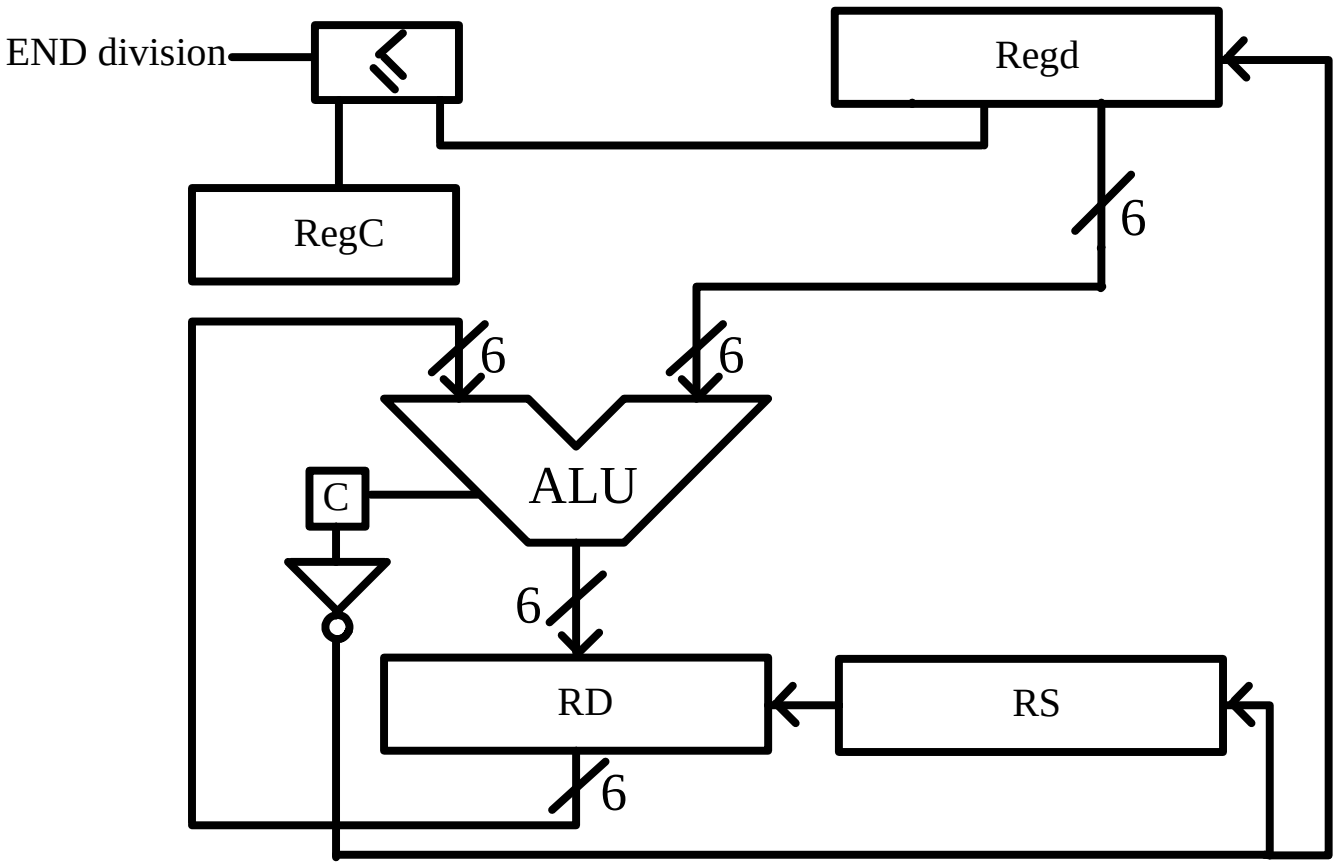
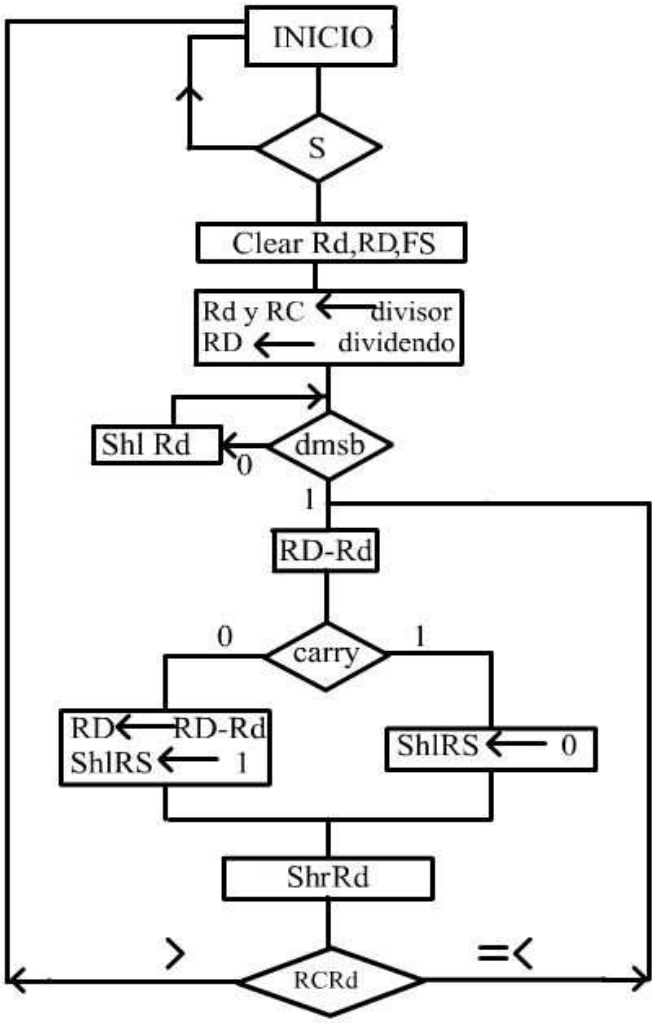
Digital System Design Course

Data-Path Division



ASM


INICIO
S
Clear Rd,RD,FS
Rd y RC ← divisor
RD ← dividendo
Shl Rd
dmsb
0
1
RD-Rd
0
carry
1
RD ← RD-Rd
ShlRS ← 1
ShlRS ← 0
ShrRd
>
RCRd
=<

Ejemplo División 45/6, 101101/000110

RD	RC	RS
101101	000110	000000

RD 101101
Rd 000000
RD 101101
Rd 011000
RD 010101
Rd 001100
RD 001001
Rd 000110
RD 000011

RD − Rd

FIN

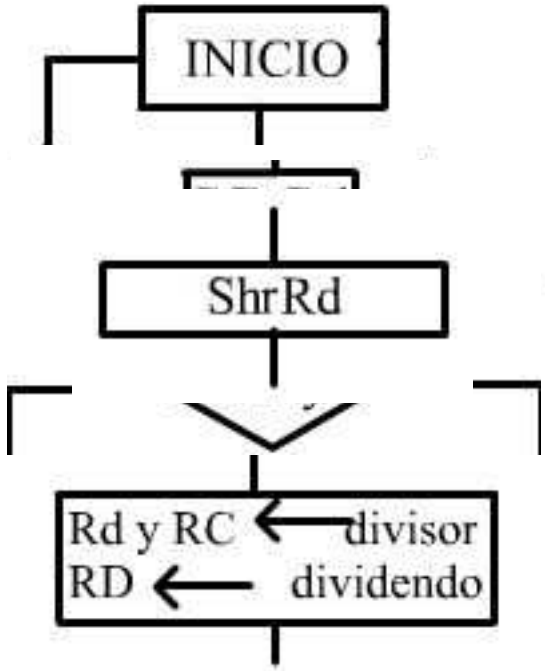
COCIENTE EN RS

000111=7

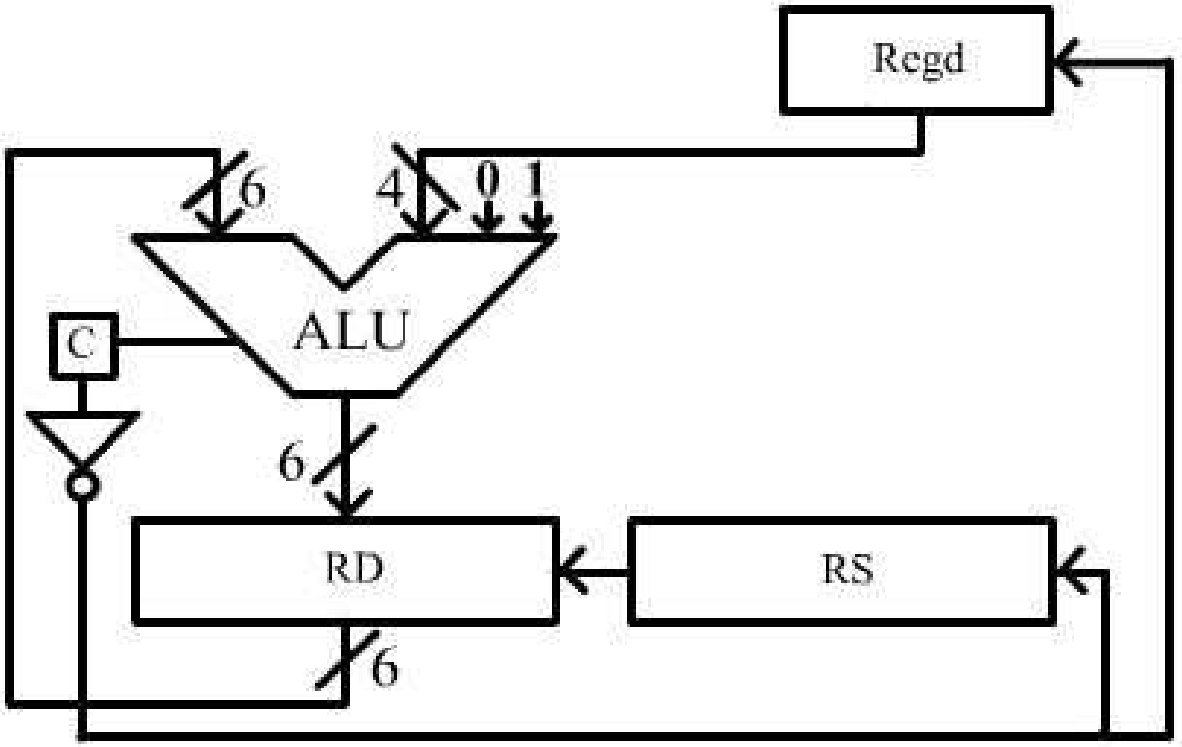
RESIDUO EN RD

000011=3

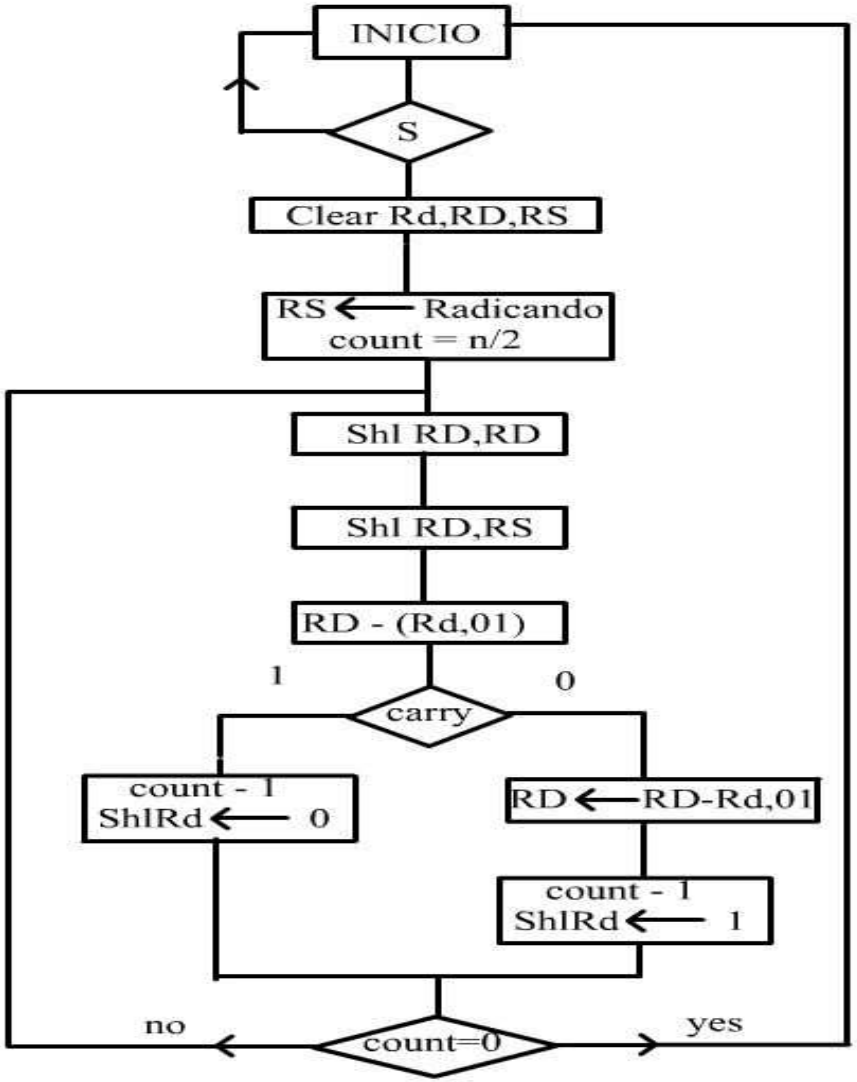
Rd 000011



Data-Path Raíz Cuadrada



Data-Path Raíz Cuadrada



Ejemplo, Raíz de 31=011111

Reg D	Reg S	Reg d 01		Count
000000	**011111**	0000	01	3
000000	**111110**	0000	01	
000001	**111100**	0000	01	
000000	**111100**	0001	01	2
000001	**111000**	0001	01	
000011	**110000**	0010	01	1
000111	**100000**	0010	01	
001111	**000000**	0010	01	
000110	**000000**	0101	01	0

INICIO

FIN

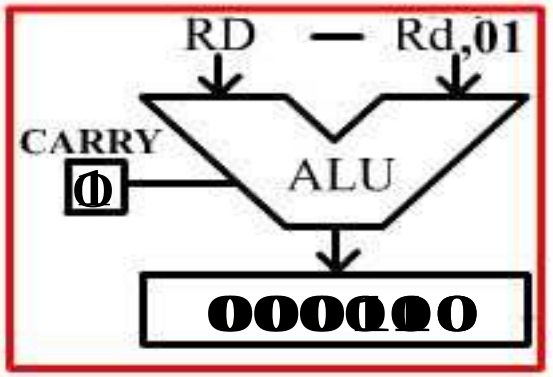
RAIZ EN Rd

0101=5

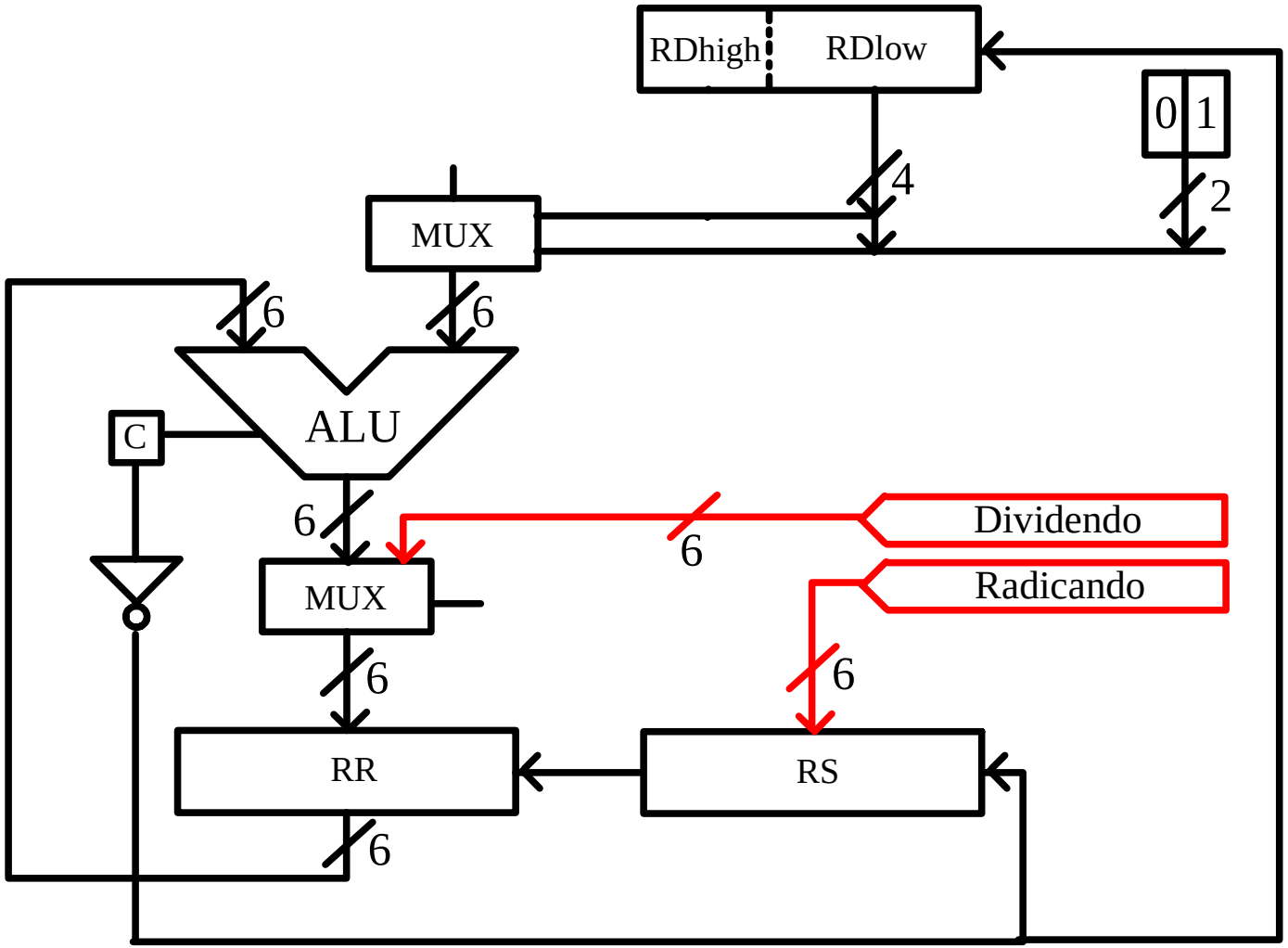
RESIDUO EN RD

000110=6

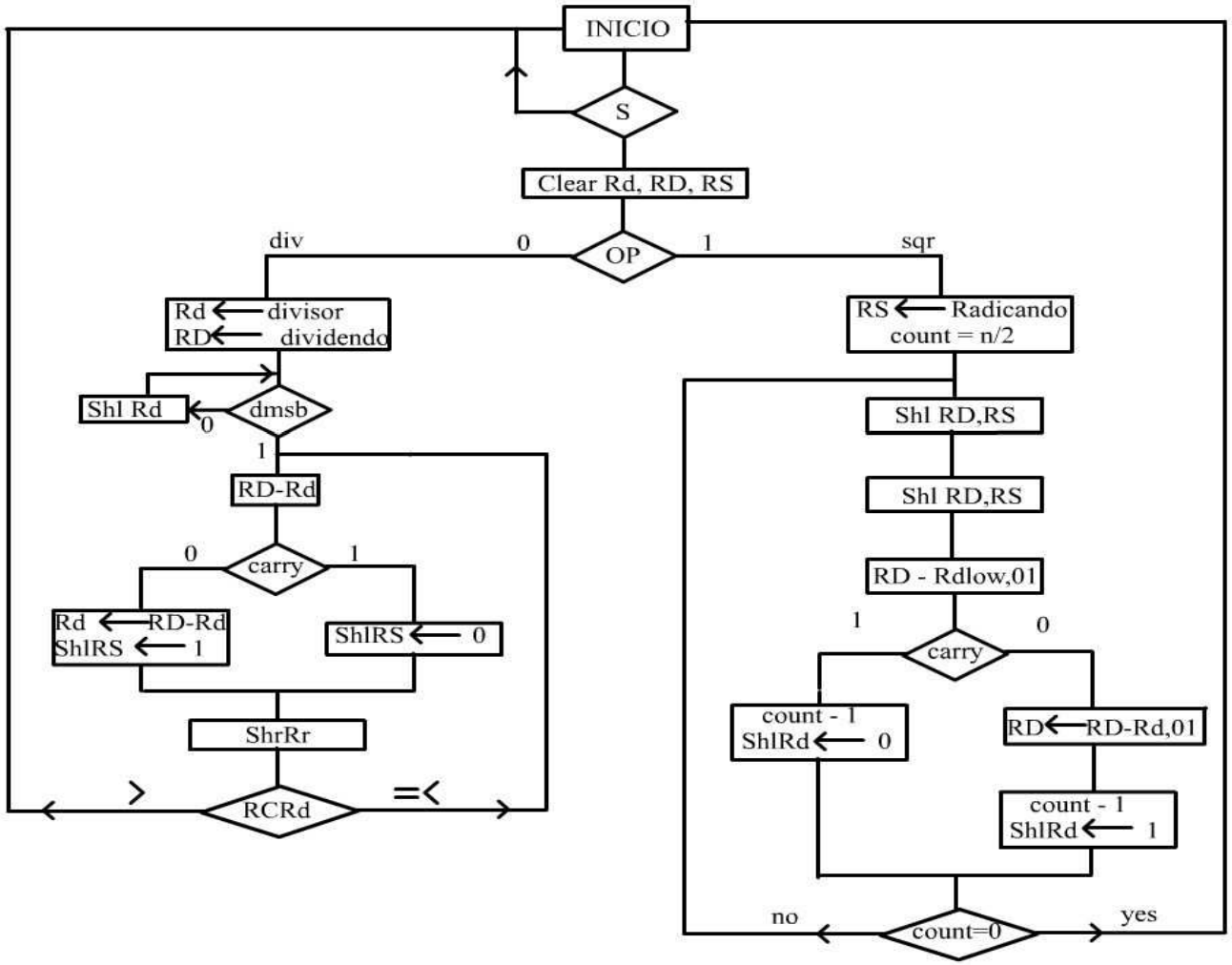
count = n/2



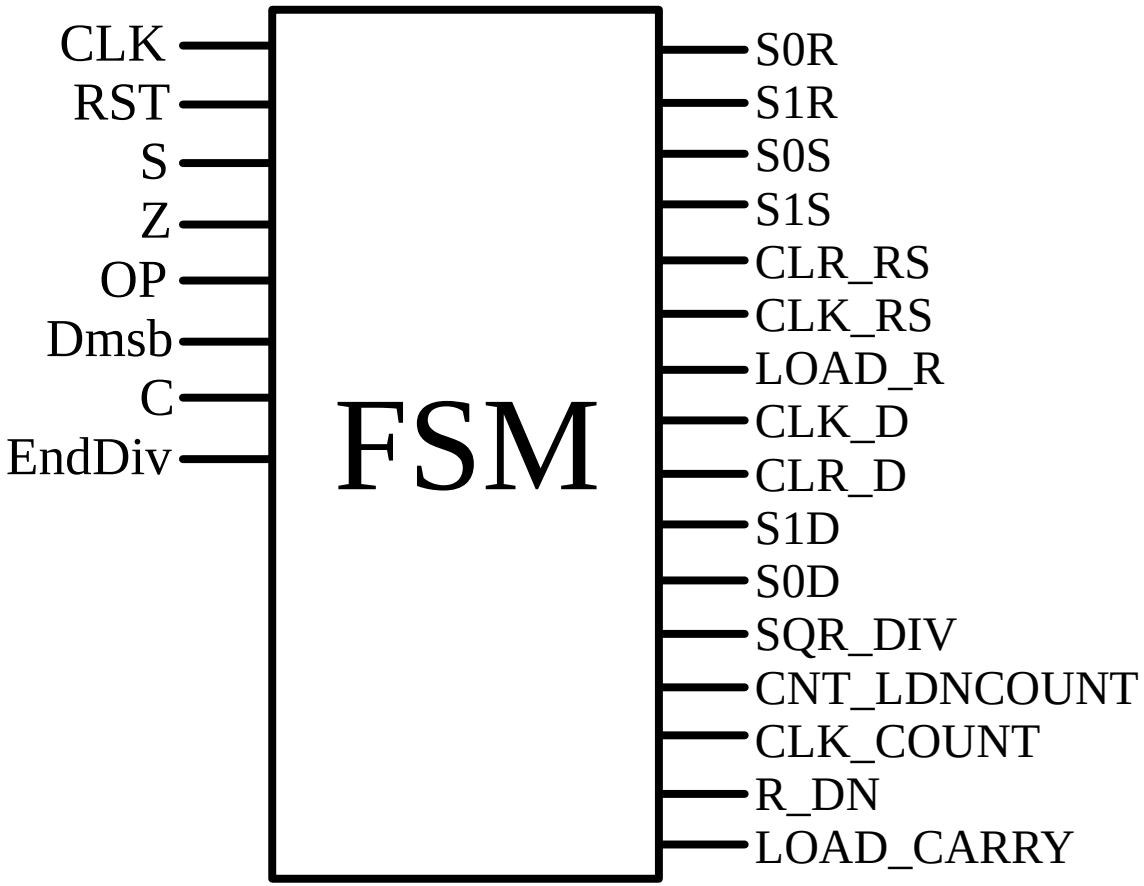
Data-path Raiz - División



ASM


INICIO
S
Clear Rd, RD, RS
div
0
OP
1
sqr
Rd ← divisor
RD ← dividendo
Shl Rd
dmsb
0
1
RD-Rd
0
carry
1
Rd ← RD-Rd
ShlRS ← 1
ShlRS ← 0
ShrRr
>
RCRd
=<
RS ← Radicando
count = n/2
Shl RD,RS
Shl RD,RS
RD - Rdlow,01
1
carry
0
count - 1
ShlRd ← 0
RD ← RD-Rd,01
count - 1
ShlRd ← 1
no
count=0
yes

FSM


CLK
RST
S
Z
OP
Dmsb
C
EndDiv
FSM
S0R
S1R
S0S
S1S
CLR_RS
CLK_RS
LOAD_R
CLK_D
CLR_D
S1D
S0D
SQR_DIV
CNT_LDNCOUNT
CLK_COUNT
R_DN
LOAD_CARRY