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TECHNICAL CORRIGENDUM 3

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Information technology — Programming languages — Prolog —
Part 1:
General core

TECHNICAL CORRIGENDUM 3

Technologies de l'information — Langages de programmation — Prolog —

Partie 1: Noyau général

RECTIFICATIF TECHNIQUE 3

Technical Corrigendum 3 to ISO/IEC 13211-1:1995 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*.

Allow explicitly extensions to options in 5.5 Extensions. Add new subclause

5.5.12 Options

A processor may support one or more additional options such as stream-options (7.10.2.11), close-options (7.10.2.12), read-options (7.10.3), and write-options (7.10.4) as an implementation specific feature. An invalid option E shall be associated with only two error conditions: an instantiation error when there is an instance (3.95) of E that is a valid option, and a domain error for the domain *optname_option* when there is no instance of E that is a valid option. Further, an instantiation error may occur in place of the domain error if a component of E is a variable, and an instantiated component is required.

NOTE — A valid option may be associated with other error conditions like 8.11.5.3 l and m.

In 6.2.1 Prolog text, add an optional layout text sequence to the fourth and last production

p text = [layout text sequence (* 6.4.1 *)] ;

In 7.1.6.3 a, Iterated-goal term, replace unifies with by has the form

a) If T has the form $^{\wedge}(_, G)$ then ...

Add term-to-body conversion in 7.8.3.4 Examples. Replace first paragraph by:

Table 21 and 22 show the execution stack before and after executing the control construct *call(G)* with *goal* obtained from G in step 7.8.3.1 f via 7.6.2.

Replace in Table 22 G by goal .

$N + 1 \quad ((goal, N - 1), \quad \Sigma \quad nil$

In 7.10.3 Read-options list, clarify unification for variables/1, specify left-to-right traversal order in read-options variable_names/1 and singletons/1. Replace the three paragraphs by:

variables(Vars) — After inputting a term, Vars shall be unified with a list of the variables in the term input, in left-to-right traversal order.

variable_names(VN_list) — After inputting a term, VN_list shall be unified with a list of elements where: (1) each element is a term $A = V$, and (2) V is a named variable of the term, and (3) A is an atom whose name is the characters of V, and (4) there is exactly one element for each named variable, and (5) the elements appear in the order of the first occurrence of their variables V in the term input, in left-to-right traversal order.

singletons(VN_list) — After inputting a term, VN_list shall be unified with a list of elements where: (1) each element is a term $A = V$, and (2) V is a named variable which occurs only once in the term, and (3) A is an atom whose name is the characters of V , and (4) there is exactly one element for each named variable occurring only once, and (5) the elements appear in the order of the first occurrence of their variables V in the term input, in left-to-right traversal order.

Remove "ground" in 3.206, add write-option variable_names(VN_list) before numbervars(Bool) in analogy to the read-option. Replace "an non-negative" by "a non-negative" in paragraph numbervars(Bool). Add Note 2

7.10.4 Write-options list

variable_names(VN_list) — Each variable V is output as the sequence of characters defined by the syntax for the atom A iff a term $A = V$ is an element of the list VN_list. If more than one element applies, the leftmost is used. VN_list is a list of terms $A = T$ with A an atom and T any term, possibly a variable.

NOTE 2 — Many Prolog processors modified write option numbervars/1 to print arbitrary variable names. The write option variable_names/1 serves this purpose and avoids vulnerabilities.

In 7.10.5, add writing with variable_names/1, correct terminology and writing of {}, lists, extra round brackets. Add as first subclause a1, rename and replace subclause a by a2, e by e1, g by e2, add new subclause e3, replace subclauses f and g:

7.10.5 Writing a term

a1) If Term is a variable and there is an effective write-option variable_names(VN_list) and there is an element $A = \text{Term}$ of the list VN_list with A an atom, then A is output with effective write-option quoted(false).

a2) Else if Term is a variable, a character sequence representing that variable is output. The sequence begins with _ (underscore) and the remaining characters are implementation dependent. During the execution of write_term/3, the same character sequence is used for each occurrence of a particular variable and a different character sequence is used for each distinct variable.

e1) If Term has the form '\$VAR'(N) for some non-negative integer N , and there is an effective write-option numbervars(true), a variable name as defined in subclause 7.10.4 is output,

e2) Else if Term has the form '.'(Head, Tail), and there is an effective write-option `ignore_ops(false)`, then Term is output using list notation, that is:

- 1) [(open list char) is output.
- 2) Head is output by recursively applying these rules. Head is preceded by ((open char) and followed by) (close char), if the term could not be re-input correctly with same set of current operators.
- 3) If Tail has the form '.'(H,T) then , (comma char) is output, set Head:=H, Tail:=T, and goto (2).
- 4) If Tail is [] then a closing bracket] (close list char) is output,
- 5) Else a | (head tail separator char) is output, Tail is output by recursively applying these rules. Tail is preceded by ((open char) and followed by) (close char), if the term could not be re-input correctly with same set of current operators. And finally,] (close list char) is output.

e3) Else if Term has the form '{}'(Arg), and there is an effective write-option `ignore_ops(false)`, then Term is output as a curly bracketed term (6.3.6), that is:

- 1) { (open curly char) is output.
- 2) Arg is output by recursively applying these rules.
- 3) } (close curly char) is output.

f) Else if Term has a principal functor which is not a current operator, or if there is an effective write-option `ignore_ops(true)`, then the term is output in functional notation (6.3.3), that is:

- 1) The atom of the principal functor is output.
- 2) ((open char) is output.
- 3) Each argument of the term is output by recursively applying these rules. The argument is preceded by ((open char) and followed by) (close char), if the term could not be re-input correctly with the same set of current operators.
- 4) , (comma char) is output between each successive pair of arguments.

5)) (close char) is output.

h) Else if Term has a principal functor which is an operator, and there is an effective write-option `ignore_ops(false)`, then the term is output in operator form, that is:

1) The atom of the principal functor is output in front of its argument (prefix operator), between its arguments (infix operator), or after its argument (postfix operator). In all cases, a space is output to separate an operator from its argument(s) if any ambiguity could otherwise arise.

Operators `'` and `|` are output as `,` (comma char) and `|` (bar char) respectively.

2) Each argument of the term is output by recursively applying these rules. An argument is preceded by `(` (open char) and followed by `)` (close char) if: (i) the argument's principal functor is an operator whose priority is so high that the term could not be re-input correctly with same set of current operators, or (ii) the argument is an atom which is a current operator, or (iii) the principal functor is output as a prefix operator - and the argument is a non-negative number, or (iv) the principal functor is output as a prefix operator - and the argument is output in infix or postfix operator form.

In 7.12.2 Error classification, add missing type, remove superfluous domain, add comma.

7.12.2 b: Add float to the set ValidType.

7.12.2 c: Remove `character_code_list` from the set ValidDomain.

7.12.2 e: add comma to `PermissionType` $\in$ { `binary_stream`, `flag`

In 8.1.2.1, 8.11.5.2, 8.11.6.2, add `_list` to types `close_options` and `stream_options`. Add 8.1.3 Note 7 for options lists

8.1.3 Errors

7 When a built-in predicate has an argument `Options` whose type is a list of *optname*-options as input, the argument is always `+optname_options_list`. It is always associated with:

1. an instantiation error, when `Options` is a partial list, or an element of a list prefix of `Options` is not a valid option but an instance of the element is a valid option;

2. a type error of the form `type_error(list, Options)`, when `Options` is neither a partial list nor a list;
3. a domain error of the form `domain_error(optname_option, E)`, when an element `E` of a list prefix of `Options` is neither a valid option nor any instance of `E` is a valid option; an instantiation error may occur

in place of the domain error, if a component is a variable, and an instantiated component is required.

A valid option may be associated with other error conditions.

In 8.5.1.4 Examples, add alternate error to second last example. Replace example by

```
current_prolog_flag(max_arity, A),  
  X is A + 1,  
  functor(T, foo, X).
```

```
If the Prolog flag max_arity has the value unbounded  
  type_error(evaluable, unbounded/0)  
else  
  representation_error(max_arity).
```

In 8.9.2.1 e Description (assertz/1), replace B by G.

In 8.10.3.4 example no. 20: undo the change introduced in Cor.1. That is, keep the list `[a, b, f(b), f(a)]` as it originally was in IS 13211-1:1995.

In 8.11.4.1 add subclause b: b) the goal succeeds.

Replace the four subclauses 8.11.5.3 c, 8.11.6.3 b, 8.14.1.3 b, 8.14.2.3 b respectively:

c/b) `Options` is a partial list or has a list prefix with an element `E` which is a variable or which has a component which is a variable, and an instantiated component is required.
— `instantiation_error`.