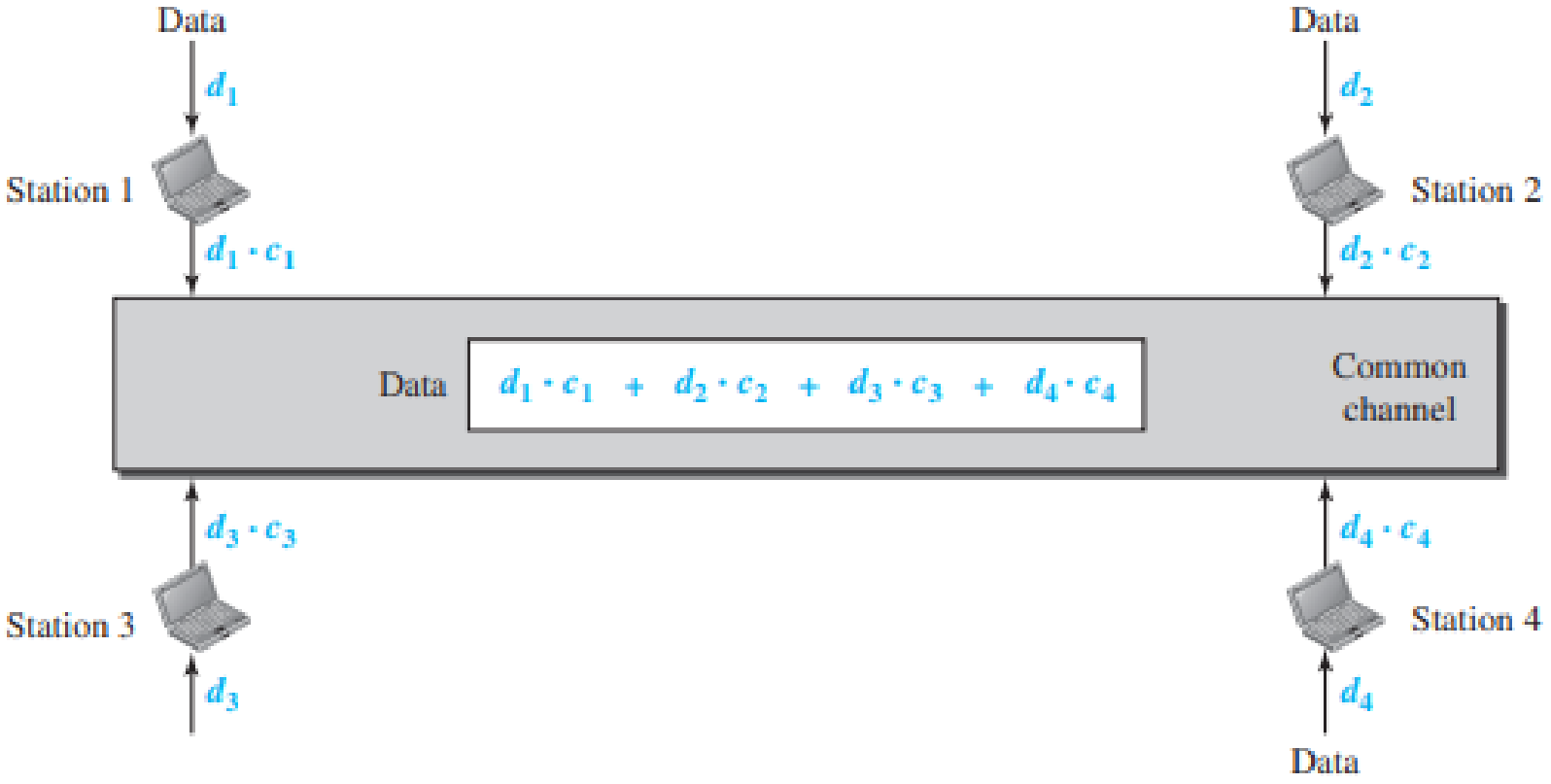
CHANNELIZATION
CDMA

One channel carries all transmissions simultaneously
Each station assigned with a code

The assigned codes have two properties.

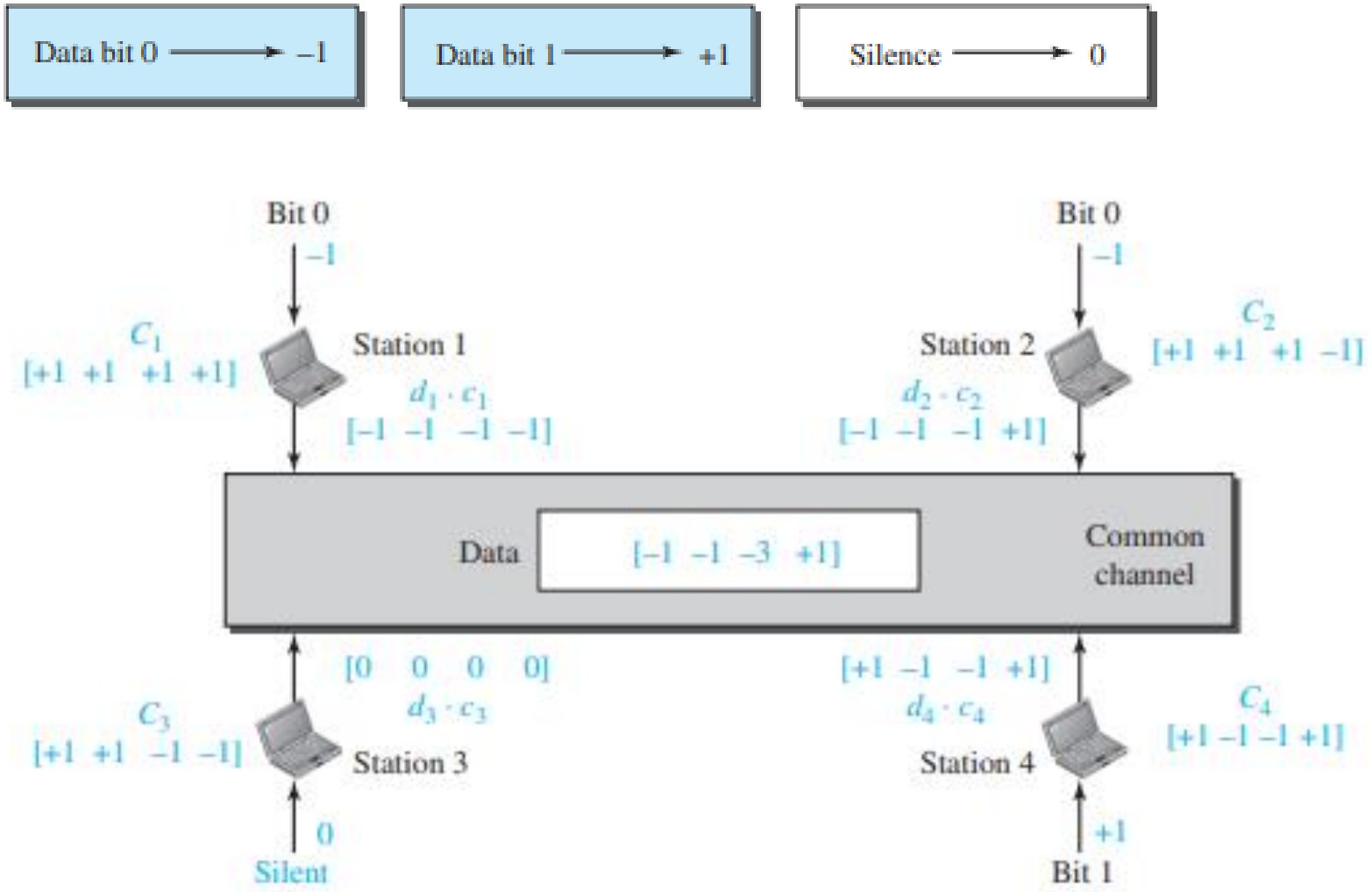
1. If we multiply each code by another, we get 0.
2. If we multiply each code by itself, we get the number of stations

CDMA CONTD..



$$\text{data} = (d_1 \cdot c_1 + d_2 \cdot c_2 + d_3 \cdot c_3 + d_4 \cdot c_4) \cdot c_1$$
$$= d_1 \cdot c_1 \cdot c_1 + d_2 \cdot c_2 \cdot c_1 + d_3 \cdot c_3 \cdot c_1 + d_4 \cdot c_4 \cdot c_1 = 4 \times d_1$$

CDMA CONTD..


Data bit 0 → –1
Data bit 1 → +1
Silence → 0
Bit 0
–1
C_1
[+1 +1 +1 +1]
Station 1
$d_1 \cdot c_1$
[–1 –1 –1 –1]
Bit 0
–1
C_2
[+1 +1 +1 –1]
Station 2
$d_2 \cdot c_2$
[–1 –1 –1 +1]
Data
[–1 –1 –3 +1]
Common channel
[0 0 0 0]
$d_3 \cdot c_3$
[+1 –1 –1 +1]
$d_4 \cdot c_4$
C_3
[+1 +1 –1 –1]
Station 3
C_4
[+1 –1 –1 +1]
Station 4
0
Silent
+1
Bit 1

CDMA CONTD..

$$W_1 = [+1] \qquad W_{2N} = \begin{bmatrix} W_N & W_N \\ W_N & \overline{W_N} \end{bmatrix}$$

a. Two basic rules

$$W_2 = \begin{bmatrix} +1 & +1 \\ +1 & -1 \end{bmatrix} \qquad W_4 = \begin{bmatrix} +1 & +1 & +1 & +1 \\ +1 & -1 & +1 & -1 \\ +1 & +1 & -1 & -1 \\ +1 & -1 & -1 & +1 \end{bmatrix}$$

b. Generation of W_2 and W_4