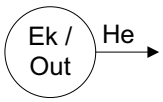
Apellidos y Nombre: Amorín Díaz, Miquel Grupo: 72 DNI: 26312288N

PLANTILLAS Práctica 6

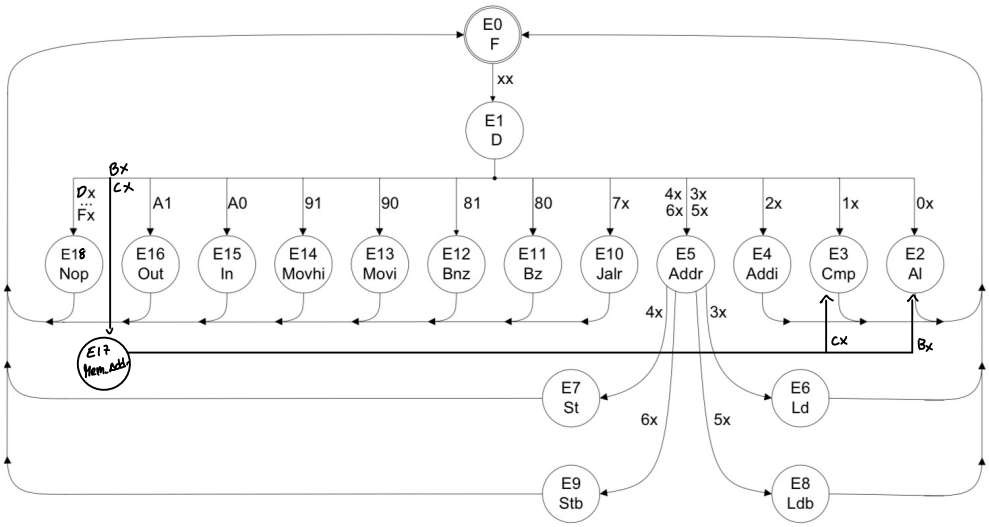
Este documento contiene plantillas en pdf que os pueden ayudar a preparar la práctica 6. Podéis imprimirlas y escribir/dibujar sobre ellas y luego escanear o fotografiar para incluirlas en el documento-memoria que entregaréis como informe previo y del cual tendréis que tener una copia para realizar la práctica en el laboratorio.

Parte del grafo de estados de la Unidad de Control

Leyenda:



Ek: Estado k (k=número en decimal).
Out: mnemotécnico salida.
H: código de operación (dígito hexadecimal).
e: extesión del código de operación (bit).

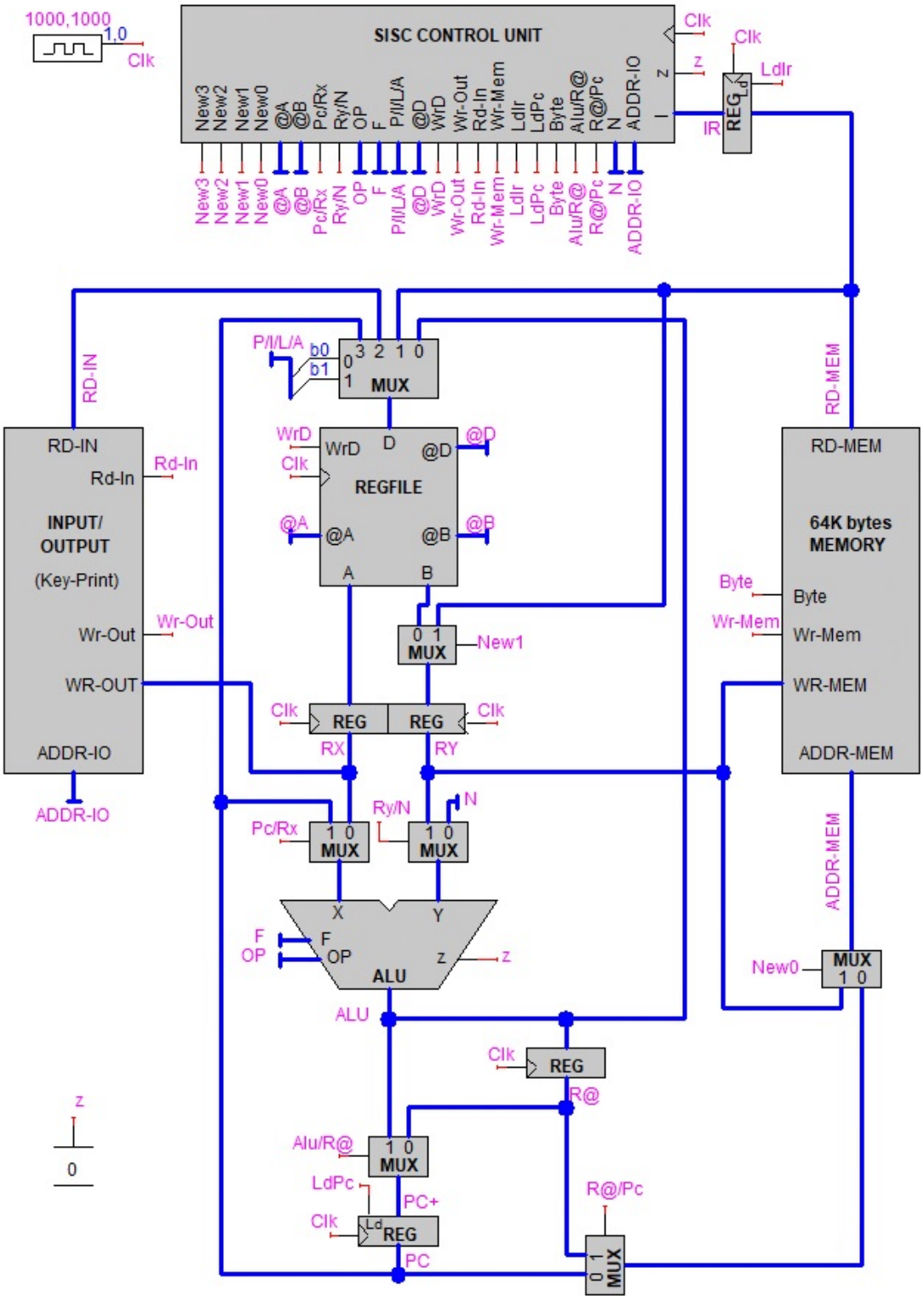


Acciones en cada nuevo estado de la Unidad de Control

Nodo/Estado		Pc/Rx=1, N=0x0002, Ry/N=0, OP=00, F=100, Alu/R@=1, LdPc=1.
Número	Mnem.	Acciones (en lenguaje de transferencia de registros)
E0	F	IR ← MEM_W[PC] // PC ← PC+2
E1	D	R@ ← PC + SE(N8)·2 // BX ← Ra // BY ← Rb
E17	Mem_Addr	Mem_b[Rb] // RY ← RD-MEM

Per fer els canvis demanats per les instruccións AL i CMD amb l'operand 'Rb' provinent de la memòria. Se'm van acudir dues maneres de fer-ho, la primera seria col·locar un MUX entre el REGFILE i RY perquè portés Rb com a adreça de memòria a llegir. I pel bus de RD-MEM fer un camí extra amb un REG que guardi la dada i un MUX que esculli entre aquest REG i el que vingui del MUX de Ry/N. El problema es que en aquesta solució s'haurien de crear dos estats per substituir les instruccions AL i CMP per les M_AL i M_CMP. No és la solució més optima.

Si optimitzem la solució anterior col·locaria un MUX que esculli entre ADDR-MEM i el que surti del REG RY i ho porti cap a la memòria. El que surti pel bus RD-MEM ho portaríem cap a un altre MUX que esculli entre Rb i la dada de RD-MEM que es carregaria en el REG RY. Després podríem aprofitar les instruccions AL i CMP que ja tenim creades per defecte ja que l'operand B seria la dada de memòria que aniria a parar a la ALU. Amb aquesta solució ens estalviem haver d'afegir un registre i passem de tenir dos estats extra a només un.



Apellidos y Nombre: Amorín Díaz, Miguel Grupo: 72 DNI: 26312288N

Nuevo contenido de la ROM_OUT:

@ROM			New1	New0	Bnz	Bz	WrMem	RdIn	WrOut	WrD	Ldlr	Byte	R@/Pc	Alu/R@	Pc/Rx	Ry/N	P/I/L/A1	P/I/L/A0	OP1	OP0	MxN1	MxN0	MxF	F2	F1	F0	Mx@D1	Mx@D0	Node
0			0	0																									F
1			0	0																									D
2			0	0																									AI
3			0	0																									Cmp
4			0	0																									Addi
5			0	0																									Addr
6			0	0																									Ld
7			0	0																									St
8			0	0																									Ldb
9			0	0																									Stb
10			0	0																									Jalr
11			0	0																									Bz
12			0	0																									Bnz
13			0	0																									Movi
14			0	0																									Movhi
15			0	0																									In
16			0	0																									Out
17			1	1	0	0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Mem_Addr
..31																													Nop

Tabla ROM_Q+ (RQ+ori) del SISC vN plus sobre la que marcar los cambios

Q	I	Q^+	$q_4q_3q_2q_1q_0$	$I_{15}I_{14}I_{13}I_{12}I_8$	Q^+ (Hexa)	# veces	Q^+ (Hexa)
F	x	D	0 0 0 0 0	x x x x x	01	32	01
D	AL	Al	0 0 0 0 1	0 0 0 0 x	02	2	02
D	CMP	Cmp	0 0 0 0 1	0 0 0 1 x	03	2	03
D	ADDI	Addi	0 0 0 0 1	0 0 1 0 x	04	2	04
D	LD	Addr	0 0 0 0 1	0 0 1 1 x	05	2	05
D	ST	Addr	0 0 0 0 1	0 1 0 0 x	05	2	05
D	LDB	Addr	0 0 0 0 1	0 1 0 1 x	05	2	05
D	STB	Addr	0 0 0 0 1	0 1 1 0 x	05	2	05
D	JALR	Jalr	0 0 0 0 1	0 1 1 1 x	0A	2	0A
D	BZ	Bz	0 0 0 0 1	1 0 0 0 0	0B	1	0B
D	BNZ	Bnz	0 0 0 0 1	1 0 0 0 1	0C	1	0C
D	MOVI	Movi	0 0 0 0 1	1 0 0 1 0	0D	1	0D
D	MOVHI	Movhi	0 0 0 0 1	1 0 0 1 1	0E	1	0E
D	IN	In	0 0 0 0 1	1 0 1 0 0	0F	1	0F
D	OUT	Out	0 0 0 0 1	1 0 1 0 1	10	1	10
D	ilegal	Nop	0 0 0 0 1	1 0 1 1 x	11	2	11
			0 0 0 0 1	1 1 x x x	11	8	11
Al	x	F	0 0 0 1 0	x x x x x	00	32	00
Cmp	x	F	0 0 0 1 1	x x x x x	00	32	00
Addi	x	F	0 0 1 0 0	x x x x x	00	32	00
Addr	!(LD+ST+ LDB+STB)	x	0 0 1 0 1	0 0 0 0 x	xx	2	00
			0 0 1 0 1	0 0 0 1 x	xx	2	00
			0 0 1 0 1	0 0 1 0 x	xx	2	00
Addr	LD	Ld	0 0 1 0 1	0 0 1 1 x	06	2	06
Addr	ST	St	0 0 1 0 1	0 1 0 0 x	07	2	07
Addr	LDB	Ldb	0 0 1 0 1	0 1 0 1 x	08	2	08
Addr	STB	Stb	0 0 1 0 1	0 1 1 0 x	09	2	09
Addr	!(LD+ST+ LDB+STB)	x	0 0 1 0 1	0 1 1 1 x	xx	2	00
			0 0 1 0 1	1 x x x x	xx	16	00
Ld	x	F	0 0 1 1 0	x x x x x	00	32	00
St	x	F	0 0 1 1 1	x x x x x	00	32	00
Ldb	x	F	0 1 0 0 0	x x x x x	00	32	00
Stb	x	F	0 1 0 0 1	x x x x x	00	32	00
Jalr	x	F	0 1 0 1 0	x x x x x	00	32	00
Bz	x	F	0 1 0 1 1	x x x x x	00	32	00
Bnz	x	F	0 1 1 0 0	x x x x x	00	32	00
Movi	x	F	0 1 1 0 1	x x x x x	00	32	00
Movhi	x	F	0 1 1 1 0	x x x x x	00	32	00
In	x	F	0 1 1 1 1	x x x x x	00	32	00
Out	x	F	1 0 0 0 0	x x x x x	00	32	00
			1 0 0 0 1	x x x x x	00	32	00
Nop	x	F	1 0 0 1 x	x x x x x	00	64	00
			1 0 1 x x	x x x x x	00	128	00
			1 1 x x x	x x x x x	00	256	00

Tabla 1.1 Contenido de la ROM_Q+ en tres tablas con formatos diferentes pero la misma información

Apellidos y Nombre: Amorín Díaz, Miguel Grupo: 72 DNI: 26312288N

Contenido de la RQ+ori del SISC vN plus sobre la que marcar los cambios

01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01
02 02
03 03
04 04
05 05
05 05
05 05
05 05
0a 0a
0b
0c
0d
0e
0f
10
11 11
11 11 11 11 11 11 11 11
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00
00 00
00 00
06 06
07 07
08 08
09 09
00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ← E17
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Cambios en la ROM Q+ para crear la nueva ROM_Q+ (RQ+new)

(solo para la zona marcada en la tabla anterior)

Q	I	Q^+
D	M_AL	Mem_Addr
D	M_CMP	Mem_Addr
Mem_Addr	M_AL	AL
Mem_Addr	M_CMP	CMP

$q_4q_3q_2q_1q_0$	$I_{15}I_{14}I_{13}I_{12}I_8$	Q^+ (Hexa)
00001	1011 X	11
00001	1100 X	11
10001	1011 X	02
10001	1100 X	03

# veces	Q^+ (Hexa)
2	11
2	11
2	02
2	03

Tabla 1.2 Contenido a cambiar enla ROM_Q+ en tres tablas con formatos diferentes pero la misma información

Apellidos y Nombre: Amorín Díaz, Miguel Grupo: 72 DNI: 26312288N

ROM_Q_OUT (RQori) del SISC vN plus sobre la que marcar los cambios para crear al RQnew

0C260F0
00020B0
0041000
0041100
0040031
0000030
0048401
0208000
0058401
0218000
0C44E2D
0400220
0800220
0040266
004026A
0140802
0080000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000
0000000