

ISO 18629-43 :2006-08 (E)

Industrial automation systems and integration_ - Process specification language_ - Part_43: Definitional extension: Activity ordering and duration extensions

Contents	Page
1. Scope.....	1
2. Normative References.....	1
3. Terms, definitions, and abbreviations.....	2
3.1 Terms and definitions.....	2
3.2 Abbreviations.....	5
4. General information on ISO 18629.....	5
5. Organization of this part of ISO 18629.....	6
6. Strong partially ordered activities.....	6
6.1 Primitive lexicon of the Strong partially ordered activities.....	7
6.2 Defined lexicon for concepts of Strong partially ordered activities.....	7
6.3 Core theories required by Strong partially ordered activities.....	7
6.4 Definitional extensions required by Strong partially ordered activities.....	7
6.5 Definitions of concepts for Strong partially ordered activities.....	8
6.5.1 same_bag.....	8
6.5.2 snapshot.....	8
6.5.3 rotate.....	8
6.5.4 reflect.....	9
6.5.5 flip.....	9
6.5.6 turn.....	10
6.5.7 bag.....	10
6.5.8 choice_poset.....	10
6.5.9 strong_poset.....	11
6.5.10 complex_poset.....	11
6.6 Grammar for process descriptions of Strong partially ordered activities.....	11
7. Duration constraints for activity occurrences.....	12
7.1 Primitive lexicon of Duration constraints for activity occurrences.....	12
7.2 Defined lexicon of Duration constraints for activity occurrences.....	12
7.3 Core theories required by Duration constraints for activity occurrences.....	13
7.4 Definitional extensions required by Duration constraints for activity occurrences.....	13
7.5 Definitions of Duration constraints for activity occurrences.....	13
7.5.1 dur.....	13
7.5.2 delay.....	13
7.5.3 dur_equiv.....	13
7.5.4 delay_equiv.....	14
7.5.5 constant.....	14
7.5.6 interval_duration.....	14
7.5.7 variable.....	14
7.6 Grammar for Duration constraints for activity occurrences.....	15
8. State-based duration.....	15
8.1 Primitive lexicon of State-based duration.....	15
8.2 Defined relations of State-based duration.....	15
8.3 Core theories required by State-based duration.....	16
8.4 Definitional extensions required by State-based duration.....	16
8.5 Definitions of State-based duration.....	16
8.5.1 conditional_duration.....	16
8.5.2 context_duration.....	16
8.5.3 unconditional_duration.....	17
8.6 Grammar for State-based duration.....	17
9. Time-based duration.....	18

9.1	Primitive lexicon of Time-based duration.....	18
9.2	Defined relations of Time-based duration.....	18
9.3	Core theories required by Time-based duration.....	18
9.4	Definitional extensions required by Time-based duration	18
9.5	Definitions of Time-based duration	18
9.5.1	rushhour	18
9.5.2	weekend	19
9.5.3	gridlock	19
9.6	Grammar for process descriptions of Time-based duration	20
10.	Duration based on state and time	20
10.1	Primitive lexicon of duration based on state and time	20
10.2	Defined lexicon of duration based on state and time	20
10.3	Core theories required by duration based on state and time	21
10.4	Definitional extensions required by Duration based on state and time	21
10.5	Definitions of Duration based on state and time	21
10.5.1	mixed_duration	21
10.5.2	nondet_mixed_duration	21
10.5.3	rigid_mixed_duration.....	22
10.6	Grammar for of Duration based on state and time	22
11.	Ordering and duration constraints on activity occurrences	23
11.1	Primitive lexicon of Ordering and duration constraints on activity occurrences	23
11.2	Defined lexicon of Ordering and duration constraints on activity occurrences	23
11.3	Core theories required by Ordering and duration constraints on activity occurrences	23
11.4	Definitional extensions required by Ordering and duration constraints on activity occurrences	24
11.5	Definitions of Ordering and duration constraints on activity occurrences.....	24
11.5.1	ordered_duration	24
11.5.2	partial_ordered_duration.....	24
11.5.3	unordered_duration	25
11.6	Grammar of process descriptions for Ordering and duration constraints on activity occurrences	25
12.	Ordering and duration constraints on embedded activity occurrences	26
12.1	Primitive lexicon of Ordering and duration constraints on embedded activity occurrences.	26
12.2	Defined lexicon of Ordering and duration constraints on embedded activity occurrences...	26
12.3	Core theories required by Ordering and duration constraints on embedded activity occurrences	26
12.4	Definitional extensions required by Ordering and duration constraints on embedded activity occurrences	26
12.5	Definitions of Ordering and duration constraints on embedded activity occurrences	27
12.5.1	embed_duration.....	27
12.5.2	partial_embed_duration	27
12.5.3	nonembed_duration.....	28
12.6	Grammar for Ordering and duration constraints on embedded activity occurrences.....	28
13.	Spoilage preconditions for activities.....	28
13.1	Primitive lexicon of Spoilage preconditions for activities	28
13.2	Defined lexicon of Spoilage precondition for activities	29
13.3	Theories required by Spoilage preconditions for activities.....	29
13.4	Definitional extensions required by Spoilage preconditions for activities	29
13.5	Definitions of Spoilage preconditions for activities.....	29
13.5.1	spoilage	29
13.5.2	possible_spoilage	30
13.5.3	nonspoilage	30
13.6	Grammar for process descriptions of Spoilage preconditions for activities.	30
14.	Scheduled embedding constraints	31
14.1	Primitive lexicon of Scheduled embedding constraints	32

14.2	Defined lexicon of Scheduled embedding constraints	32
14.3	Core theories required by Scheduled embedding constraints	32
14.4	Definitional extensions required by Scheduled embedding constraints.....	32
14.5	Definitions of Scheduled embedding constraints.....	32
14.5.1	scheduled.....	32
14.5.2	partial_scheduled	33
14.5.3	unscheduled.....	33
14.6	Grammar for Scheduled embedding constraints	34
15.	Duration-based effects	34
15.1	Primitive lexicon of Duration-based effects	35
15.2	Defined lexicon of Duration-based effects	35
15.3	Core theories required by Duration-based effects.....	35
15.4	Definitional extensions required by Duration-based effects	35
15.5	Definitions of Duration-based effects	35
15.5.1	duration_effects.....	35
15.5.2	partial_duration_effects	36
15.5.3	nonduration_constraints	36
15.6	Grammar for Duration-based effects	36
16.	Effects of activities based on duration and time	37
16.1	Primitive lexicon of Effects of activities based on duration and time	37
16.2	Defined lexicon of Effects of activities based on duration and time	37
16.3	Core theories required by Effects of activities based on duration and time.....	37
16.4	Definitional extensions required by Effects of activities based on duration and time	37
16.5	Definitions of Effects of activities based on duration and time	38
16.5.1	maintain_effects.....	38
16.5.2	partial_maintain	38
16.5.3	nonmaintain.....	39
16.6	Grammar for Effects of activities based on duration and time	39
17.	Complex sequence ordering relations	40
17.1	Primitive lexicon of Complex sequence ordering relations	40
17.2	Defined lexicon of Complex sequence ordering relations	40
17.3	Theories required by Complex sequence ordering relations.....	40
17.4	Definitional extensions required by Complex sequence ordering relations.....	40
17.5	Definitions of Complex sequence ordering relations.....	40
17.5.1	coo_precedes.....	41
17.5.2	strong_parallel.....	41
17.5.3	atomocc	41
Annex A (normative ASN.1)	Identifier of ISO 18629-43	42
Annex B (informative)	Example of process description using ISO 18629-43	43
Bibliography		52
Index		53

Figures

Figure B1: TOP level process for manufacturing a GT350 [5]	43
Figure B.2: PROCESS for manufacturing the 350–Engine [5]	46
Figure B.3: PROCESS for manufacturing the 350–Block [5]	48
Figure B.4: PROCESS for manufacturing the 350–Harness [5].....	49
Figure B.5: PROCESS for manufacturing the harness wire [5].....	50
Figure B.6 : Process for manufacturing the 350-Wire [5]	50