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Information technology — Programming languages, their environments and system software interfaces — Programming language Extended APL

*Technologies de l'information — Langages de programmation, leurs
environnements et interfaces logiciel système — Langage de
programmation APL étendu*

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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Contents

1	Scope	1
2	Normative References	2
3	Form of this International Standard	3
3.1	Form of Definitions	3
3.2	Named Arrays in Examples	4
3.3	Notes	5
3.4	Cross-References	5
3.5	General Definitions	5
4	Compliance	7
4.1	Conforming Implementations	7
4.1.1	Required Behaviour for Conforming Implementations	7
4.1.2	Required Documentation for Conforming Implementations	8
4.1.2.1	Documentation of Optional-Facilities	8
4.1.2.2	Documentation of Implementation-Defined-Facilities	8
4.1.2.3	Consistent Extensions	9
4.2	Conforming Programs	9
4.2.1	Required Behaviour for Conforming Programs	9
4.2.2	Required Documentation for Conforming Programs	9
5	Definitions	11
5.1	Characters	11
5.2	Numbers	13
5.2.1	Elementary Operations	13
5.2.2	Number Constants	14
5.2.3	Subsets of the Set of Numbers	14
5.2.4	Implementation Algorithms	16
5.2.5	Defined Operations	18
5.3	Objects	20
5.3.1	Lists	20
5.3.2	Arrays	21
5.3.3	Defined-Functions	23
5.3.4	Tokens	25

ISO/IEC 13751 : 2001 (E)

5.3.4.1	Metaclasses	26
5.3.4.2	Index-List	29
5.3.5	Symbols	29
5.3.6	Contexts	29
5.3.7	Workspaces	30
5.3.8	Sessions	30
5.3.9	Shared-Variables	32
5.3.10	Systems	33
5.4	Evaluation Sequences	35
5.4.1	Evaluation Sequence Phrases	36
5.4.2	Diagrams	37
5.5	Other Terms	38
6	Syntax and Evaluation	39
6.1	Introduction	39
6.1.1	Evaluate-Line	39
6.1.2	Character-Diagrams	40
6.1.3	Evaluate-Statement	47
6.1.4	Bind-Token-Class	49
6.1.5	Literal-Conversion	50
6.1.6	Statement-Analysis Token-Diagrams	50
6.2	Reduce-Statement	55
6.3	The Phrase Evaluators	60
6.3.1	Diagrams	60
6.3.2	Remove-Parentheses	60
6.3.3	Evaluate-Niladic-Function	60
6.3.4	Evaluate-Monadic-Function	61
6.3.5	Evaluate-Monadic-Operator	62
6.3.6	Evaluate-Dyadic-Function	63
6.3.7	Evaluate-Dyadic-Operator	65
6.3.8	Evaluate-Indexed-Reference	66
6.3.9	Evaluate-Assignment	67
6.3.10	Evaluate-Indexed-Assignment	67
6.3.11	Evaluate-Variable	68
6.3.12	Build-Index-List	68
6.3.13	Process-End-of-Statement	69
6.4	The Form Table	70
7	Scalar Functions	75
7.1	Monadic Scalar Functions	76
7.1.1	Conjugate	76
7.1.2	Negative	76
7.1.3	Direction	77
7.1.4	Reciprocal	77
7.1.5	Floor	78
7.1.6	Ceiling	78
7.1.7	Exponential	79

7.1.8	Natural Logarithm	79
7.1.9	Magnitude	80
7.1.10	Factorial	81
7.1.11	Pi times	82
7.1.12	Not	83
7.2	Dyadic Scalar Functions	83
7.2.1	Plus	84
7.2.2	Minus	84
7.2.3	Times	85
7.2.4	Divide	85
7.2.5	Maximum	86
7.2.6	Minimum	86
7.2.7	Power	87
7.2.8	Logarithm	88
7.2.9	Residue	89
7.2.10	Binomial	90
7.2.11	Circular Functions	91
7.2.12	And/LCM	93
7.2.13	Or/GCD	94
7.2.14	Nand	94
7.2.15	Nor	95
7.2.16	Equal	96
7.2.17	Less than	97
7.2.18	Less than or equal to	98
7.2.19	Not equal	99
7.2.20	Greater than or equal to	100
7.2.21	Greater than	101
8	Structural Primitive Functions	102
8.1	Introduction	102
8.2	Monadic Structural Primitive Functions	102
8.2.1	Ravel	102
8.2.2	Shape	103
8.2.3	Index Generator	104
8.2.4	Table	105
8.2.5	Depth	106
8.2.6	Enlist	107
8.3	Dyadic Structural Primitive Functions	107
8.3.1	Reshape	107
8.3.2	Join	109
9	Operators	110
9.1	Introduction	110
9.2	Monadic Operators	110
9.2.1	Reduction	110
9.2.2	Scan	113
9.2.3	N-wise Reduction	115

ISO/IEC 13751 : 2001 (E)

9.2.4	Duplicate	118
9.2.5	Commute	118
9.2.6	Each	119
9.3	Dyadic Operators	120
9.3.1	Outer Product	120
9.3.2	Inner Product	121
9.3.3	Rank operator definitions	123
9.3.4	Rank operator deriving monadic function	124
9.3.5	Rank operator deriving dyadic function	125
10	Mixed Functions	127
10.1	Monadic Mixed Functions	127
10.1.1	Roll	127
10.1.2	Grade Up	129
10.1.3	Grade Down	131
10.1.4	Reverse	132
10.1.5	Monadic Transpose	133
10.1.6	Matrix Inverse	134
10.1.7	Execute	135
10.1.8	Unique	136
10.1.9	First	137
10.2	Dyadic Mixed Functions	137
10.2.1	Join Along an Axis	137
10.2.2	Index of	140
10.2.3	Member of	141
10.2.4	Deal	142
10.2.5	Replicate	143
10.2.6	Expand	145
10.2.7	Rotate	147
10.2.8	Base Value	149
10.2.9	Representation	151
10.2.10	Dyadic Transpose	153
10.2.11	Take	155
10.2.12	Drop	156
10.2.13	Matrix Divide	157
10.2.14	Indexed Reference	158
10.2.15	Indexed Assignment	159
10.2.16	Without	161
10.2.17	Left	161
10.2.18	Right	162
10.2.19	Character Grade Definitions	162
10.2.20	Character Grade Down	163
10.2.21	Character Grade Up	164
10.2.22	Pick	166
10.2.23	Identical	167
10.2.24	Disclose	168
10.2.25	Disclose with Axis	168

10.2.26	Enclose	169
10.2.27	Enclose with Axis	169
11	System Functions	170
11.1	Introduction	170
11.2	Definitions	170
11.3	Diagram	171
11.4	Niladic System Functions	171
11.4.1	Time Stamp	171
11.4.2	Atomic Vector	172
11.4.3	Line Counter	172
11.4.4	Event Message	173
11.4.5	Event Type	174
11.5	Monadic System Functions	174
11.5.1	Delay	174
11.5.2	Name Class	175
11.5.3	Expunge	176
11.5.4	Name List	177
11.5.5	Query Stop	178
11.5.6	Query Trace	179
11.5.7	Monadic Event Simulation	180
11.6	Dyadic System Functions	180
11.6.1	Name List	180
11.6.2	Set Stop	181
11.6.3	Set Trace	182
11.6.4	Execute Alternate	183
11.6.5	Dyadic Event Simulation	184
11.6.6	Transfer Form	185
12	System Variables	186
12.1	Definitions	186
12.2	Evaluation Sequences	187
12.2.1	Comparison Tolerance	187
12.2.2	Random Link	188
12.2.3	Print Precision	189
12.2.4	Index Origin	190
12.2.5	Latent Expression	191
13	Defined Functions	192
13.1	Introduction	192
13.2	Definitions	192
13.3	Diagrams	196
13.4	Operations	200
13.4.1	Call-Defined-Function	200
13.4.2	Defined-Function-Control	202
13.4.3	Function Fix	203
13.4.4	Character Representation	204
13.5	Function Editing	204

ISO/IEC 13751 : 2001 (E)

13.5.1	Evaluate-Function-Definition-Request	204
13.5.2	Evaluate-Editing-Request	206
13.5.3	Diagrams	207
14	Shared Variables	210
14.1	Informal Introduction	210
14.2	Definitions	214
14.3	Diagrams	214
14.4	Operations	214
14.4.1	Primary-Name	214
14.4.2	Surrogate-Name	214
14.4.3	Degree-of-Coupling	215
14.4.4	Access-Control-Vector	215
14.4.5	Offer	215
14.4.6	Retract	216
14.4.7	Shared-Variable-Reset	216
14.4.8	Report-State	216
14.4.9	Signal-Event	217
14.4.10	Clear-Event	217
14.5	Shared Variable Forms	217
14.5.1	Shared Variable Reference	217
14.5.2	Shared Variable Assignment	218
14.5.3	Shared Variable Indexed Assignment	219
14.6	Shared Variable System Functions	219
14.6.1	Shared Variable Access Control Inquiry	219
14.6.2	Shared Variable Query	221
14.6.3	Shared Variable Degree of Coupling	222
14.6.4	Shared Variable Offer	223
14.6.5	Shared Variable Retraction	224
14.6.6	Shared Variable Access Control Set	225
14.6.7	Shared Variable State Inquiry	226
14.6.8	Shared Variable Event	227
15	Formatting and Numeric Conversion	228
15.1	Introduction	228
15.2	Numeric Conversion	228
15.2.1	Numeric-Input-Conversion	228
15.2.2	Numeric-Output-Conversion	230
15.3	Diagrams	231
15.4	Operations	233
15.4.1	Monadic Format	233
15.4.2	Dyadic Format	237
16	Input and Output	239
16.1	Introduction	239
16.2	Definitions	240
16.2.1	User Facilities	240
16.2.2	Implementation Algorithms	240

16.2.3 Prompts	241
16.3 Diagrams	242
16.4 Operations	242
16.4.1 Immediate-Execution	242
16.4.2 Quad Input	244
16.4.3 Quote Quad Input	245
16.4.4 Quad Output	245
16.4.5 Quote Quad Output	246
17 System Commands	247
17.1 Introduction	247
17.2 Definitions	247
17.3 Diagrams	248
17.4 Operations	248
17.4.1 Evaluate-System-Command	248
17.5 Diagrams and Evaluation Sequences	249
Annex A (normative) Component Files	254
A.1 Definitions of arguments and results	254
A.2 Definition of functions	255
A.3 Errors	256

ISO/IEC 13751 : 2001 (E)

List of Figures

1	Statement Evaluation.	59
2	Shared Variable Access Rules.	213

List of Tables

1	The Required Character Set	12
2	Relationship between Class-Name and Content	27
3	The Phrase Table.	58
4	The Form Table	71
5	Actions for the Reduction of an Empty Vector.	113
6	Actions for the N-wise Reduction of an Empty Vector.	117

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 13751 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*.

Annex A forms a normative part of this International Standard.

ISO/IEC 13751 : 2001 (E)

Introduction

APL stands for **A Programming Language**. It is a notation invented by K. E. Iverson in the late 1950s for the description of algorithms, and expanded on and made into the programming system *APL* 360 by Iverson and his colleagues Adin Falkoff, Larry Breed, Dick Lathwell, and Roger Moore in the mid-1960s.

This document, **Programming Language APL, Extended**, is a sequel to **Programming Language APL**, ISO 8485 (1989).

The principal differences that the reader will find here have to do with new features that have been added. These topics are:

- without
- greatest common divisor
- least common multiple
- duplicate
- commute
- table
- join along first axis
- mixed arrays
- overbar in names
- underbar in names
- replicate
- character grades
- grades of arrays greater than rank one
- unique
- alpha as a name
- omega as a name
- ambivalent defined functions
- event handling
- n-wise reduction
- complex arithmetic
- left
- right
- function rank operator
- defined operators
- component file system

enclose
disclose
enlist
pick
depth
identical
each
first

An entry for each of these topics will be found in the index. Some new system commands have been added. Shared variable extensions have been added. Workspace Interchange Standard 2 is given, in which canonical representation vectors of type “E” are used to represent generalised arrays.

Information technology — Programming languages, their environments and system software interfaces — Programming language Extended APL

1 Scope

This International Standard defines the programming language APL and the environment in which APL programs are executed. Its purpose is to facilitate interchange and promote portability of APL programs and programming skills. This International Standard specifies the syntax and semantics of APL programs and the characteristics of the environment in which APL programs are executed.

It also specifies requirements for conformance to this International Standard, including the publication of values and characteristics of implementation properties so that conforming implementations can be meaningfully compared.

This International Standard does not specify:

- implementation properties that are likely to vary with the particular equipment or operating system used;
- required values for implementation limits such as APL workspace size or numeric precision;
- the data structures used to represent APL objects;
- the facilities available through shared variables.

ISO/IEC 13751 : 2001 (E)

2 Normative References

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 2382-15:1999, *Information technology – Vocabulary – Part 15: Programming languages*.

ISO 8485:1989, *Programming languages – APL*.

International Register of Coded Character Sets To Be Used With Escape Sequences, Registered character set 68. (<http://www.itsecj.ipsj.or.jp/ISO-IR/068.pdf>)