ISO/IEC JTC1/SC22/WG5 N1364

(J3/99-171)

Date: 10th June 1999 To: J3 From: Malcolm Cohen Subject: Baroque spelling of 'WITH' functionality

1. Introduction

The editor has called to our attention that people who are not using extensible types will not think of looking in SELECT TYPE to find the ASSOCIATE facility. The syntax is also weird and inconvenient - "SELECT TYPE" and "TYPE DEFAULT are misleading.

Therefore we propose that a separate (but very similar) construct should be used for accessing the ASSOCIATE facility when type-selection is not required.

2. Syntax

ASSOCIATE (<associate-name> => <expr>[, <associate-name> => <expr>]...)
...
END ASSOCIATE

Each <associate-name> is a construct entity that has the scope of the ASSOCIATE block, just like the <associate-name> in a SELECT TYPE.

```
For consistency, we should change our existing
   SELECT TYPE ( <expr> ) [ ASSOCIATE( <name> ) ]
to
   SELECT TYPE ( [ <name> => ] <expr> )
```

3. Examples

Before these changes, an example might look like this:

```
TYPE(MYTYPE) AX,AY
...
SELECT TYPE ( AX%B(I,J)%D ) ASSOCIATE ( ZX )
TYPE DEFAULT
SELECT TYPE ( AY%B(I,J)%D ) ASSOCIATE ( ZY )
TYPE DEFAULT
W = ZX*X + ZY*Y
END SELECT
END SELECT
```

After these changes, it would look like this:

```
TYPE(MYTYPE) AX,AY
...
ASSOCIATE ( Z1 => AX%B(I,J)%D, Z2 => AY%B(I,J)%D )
W = ZX*X + ZY*Y
END ASSOCIATE
```

4. Discussion

Given this construct, it no longer makes sense to allow SELECT TYPE on non-polymorphic expressions; therefore we limit SELECT TYPE to polymorphic exprs.

5. Edits

{Add the ASSOCIATE construct to the list of executable constructs}
[11:2+] Add new line "<<or>> <associate-construct>".

{Allow the blank between END and ASSOCIATE to be omitted}
[27:33+] Add new line "END ASSOCIATE".

{Require the SELECT TYPE type-selector to be polymorphic.}
[176:30+] Add new constraint
"Constraint: <selector> shall be polymorphic."

{Since we only allow polymorphic expressions in SELECT TYPE, TYPE IS should require an extensible type name. This also fixes the <type-name> problem.} [176:31] Change "<type-name>" to "<extensible-type-name>"

{SELECT TYPE type-selector is polymorphic, so the associate-name in the TYPE DEFAULT block is polymorphic} [177:29] After "name" insert "is polymorphic and" [177:30-31] Delete "; it is ... polymorphic"

{Delete old example} [178:27-33] Delete.

{Add new syntax}
[178:33+] Insert new section and renumber existing 8.1.5
"8.1.5 ASSOCIATE construct

The ASSOCIATE construct associates a name with an expression during the execution of its block.

8.1.5.1 Form of the ASSOCIATE construct

R820a <associate-construct> <<is>> <associate-stmt> <block> <end-associate-stmt> R820b <associate-stmt> <<is>> [<associate-construct-name> :] & ASSOCIATE (<association> & [, <association>]...) R820c <association> <<is>> <associate-name> => <selector> Constraint: If <selector> is not a <variable>, <associate-name> shall not appear in a variable definition context (14.7.7). R820d <selector> <<is>> <expr> <<or>> <variable> R820e <end-associate-stmt> <<is>> END ASSOCIATE [<associate-construct-name>] Constraint: If the <associate-stmt> of an <associate-construct> specifies an <associate-construct-name>, the corresponding <end-associate-stmt> shall specify the same <associate-construct-name>. If the <associate-stmt> of an <associate-construct> does not specify an <associate-construct-name>, the corresponding <end-associate-stmt> shall not specify an <associate-construct-name>.

8.1.5.2 Execution of the ASSOCIATE construct

Execution of an ASSOCIATE construct causes execution of its block. During execution of that block each associate name is associated (14.6.1.4) with the corresponding selector. The associate name assumes the type, type parameters, rank, and bounds of the selector. If the selector is not definable, its associate name is not definable. The associate name is polymorphic if and only if the selector is polymorphic.

Execution of an ASSOCIATE construct with a selector that is not a <variable> causes that selector expression to be evaluated prior to execution of the block.

It is permissible to branch to an END ASSOCIATE statement only from within the ASSOCIATE construct.

8.1.5.3 Example of the ASSOCIATE construct

```
Note 8.13
ASSOCIATE ( Z ) WITH ( EXP(-(X**2+Y**2)) * COS(THETA) )
PRINT *, A+Z, A-Z
END ASSOCIATE
".
```

{Add association information to ch14}
[372:2+] Insert
"Execution of an ASSOCIATE statement establishes an association between each
selector and the corresponding associate name of the ASSOCIATE construct.
The associate name remains associated to its selector throughout the
execution of the construct. Within the ASSOCIATE construct, each selector is
known by and may be accessed by its associate name. Upon termination of the
ASSOCIATE construct, the association is terminated.".