6. **Code Division Multiple Access (CDMA) [10 pts]**

| A	-1	-1	-1	1	1	-1	1	1
B	-1	-1	1	-1	1	1	1	-1
C	-1	1	-1	1	1	1	-1	-1

a) Suppose that three CDMA users: A, B and C – are all simultaneously transmitting bits 10, each using the following chip sequence:

What is the resultant chip sequence/signal observe on the transmission channel? (4pts)

-3 -1 -1 +1 +3 +1 +1 –1 +3 +1 +1 -1 -3 -1 -1 +1

You use chipping code to send and inverse of the code to zero. For composite signal you add them together.

Draw a resultant chip sequence? (2 pts)
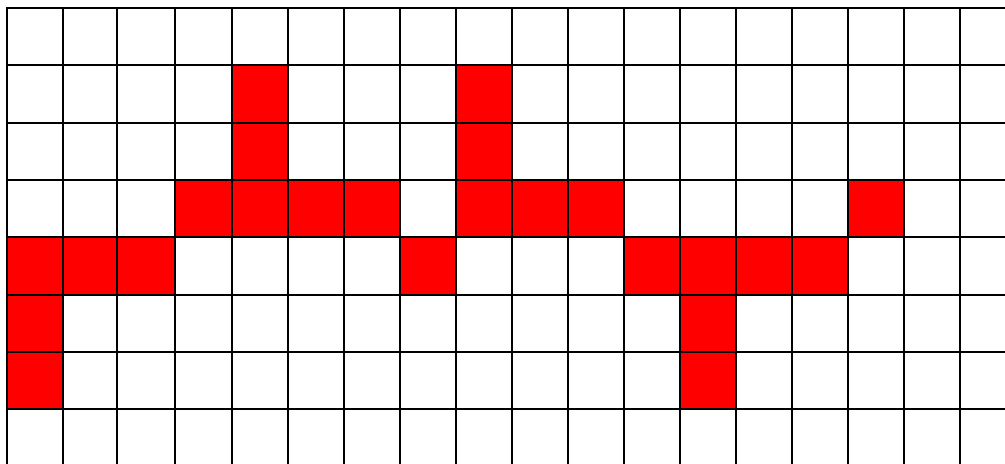
b) A CDMA receiver gets the following chip sequence/signal: S = -1 +1 -3 +1 -1 -3 +1 +1.
Assuming the chip sequences from 4.a), which station(s) transmitted and which bits did each one send? (4pts)

S*A = 1 - 1 +3 +1 -1 +3 +1 +1 = +8 -- positive value ⇒ B set binary 1

S*B = 1 -1 -3 -1 -1 -3 +1 -1 = -8 -- negative value ⇒ A sent binary 0

S*C = 1 +1 +3 +1-1 -3 -1 -1 = 0 - zero ⇒ C did not send anything