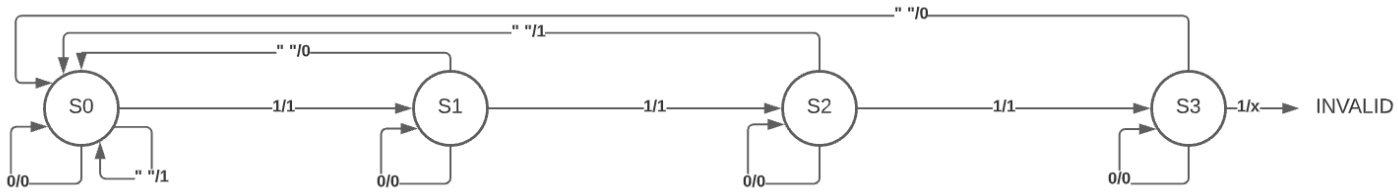
3-bit Odd Parity Generator

Let the input 3-bits be A, B, C

a)

State Diagram:



State Table:

Current State\INPUT	1	0	" "
S0	(S1,1)	(S0,0)	(S0,1)
S1	(S2,1)	(S3,0)	(S0,0)
S2	(S3,1)	(S3,0)	(S0,1)
S3	INVALID	(S3,0)	(S0,0)

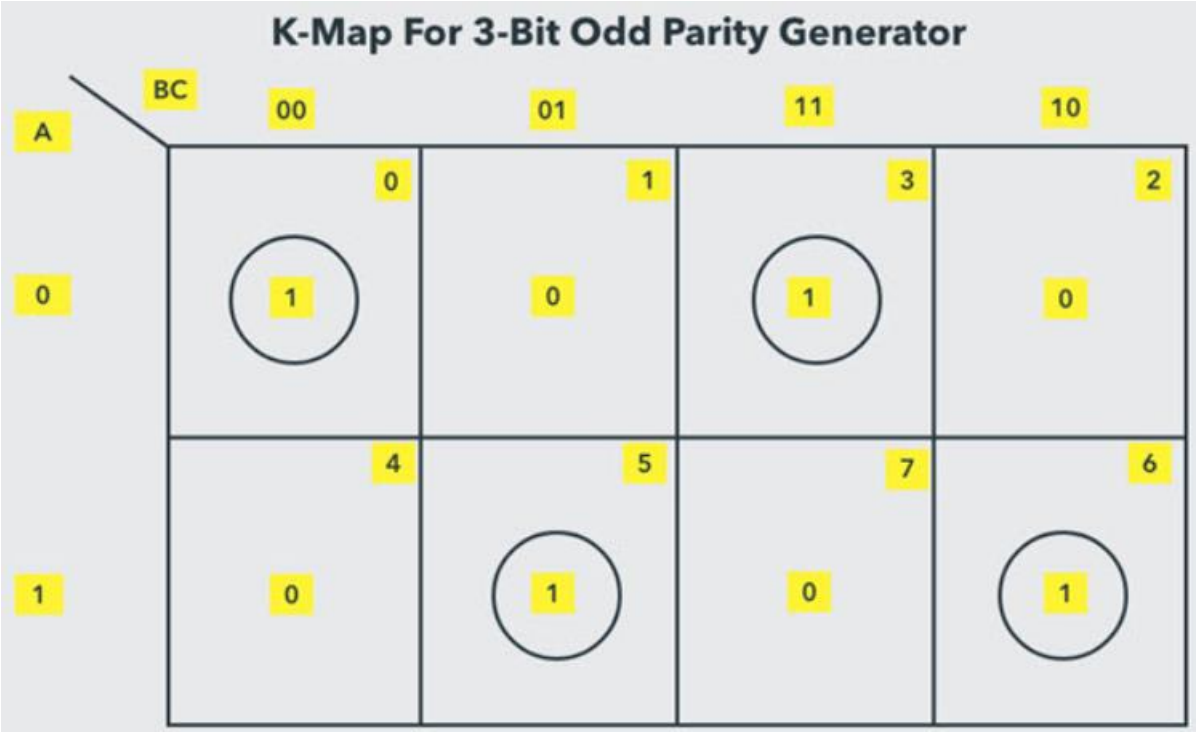
Transition and Output Table:

Current State	Input	Next State	Output
S0	0	S0	0
S0	1	S1	1
S0	" "	S0	1
S1	0	S1	0
S1	1	S2	1
S1	" "	S0	0
S2	0	S2	0
S2	1	S3	1
S2	" "	S0	1
S3	0	S3	0
S3	1	ERROR	x
S3	" "	S0	0

Excitation Table:

Current State	Input	Next State / DFF	Output
S0	0	S0	0
S0	1	S1	1
S0	" "	S0	1
S1	0	S1	0
S1	1	S2	1
S1	" "	S0	0
S2	0	S2	0
S2	1	S3	1
S2	" "	S0	1
S3	0	S3	0
S3	1	ERROR	x
S3	" "	S0	0

b)



Circuit Diagram:

$P = A \oplus (B \overline{\oplus} C)$