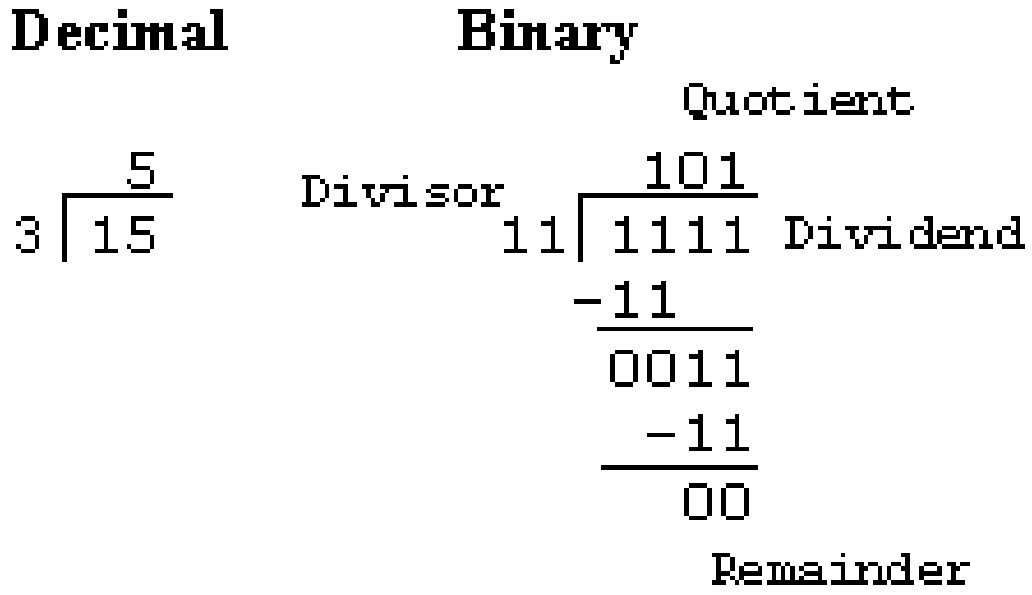
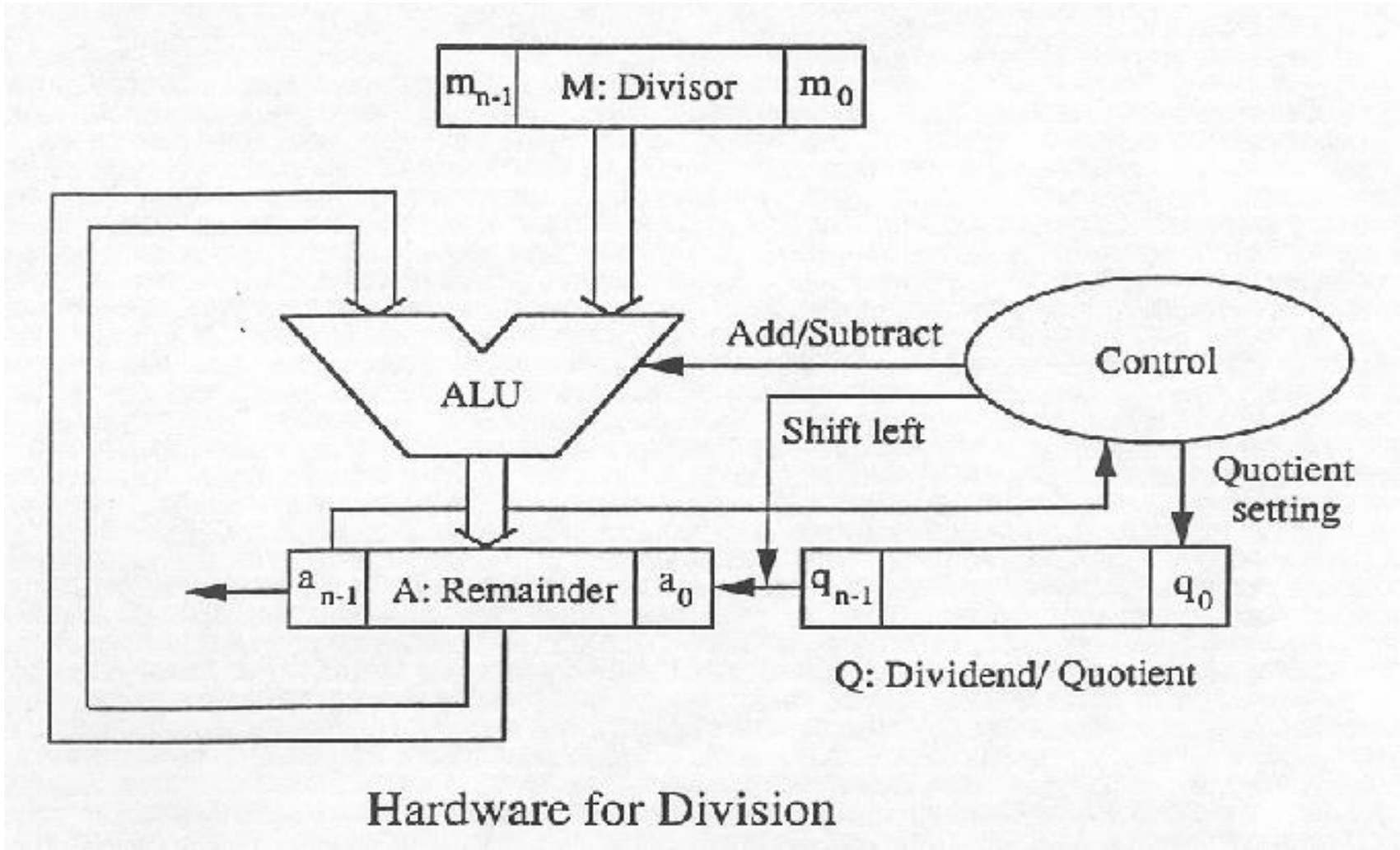
Arithmetic Division (Restoring and Non-Restoring Methods)

-Mitali Desai

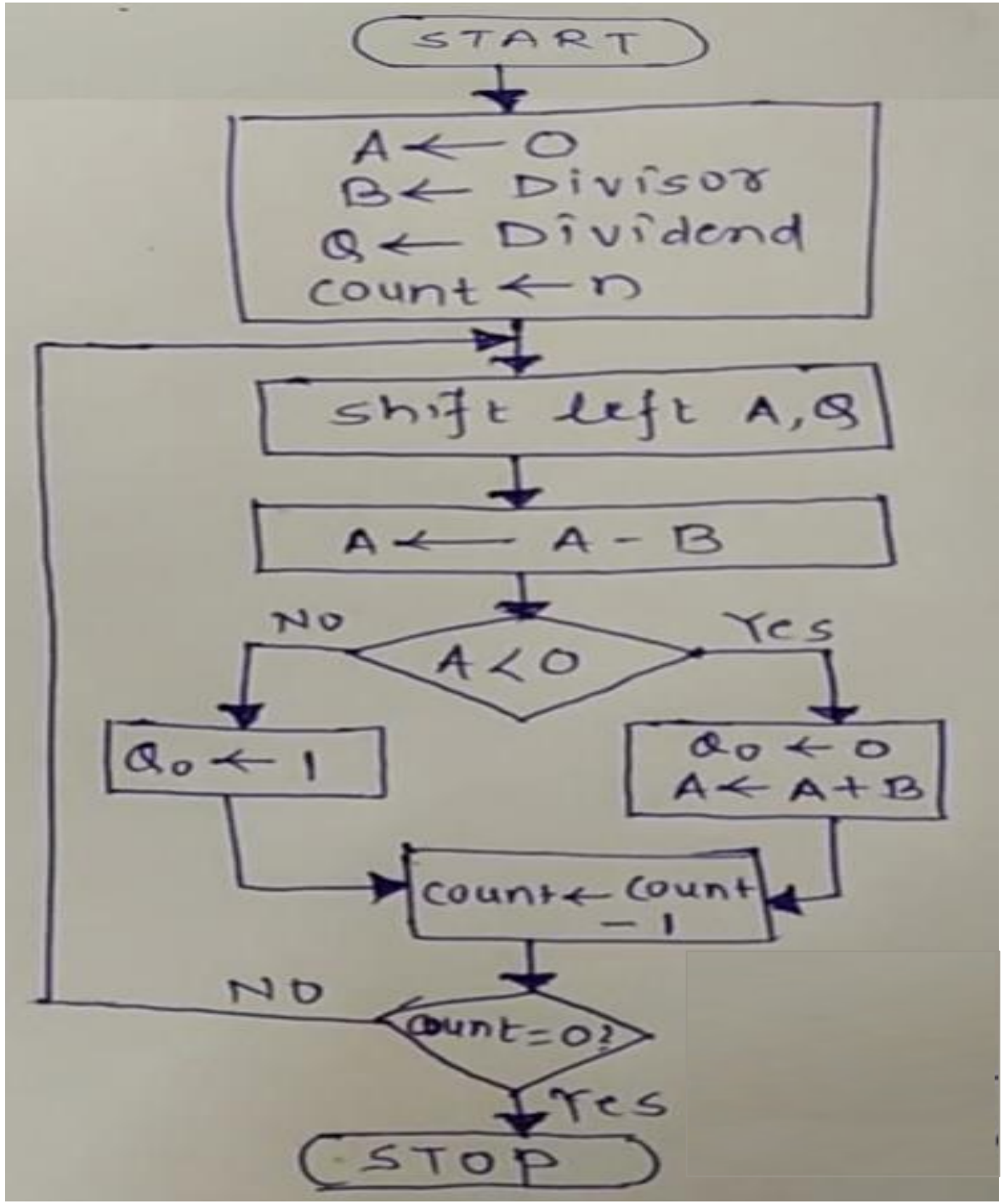
Binary Division: Pen and Paper





Hardware for Division

Arithmetic Division (Restoring Method)


START
A ← 0
B ← Divisor
Q ← Dividend
count ← n
shift left A,Q
A ← A - B
NO
A<0
Yes
Q0 ← 1
Q0 ← 0
A ← A+B
count ← count - 1
NO
count=0?
Yes
STOP

Example : Dividend = 1010 n=4
Divisor = 0011 ⇒B⇒ 00011
B̄+1 = 11101

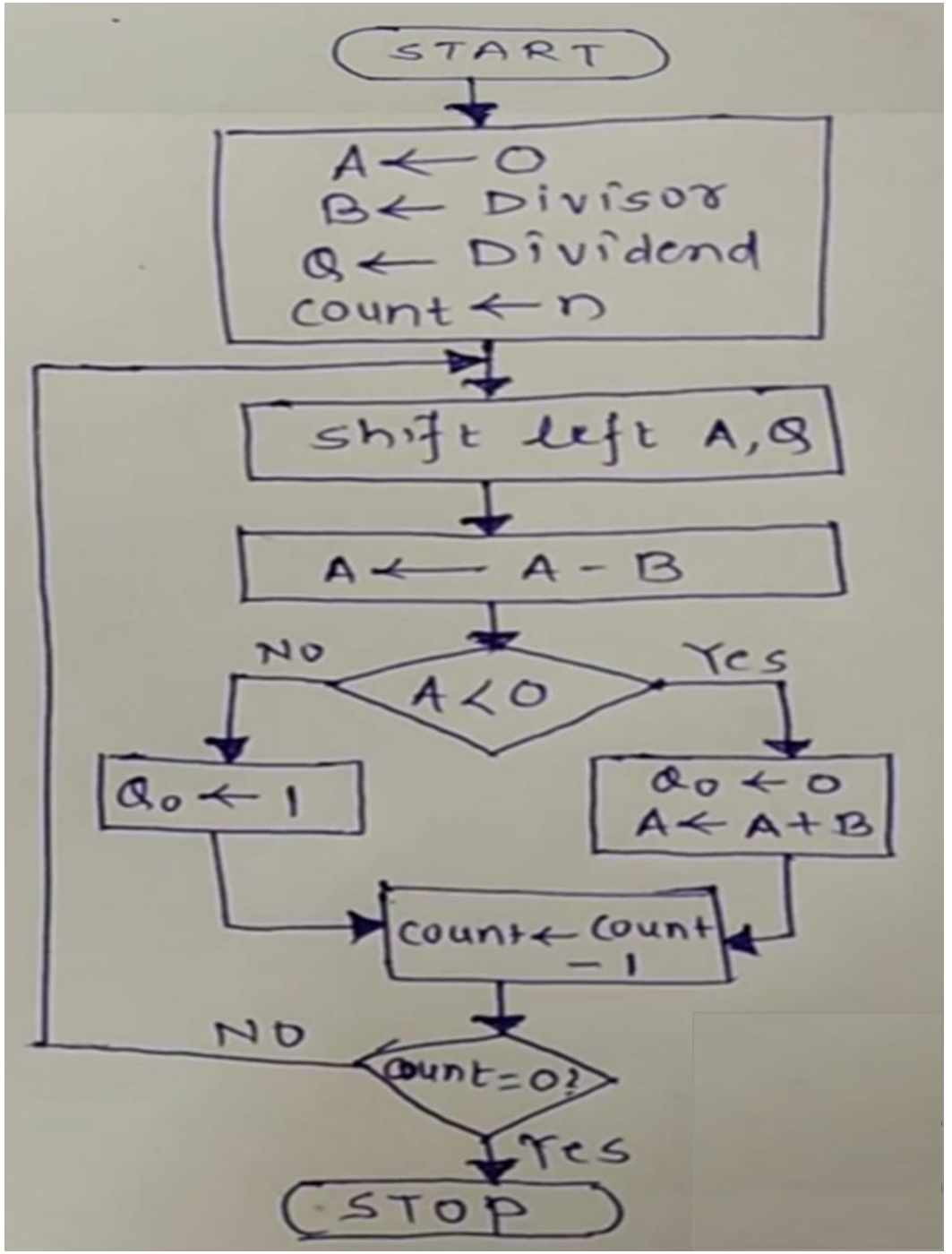
operation	A	Q
Initial	00000	1010

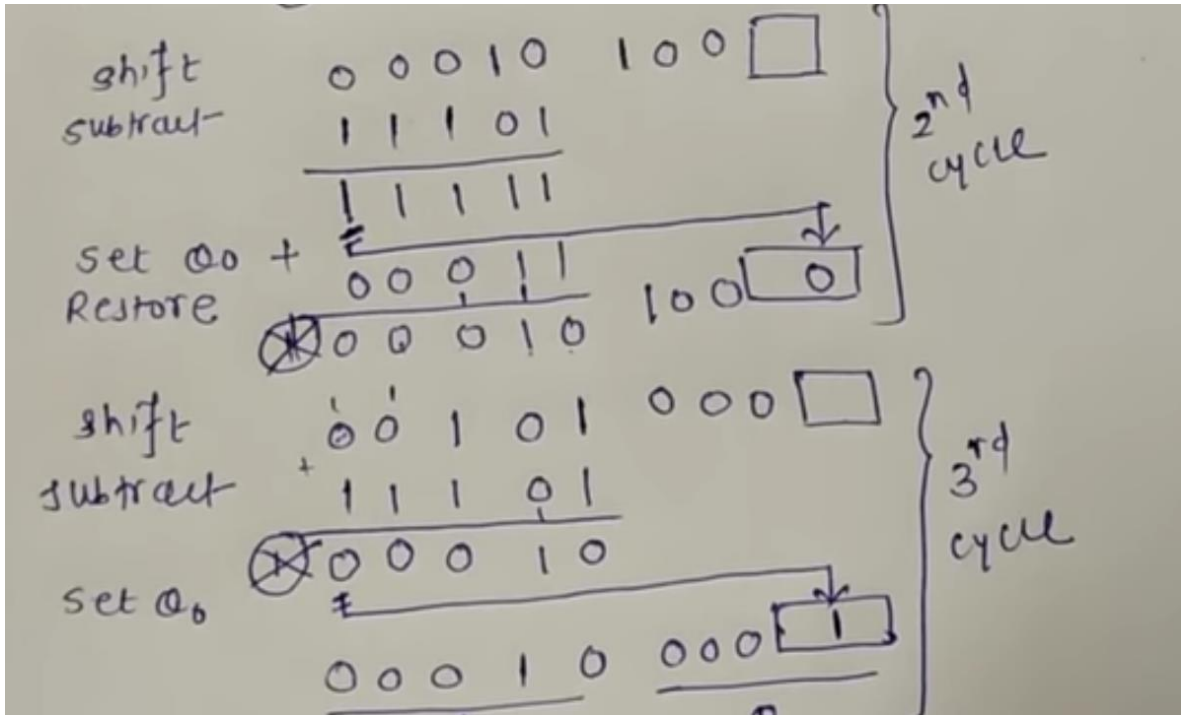
Example : Dividend = 1010 n=4
Divisor = 0011 ⇒B⇒ 00011
B̄+1 = 11101

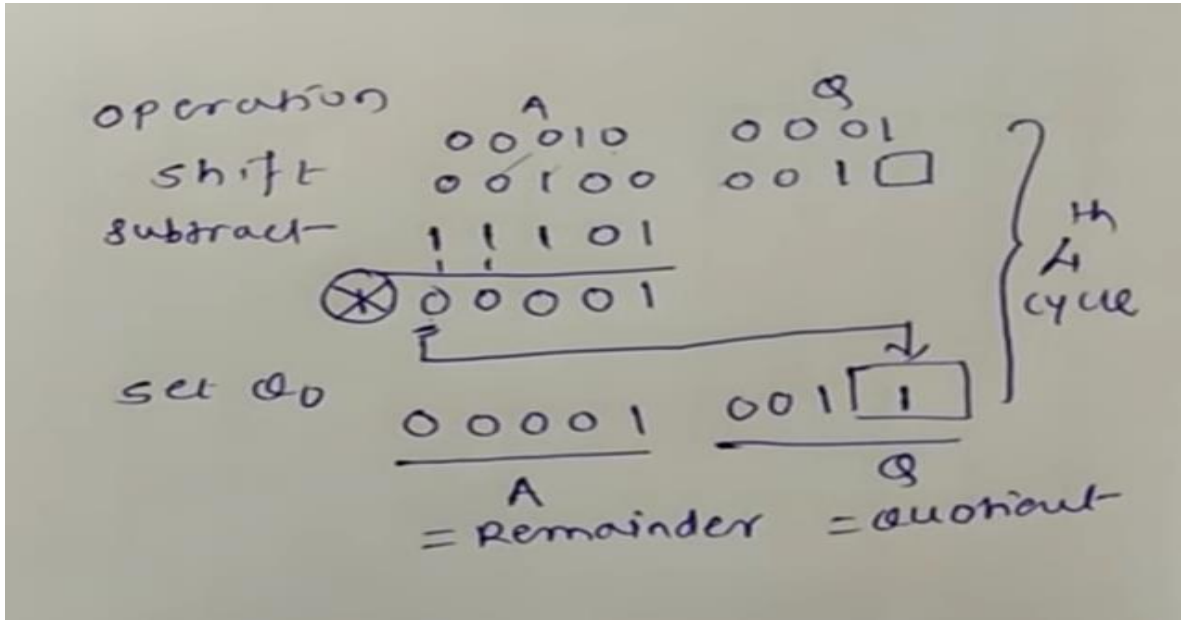
operation	A	Q	
Initial	00000	1010	
shift	00001	010	
subtract	+ 11101		
	11110		
set Q_0	+ 00011	010	0
Restore A	00001		
shift	00010	100	
subtract	+ 11101		
	11111		
set Q_0	+ 00011	100	0
Restore	00010		

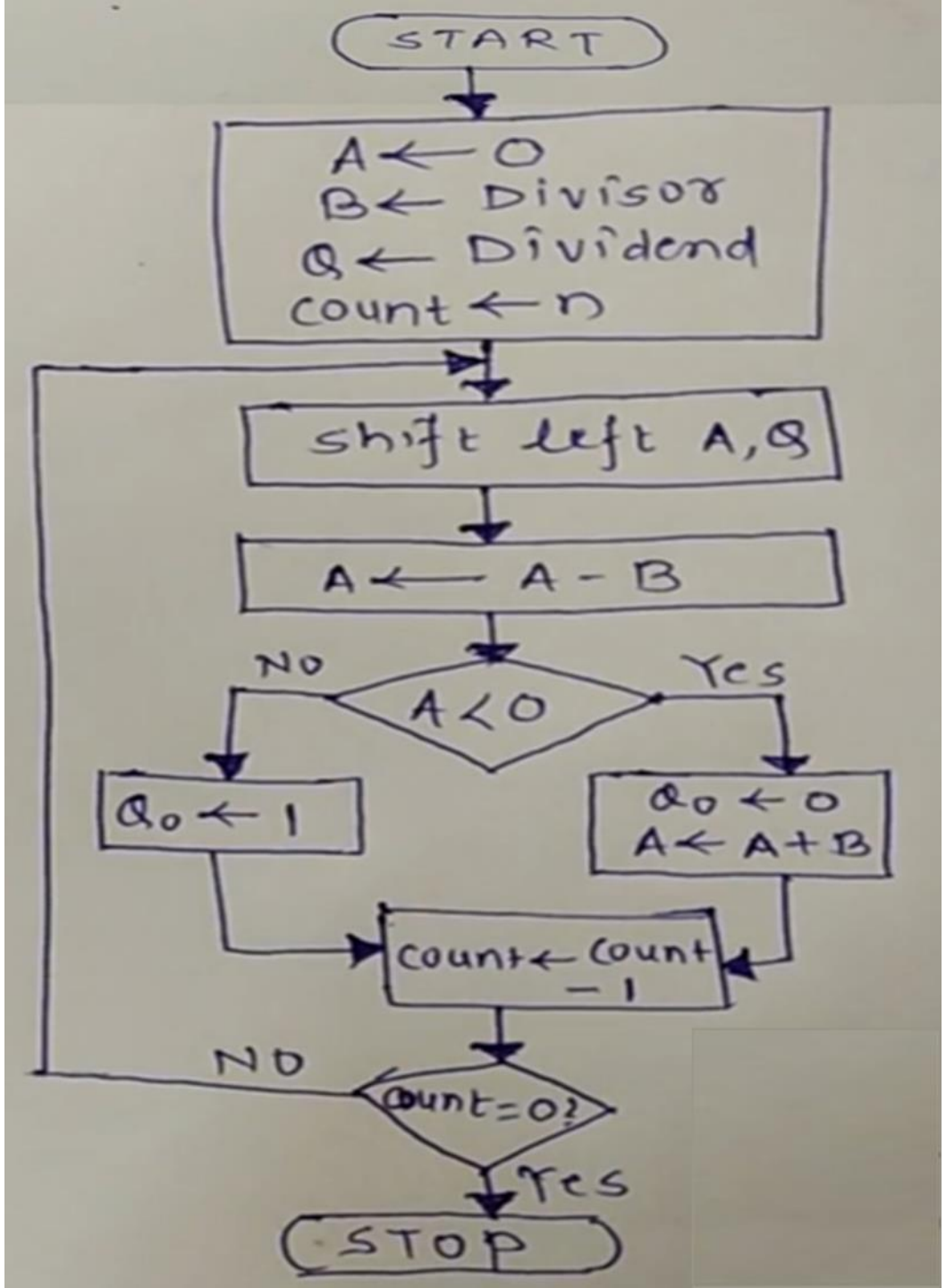
1st cycle

2nd cycle




shift
subtract
set Q_0 +
Restore
2nd cycle
shift
subtract
set Q_0
3rd cycle


operation
A
Q
shift
subtract
set Q_0
4th cycle
A
= Remainder
Q
= quotient


START
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Q ← Dividend
count ← n
shift left A,Q
A ← A - B
NO
A<0
Yes
Q_0 ← 1
Q_0 ← 0
A ← A+B
count ← count - 1
NO
count=0?
Yes
STOP