∘	b	bi	d	di	o	oi	m	mi	s	si	f	fi
b	b	**B**	b d o m s	b	b	b d o m s	b	b d o m s	b	b	b d o m s	b
bi	**B**	bi	bi d oi mi fi	bi	bi d oi mi fi	bi	bi d oi mi fi	bi	bi d oi mi fi	bi	bi	bi
d	b	bi	d	**B**	b d o m s	bi d oi mi f	b	bi	d	bi d oi mi f	d	b d o m s
di	b di o m fi	bi di oi mi si	d di s si f fi o oi eq	di	di o fi	di oi si	di o fi	di oi fi	di o fi	di	di oi si	di
o	b	bi di oi mi si	d o s	b di o m fi	b o m	eq d di o oi s si f fi	b	di oi si	o	di oi fi	d o s	b o m
oi	b di o m fi	bi	d oi f	bi di oi mi si	eq d di o oi s si f fi	bi oi mi	di o fi	bi	d oi f	bi oi mi	oi	di oi si
m	b	bi di oi mi si	d o s	b	b	d o s	b	eq f fi	m	m	d o s	b
mi	b di o m fi	bi	d oi f	bi	d oi f	bi	eq s si	bi	d oi f	bi	mi	mi
s	b	bi	d	b di o m fi	b o m	d oi f	b	mi	s	eq s si	d	b o m
si	b di o m fi	bi	d oi f	di	di o fi	oi	di oi fi	mi	eq s si	si	oi	di
f	b	bi	d	bi di oi mi si	d o s	bi oi mi	m	bi	d	bi oi mi	f	eq f fi
fi	b	bi di oi mi si	d o s	di	o	di oi s	m	di oi s	o	di	eq f fi	fi

Table 1.3: Allen's composition table for IA (the basic relation "eq" is omitted). The composition of eq and any basic relation r is r.

about the ordering of two temporal intervals. (For more details on these classes, the interested reader may see the chapter on computational complexity of temporal constraint problems in this book).

Finally, Golumbic and Shamir studied some interesting tractable subclasses of IA, which are restrictions of the set of relations forming the intractable class $\mathcal{A}_3$ [Golumbic and Shamir, 1993]. In particular, they show that, for some of these tractable subclasses, the problem of deciding consistency is equivalent to some well-known polynomial graph-theoretic problems; while for the other tractable subclasses they present new polynomial graph-based techniques. Golumbic and Shamir illustrate also some interesting applications of temporal reasoning involving their classes of relations.

In the rest of this section we will focus on the main techniques for processing constraints in SIA^c, SIA and ORD-Horn.

1.3.1 Consistency Checking and Finding a Solution

Consistency checking (finding a consistent scenario/solution) for a set of constraints in SIA^c and SIA can be easily reduced to consistency checking (finding a consistent scenario/solution) for an equivalent set of constraints in PA^c and PA respectively. Hence, these tasks can be performed by using the method described in Section 1.2.1, which requires $O(n^2)$ time.

Concerning ORD-Horn constraints, it has been proved that path consistency guarantees consistency [Nebel and Bürckert, 1995]: given a set Ω of constraints in ORD-Horn, the path consistency algorithm of Figure 1.6 is a complete procedure for deciding the consistency of Ω in cubic time.*

Other path consistency algorithms for processing IA-constraints have been proposed in the temporal reasoning literature. For a comparison of some of the most representative see [Bessière, 1996].

*We have introduced this algorithm in the context of PA, but the same algorithm can be used also for constraints in IA. Of course, for IA-constraints the algorithm uses a different composition table and a different INVERSE function.