

Current Status of BALMSETL Implementation

The complete BALMSETL implementation package is now available on a single file, BIA4293. This file contains four "execute blocks" (series of BALM statements, of which the last is "STOP;"). To run BALMSETL programs use the following deck structure:

```
JOB, CM 70000, T50. *BALMSETL*
ATTACH (BIA, BIA4293)
BALM.
E-O-R
BIA = FILE(≠BIA≠);
FOR I = (1,4) REPEAT EXECUTE (BIA, OUTPUT);
--BALMSETL SOURCE--
E-O-F
```

The four blocks on BIA are as follows:

- 1) Definitions in BALM of the procedures necessary to implement the basic operations of SETL, and definitions of the procedures BSI and BSU used to establish operator precedence.
- 2) Definitions of the BALM procedures implementing the MEANS macro facility (see 4).
- 3) Invocations of BSI and BSU to establish operator precedence. The four precedence levels are currently defined in order of decreasing precedence as follows:
 - a) Monadic (or unary) non-boolean valued operators with precedence of 2010
 - b) Monadic boolean valued operators with precedence of 2008
 - c) Dyadic (or infix) non-boolean valued operators with left precedence of 2007, right precedence of 2006. Thus $a \text{ op } b \text{ op } c$ is interpreted $(a \text{ op } b) \text{ op } c$.
 - d) Dyadic boolean valued with left precedence of 2005, right precedence of 2004.

Note in particular that after executing this block HD and TL refer to corresponding SETL procedures. If the user wishes to keep the BALM HD and TL as monadic operators, called HDB and TLB respectively he should insert the statement

```
BSU(=(2010 HDB CAR TLB CDR));
```

before his program.

4) Several uses of MEANS, the new macro-feature due to Malcolm Harrison, which define the following forms

| SETL | BALMSETL |
|----------------------|--|
| {g(x), x ∈ a h(x)} | SETOF X EL A SUCH H(X) EXP G(X) |
| (∀x ∈ a h(x))block | FORALL X EL A SUCH H(X) REPEAT BLOCK |
| g(x) = y | G OF X = Y (do <u>not</u> use G OF X = UND for g(x) = Ω) |
| x <u>in</u> a | X IN A |
| y <u>from</u> x | Y FROM X |

As an example of the use of MEANS, note that SETOF is defined as follows:

```
BSU (= (500 SETOF SETOF)); -1
BSI (= (650 650 SUCH SUCH EXP EXP));
SETOF X1 EL X2 SUCH X3 EXP X4 MEANS
SETC(MAPX(CDR(X2), PROC(X1), IF X3
      THEN X4 ELSE UNDEF END));
```

Users may use MEANS to define further macros as follows:

1) Define all symbols used as markers in macro as infix or prefix operators; for example, SETOF, SUCH, EXP are used in this way in definition of SETOF. The choice of precedence levels determines the scope of the subparts of the macro.

2) execute

```
exp(x1,x2,x3,x4,x5,x6) MEANS max(x1,x2,x3,x4,x5,x6);
```

MEANS will analyze the expression and create a macro which will translate the argument exp into the BALMSETL (which includes BALM) expression on the right during further translation of source program.

It is suggested that users familiarize themselves with the MEANS feature by experimenting at the teletype.

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