## CNT

Population Count per byte. This instruction counts the number of bits that have a value of one in each vector element in the source SIMD&FP register, places the result into a vector, and writes the vector to the destination SIMD&FP register.

Depending on the settings in the *CPACR_EL1*, *CPTR_EL2*, and *CPTR_EL3* registers, and the current Security state and Exception level, an attempt to execute the instruction might be trapped.

| 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 | Q | 0 | 0 | 1 | 1 | 1 | 0 | size | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 0 | Rn | Rd |

       **CNT  `<Vd>.<T>`, `<Vn>.<T>`**

```
integer d = UInt(Rd);
integer n = UInt(Rn);

if size != '00' then UNDEFINED;
constant integer esize = 8;
constant integer datasize = 64 << UInt(Q);
integer elements = datasize DIV 8;
```

**Assembler Symbols**

<Vd>

Is the name of the SIMD&FP destination register, encoded in the "Rd" field.

<T>

Is an arrangement specifier, encoded in "size:Q":

| size | Q | <T> |
|---|---|---|
| 00 | 0 | 8B |
| 00 | 1 | 16B |
| 01 | x | RESERVED |
| 1x | x | RESERVED |

<Vn>

Is the name of the SIMD&FP source register, encoded in the "Rn" field.

**Operation**

```
CheckFPAdvSIMDEnabled64();
bits(datasize) operand = V[n, datasize];
bits(datasize) result;

integer count;
for e = 0 to elements-1
    count = BitCount(Elem[operand, e, esize]);
    Elem[result, e, esize] = count<esize-1:0>;
V[d, datasize] = result;
```

**Operational information**

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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