

: Mjølner BETA Low Level Primitives

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Mj̄lner Informatics Report
August 1999

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BETA Language Modifications

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Introduction

This document describes the semantics of the low-level primitives available in the Mjllner implementation of the BETA language. There are currently some syntactic inconveniences. These may be fixed with a grammar change in a future version.

Low Level Operations

Low level operations on bits, bytes and words are available as described below. Use of these operations may in general be platform dependent.

Syntax

The syntax is as follows

%op

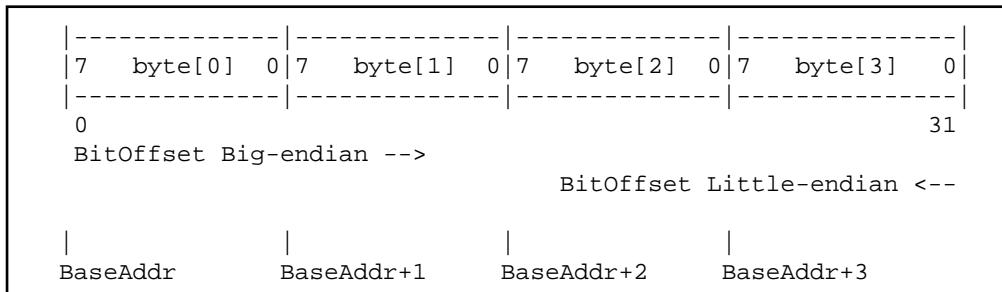
i.e., the % indicates, that op is a special low-level operation.

In the following, E, val, and inx are assumed to be integer evaluations, A is an integer object, and R is a repetition object.

Addressing Conventions

The addressing conventions of bytes, words, longs and bitfields follow the big-endian (Motorola, SPARC etc.) conventions:

| | | |
|----|---------|---------|
| 31 | long[0] | 0 |
| 15 | word[0] | word[1] |



Notice that a BitOffset is addressed from the most significant bit on big-endian architectures, and from the the least significant bit on little-endian architectures (nti, linux).

Operations

The following operations are available.

Bitwise logical complement (one's complement)

```
OP:      %Bnot
usage:   %Bnot E
```

Bitwise logical and, or, exclusive or

```
OP:      %Band, %Bor, %Bxor
usage:   E1 OP E2
ex:     E1 %Band E2
```

Note the B in these operations - B stands for bitwise. A future version may use the syntax %and.

Shift of a long

```
OP:      %srl      shift right logical
         %sll      shift left logical
         %sra      shift right arithmetic
         %sla      shift left arithmetic
         %ror      rotate right
         %rol      rotate left
usage:   E1 OP E2
ex:     E1 %sll E2
```

Get byte/short from a long

```
OP:      byteNo  -> A.%getByte
         shortNo -> A.%getShort
         longNo  -> A.%getLong
         byteNo  -> A.%getSignedByte
         shortNo -> A.%getSignedShort
```

where byteNo is an integer-evaluation in [0,3], shortNo in [0,1] and longNo in [0].

Usage: E1 -> A1.%getByte -> A2
Ex: 1 -> A.%getByte -> B

Note: byteNo -> A.%getLong is the same as A.

Put byte/short into a long

OP: (val,byteNo) -> A.%putByte
(val,shortNo) -> A.%putShort
(val,longNo) -> A.%putLong

The same restrictions for byteNo etc. as in [Get byte/short from a long](#) apply here.

usage: (val,E) -> A.OP
ex.: (val,3) -> A.%putByte

The same restrictions for byteNo etc. as in [Get byte/short from a long](#) apply here.

Note: (val,E)->A.%putLong is the same as val->A.

Get bits from a long

OP: (pos,width) -> A.%getBits
(pos,width) -> A.%getSignedBits

where pos, width in [0,31] are integer-evaluations.

usage: (pos,width) -> A.%getBits -> V

Put bits into a long

OP: (val,pos,width) -> A.%putBits

where pos, width in [0,31] are integer-evaluations.

usage: (V,12,4) -> A.%putBits

This object

Note: This operation is needed in some cases where THIS(P) cannot be used. E.g. inside singular objects in the do-part.

Notice that THIS(Object) will NOT work, you must use the operation below:

OP: %thiss object

A reference to the current object is returned.

Usage: %thiss object -> S[]

where S is declared as S: ^Object.

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