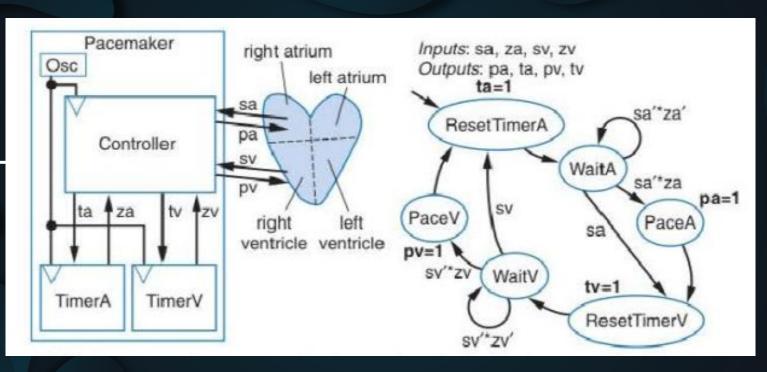
Projeto I Marcapasso

DCA0212.0 - Circuitos Digitais

Componentes:

- IGOR SÉRGIO DE FRANÇA CORREIA
- NEUMAN FABRICIO DE OLIVEIRA FERNANDES
- THIAGO THEIRY DE OLIVEIRA

Introdução



Desenvolvimento

Captura(interpretação) do comportamento da máquina de estados finita;



Definição da arquitetura



Codificação dos estados



Conversão - Tabela verdade

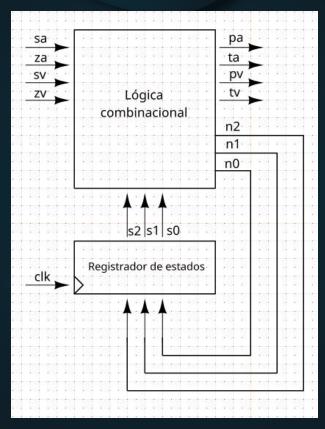


Conversão - Equações booleanas

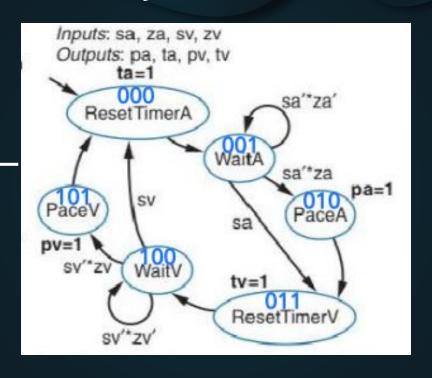


Circuito lógico (Portas lógicas e registrador de estados)

Definição da arquitetura



Codificação dos estados



Conversão - Tabela verdade

states				input			output							
States	s2	s1	s0	sa	sv	za	ZV	n2	n1	n0	pa	ta	pv	tv
ResetTimerA	0	0	0	х	х	х	х	0	0	1	0	1	0	0
	0	0	1	0	0	х	х	0	0	1	0	0	0	0
WaitA	0	0	1	0	1	х	х	0	1	0	0	0	0	0
	0	0	1	1	х	х	х	0	1	1	0	0	0	0
PaceA	0	1	0	х	х	x	х	0	1	1	1	0	0	0
ResetTimerV	0	1	1	х	х	x	х	1	0	0	0	0	0	1
	1	0	0	х	х	0	0	1	0	0	0	0	0	0
WaitV	1	0	0	х	х	1	х	0	0	0	0	0	0	0
	1	0	0	х	х	0	1	1	0	1	0	0	0	0
PaceV	1	0	1	Х	х	х	Х	0	0	0	0	0	1	0

Conversão - Equações Booleanas

```
n2 = s2'*s1*s0 + s2*s1'*s0'*za'*zv' + s2*s1'*s0'+za'+zv;
n1 = s2'*s1'*s0*sa'*sv + s2'*s1'*s0*sa + s2'*s1*s0';
n0 = s2'*s1'*s0' + s2'*s1'*s0*sa'*sv' + s2'*s1'*s0*sa + s2'*s1*s0' + s2*s1'*s0'*za'*zv;
pa= s2'*s1*s0';
ta= s2'*s1'*s0';
pv = s2*s1'*s0;
tv = s2'*s1*s0;
```

Conversão - Equações Booleanas: Simplificações

```
n2= s2'*s1*s0 + s2*s1'*s0'*za', pela propriedade da identidade;

n0= s2'*s0' *(s1' + s1) + s2'*s1'*s0*sa'*sv' + s2'*s1'*s0*sa+ s2*s1'*s0'*za'*zv, pela prop.distributiva;

n0= s2'*s0'*1 + s2'*s1'*s0*sa'*sv' + s2'*s1'*s0*sa+ s2*s1'*s0'*za'*zv, pela prop. do complemento;

n0= s2'*s0' + s2'*s1'*s0*sa'*sv' + s2'*s1'*s0*sa+ s2*s1'*s0'*za'*zv, pela prop.da identidade;

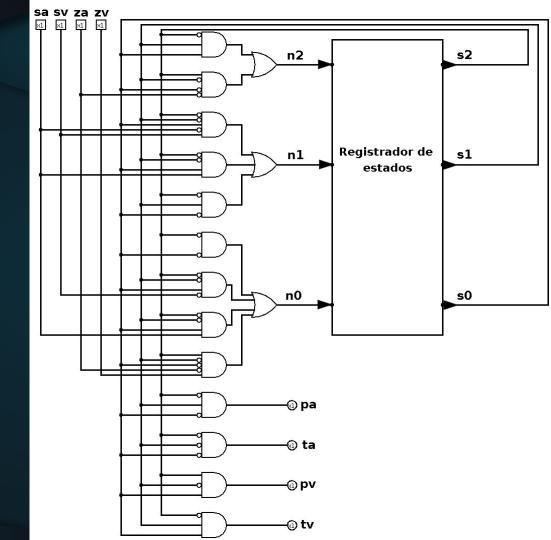
n0= s2'*s0' + s2'*s1'*s0* (sa'*sv' + sa) + s2*s1'*s0'*za'*zv, pela prop. distributiva;

n0= s2'*s0' + s2'*s1'*s0* (sv' + sa) + s2*s1'*s0'*za'*zv, pela lei da absorção;

n0= s2'*s0' + s2'*s1'*s0*sv' + s2'*s1'*s0*sa+ s2*s1'*s0'*za'*zv, distribuindo;
```

n2= s2'*s1*s0 + s2*s1'*s0'*za'*(zv' + zv), pela propriedade distributiva; n2= s2'*s1*s0 + s2*s1'*s0'*za'*1, pela propriedade do complemento;

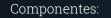
Implementação da lógica combinacional



Dificuldades e soluções

			-										
10000	(20/2)	7.00		7.000	100.00		1.0000			_	100000	0.000	tv
			- 22	27.70		1,072			7,172	10000		1000	0
		-		-			-	-	N 2/100 (A)	_	- 72	-	0
		_			_					_			0
				37.37	1				1	0		0	0
10000	1033	2007	- (21)	- 67	0	2000	- 60	0.000	1	0	20	0	0
0	0	0	0	1	0	1	0	0	1	0	1	0	0
0	0	0	0	1	1	0	0	0	1	0	1	0	0
0	0	0	0	1	1	1	0	0	1	0	1	0	0
0	0	0	1	0	0	0	0	0	1	0	1	0	0
0	0	0	1	0	0	1	0	0	1	0	1	0	0
0	0	0	1	0	1	0	0	0	1	0	1	0	0
0	0	0	1	0	1	1	0	0	1	0	1	0	0
0	0	0	1	1	0	0	0	0	1	0	1	0	0
0	0	0	1	1	0	1	0	0	1	0	1	0	0
0	0	0	1	1	1	0	0	0	1	0	1	0	0
0	0	0	1	1	1	1	0	0	1	0	1	0	0
0	0	1	0	0	0	0	0	0	1	0	0	0	0
0	0	1	0	0	0	1	0	0	1	0	0	0	0
0	0	1	0	0	1	0	0	1	0	0	0	0	0
0	0	1	0	0	1	1	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0	0	1	0	0	0	0
0	0	1	0	1	0	1	0	0	1	0	0	0	0
0	0	1	0	1	1	0	0	1	0	0	0	0	0
0	0	1	0	1	1	1	0	1	0	0	0	0	0
0	0	1	1	0	0	0	0	1	1	0	0	0	0
0	0	1	1	0	0	1	0	1	1	0	0	0	0
0	0	1	1	0	1	0	0	1	1	0	0	0	0
0	0	1	1	0	1	1	0	1	1	0	0	0	0
0	0	1	1	1	0	0	0	1	1	0	0	0	0
0	0	1	1	1	0	1	0	1	1	0	0	0	0
0	0	1	1	1	1	0	0	1	1	0	0	0	0
0	0	1	1	1	1	1	0	1	1	0	0	0	0
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	s2 s1 s0 sa sy 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 0 1 0 <td>\$2 \$1 \$0 \$a \$v \$za 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 1 1 0<</td> <td>s2 s1 s0 sa sv za zv 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 0 0 0 0 0 1 0 1 0 0 0 0 0 0 1 1 0 0 1 1 0 0 1 0 1 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0<</td> <td>\$2 \$1 \$0 \$a \$v \$za \$zv \$n2 0 <t< td=""><td>\$2 \$1 \$0 \$a \$v \$2a \$v \$n2 \$n1 0 <</td><td>s2 s1 s0 sa sv 2a zv n2 n1 n0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 1 0 0 <td< td=""><td>\$2 \$1 \$0 \$a \$v \$2a \$v \$n2 \$n1 \$n0 \$pa\$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 1 0</td><td>s2 s1 s0 sa sv 2a zv n2 n1 n0 pa ta 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 1 0 0 1 0 <</td><td>S2 S1 S0 Sa SV 2a 2V n2 n1 n0 pa ta pV 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 1</td></td<></td></t<></td>	\$2 \$1 \$0 \$a \$v \$za 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 1 1 0<	s2 s1 s0 sa sv za zv 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 0 0 0 0 0 1 0 1 0 0 0 0 0 0 1 1 0 0 1 1 0 0 1 0 1 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0<	\$2 \$1 \$0 \$a \$v \$za \$zv \$n2 0 <t< td=""><td>\$2 \$1 \$0 \$a \$v \$2a \$v \$n2 \$n1 0 <</td><td>s2 s1 s0 sa sv 2a zv n2 n1 n0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 1 0 0 <td< td=""><td>\$2 \$1 \$0 \$a \$v \$2a \$v \$n2 \$n1 \$n0 \$pa\$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 1 0</td><td>s2 s1 s0 sa sv 2a zv n2 n1 n0 pa ta 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 1 0 0 1 0 <</td><td>S2 S1 S0 Sa SV 2a 2V n2 n1 n0 pa ta pV 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 1</td></td<></td></t<>	\$2 \$1 \$0 \$a \$v \$2a \$v \$n2 \$n1 0 <	s2 s1 s0 sa sv 2a zv n2 n1 n0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 1 0 0 <td< td=""><td>\$2 \$1 \$0 \$a \$v \$2a \$v \$n2 \$n1 \$n0 \$pa\$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 1 0</td><td>s2 s1 s0 sa sv 2a zv n2 n1 n0 pa ta 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 1 0 0 1 0 <</td><td>S2 S1 S0 Sa SV 2a 2V n2 n1 n0 pa ta pV 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 1</td></td<>	\$2 \$1 \$0 \$a \$v \$2a \$v \$n2 \$n1 \$n0 \$pa\$ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 1 0	s2 s1 s0 sa sv 2a zv n2 n1 n0 pa ta 0 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 1 0 0 1 0 <	S2 S1 S0 Sa SV 2a 2V n2 n1 n0 pa ta pV 0 0 0 0 0 0 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 1

0)	1	_											
		1	0	0	0	0	0	0	1	1	1	0	0	0
0)	1	0	0	0	0	1	0	1	1	1	0	0	0
)	1	0	0	0	1	0	0	1	1	1	0	0	0
. 0)	1	0	0	0	1	1	0	1	1	1	0	0	0
0)	1	0	0	1	0	0	0	1	1	1	0	0	0
0)	1	0	0	1	0	1	0	1	1	1	0	0	0
0)	1	0	0	1	1	0	0	1	1	1	0	0	0
PaceA)	1	0	0	1	1	1	0	1	1	1	0	0	0
raceA 0)	1	0	1	0	0	0	0	1	1	1	0	0	0
0)	1	0	1	0	0	1	0	1	1	1	0	0	0
0)	1	0	1	0	1	0	0	1	1	1	0	0	0
0)	1	0	1	0	1	1	0	1	1	1	0	0	0
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0)	1	0	1	1	1	0	0	1	1	1	0	0	0
0)	1	0	1	1	1	1	0	1	1	1	0	0	0
0)	1	1	0	0	0	0	1	0	0	0	0	0	1
0)	1	1	0	0	0	1	1	0	0	0	0	0	1
0)	1	1	0	0	1	0	1	0	0	0	0	0	1
0)	1	1	0	0	1	1	1	0	0	0	0	0	1
0)	1	1	0	1	0	0	1	0	0	0	0	0	1
0)	1	1	0	1	0	1	1	0	0	0	0	0	1
0)	1	1	0	1	1	0	1	0	0	0	0	0	1
0)	1	1	0	1	1	1	1	0	0	0	0	0	1
ResetTimerV)	1	1	1	0	0	0	1	0	0	0	0	0	1
0)	1	1	1	0	0	1	1	0	0	0	0	0	1
0)	1	1	1	0	1	0	1	0	0	0	0	0	1
0)	1	1	1	0	1	1	1	0	0	0	0	0	1
0)	1	1	1	1	0	0	1	0	0	0	0	0	1
0)	1	1	1	1	0	1	1	0	0	0	0	0	1
0)	1	1	1	1	1	0	1	0	0	0	0	0	1
0)	1	1	1	1	1	1	1	0	0	0	0	0	1



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- THIAGO THEIRY DE OLIVEIRA

Obrigado pela atenção!