

## DECB, DECD, DECH, DECW (scalar)

Decrement scalar by multiple of predicate constraint element count

Determines the number of active elements implied by the named predicate constraint, multiplies that by an immediate in the range 1 to 16 inclusive, and then uses the result to decrement the scalar destination.

The named predicate constraint limits the number of active elements in a single predicate to:

- A fixed number (VL1 to VL256)
- The largest power of two (POW2)
- The largest multiple of three or four (MUL3 or MUL4)
- All available, implicitly a multiple of two (ALL).

Unspecified or out of range constraint encodings generate an empty predicate or zero element count rather than Undefined Instruction exception.

It has encodings from 4 classes: [Byte](#) , [Doubleword](#) , [Halfword](#) and [Word](#)

### Byte

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	1	0	0	0	0	1	1	imm4				1	1	1	0	0	1	pattern					Rdn				
size<1>size<0>								D																							

**DECB** <Xdn>{, <pattern>{, MUL #<imm>}}

```
if !HaveSVE() && !HaveSME() then UNDEFINED;
constant integer esize = 8;
integer dn = UInt(Rdn);
bits(5) pat = pattern;
integer imm = UInt(imm4) + 1;
```

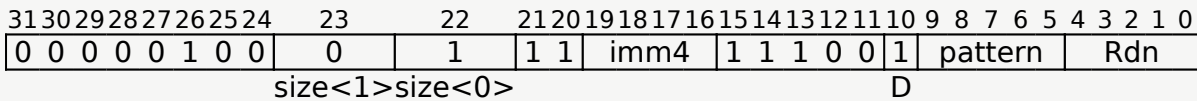
### Doubleword

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	1	0	0	1	1	1	imm4				1	1	1	0	0	1	pattern					Rdn					
size<1>size<0>								D																							

**DECD** <Xdn>{, <pattern>{, MUL #<imm>}}

```
if !HaveSVE() && !HaveSME() then UNDEFINED;
constant integer esize = 64;
integer dn = UInt(Rdn);
bits(5) pat = pattern;
integer imm = UInt(imm4) + 1;
```

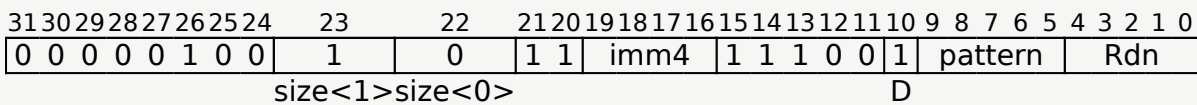
## Halfword



**DECH** <Xdn>{, <pattern>{, MUL #<imm>}}

```
if !HaveSVE() && !HaveSME() then UNDEFINED;
constant integer esize = 16;
integer dn = UInt(Rdn);
bits(5) pat = pattern;
integer imm = UInt(imm4) + 1;
```

## Word



**DECW** <Xdn>{, <pattern>{, MUL #<imm>}}

```
if !HaveSVE() && !HaveSME() then UNDEFINED;
constant integer esize = 32;
integer dn = UInt(Rdn);
bits(5) pat = pattern;
integer imm = UInt(imm4) + 1;
```

## Assembler Symbols

<Xdn>                      Is the 64-bit name of the source and destination general-purpose register, encoded in the "Rdn" field.

<pattern>

Is the optional pattern specifier, defaulting to ALL, encoded in "pattern":

pattern	<pattern>
00000	POW2
00001	VL1
00010	VL2
00011	VL3
00100	VL4
00101	VL5
00110	VL6
00111	VL7
01000	VL8
01001	VL16
01010	VL32
01011	VL64
01100	VL128
01101	VL256
0111x	#uimm5
101x1	#uimm5
10110	#uimm5
1x0x1	#uimm5
1x010	#uimm5
1xx00	#uimm5
11101	MUL4
11110	MUL3
11111	ALL

<imm>

Is the immediate multiplier, in the range 1 to 16, defaulting to 1, encoded in the "imm4" field.

## Operation

```
CheckSVEEnabled();  
integer count = DecodePredCount(pat, esize);  
constant integer VL = CurrentVL;  
bits(64) operand1 = X[dn, 64];  
  
X[dn, 64] = operand1 - (count * imm);
```

## Operational information

If FEAT\_SVE2 is implemented or FEAT\_SME is implemented, then if PSTATE.DIT is 1:

- The execution time of this instruction is independent of:
  - The values of the data supplied in any of its registers.
  - The values of the NZCV flags.
- The response of this instruction to asynchronous exceptions does not vary based on:
  - The values of the data supplied in any of its registers.
  - The values of the NZCV flags.

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Internal version only: isa v33.64, AdvSIMD v29.12, pseudocode  
no\_diffs\_2023\_09\_RC2, sve v2023-06\_rel ; Build timestamp: 2023-09-18T17:56

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