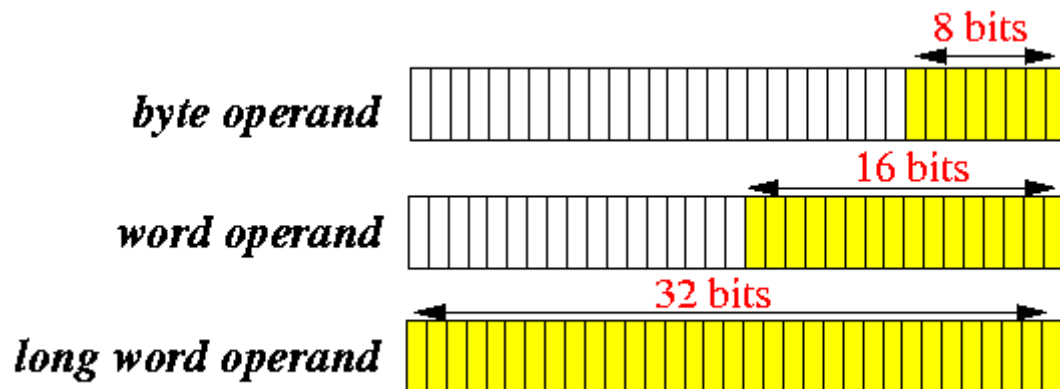


Data Register Operands

- Operands in *data registers*
 - can provide source operands used in arithmetic (add, subtract, multiply, divide) and logic (and, or, not) operations
 - can be used as destination to store results from arithmetic or logic operation
 - if an instruction changes the content of a data register, the **status flags** N, Z, V and C will be **set** according the result in the modified portion of the data register.
 - 3 types of operands in data registers:
 - byte (8 bits)
 - word (16 bits)
 - long word (32 bits)
 - Location of the different types of operands inside a data register:



- Example **byte** operation on data register

Before operation:

```

+-----+-----+-----+-----+
D0 = | 10000000 | 00000000 | 01111111 | 11111111 |
+-----+-----+-----+-----+
D1 = | 10000000 | 00000000 | 00000000 | 11111111 |
+-----+-----+-----+-----+

```

Operation: **ADD.B D0, D1**

(add byte operands in D0 and D1 and store in D1)

After the operation:

```

+-----+-----+-----+-----+
D0 = | 10000000 | 00000000 | 01111111 | 11111111 |
+-----+-----+-----+-----+
D1 = | 10000000 | 00000000 | 00000000 | 11111110 |
+-----+-----+-----+-----+

```

Flags in PSR:

```

N = 1
Z = 0
V = 0

```

C = 1

○ Example **word** (16 bits) operation on data register

Before operation:

```

+-----+-----+-----+-----+
D0 = | 10000000 | 00000000 | 01111111 | 11111111 |
+-----+-----+-----+-----+
+-----+-----+-----+-----+
D1 = | 10000000 | 00000000 | 00000000 | 11111111 |
+-----+-----+-----+-----+

```

Operation: **ADD.W D0, D1**

(add byte operands in D0 and D1 and store in D1)

After the operation:

```

+-----+-----+-----+-----+
D0 = | 10000000 | 00000000 | 01111111 | 11111111 |
+-----+-----+-----+-----+
+-----+-----+-----+-----+
D1 = | 10000000 | 00000000 | 10000000 | 11111110 |
+-----+-----+-----+-----+

```

Flags in PSR:

N = 1
Z = 0
V = 1
C = 0

○ Example **long word** (32 bits) operation on data register

Before operation:

```

+-----+-----+-----+-----+
D0 = | 10000000 | 00000000 | 01111111 | 11111111 |
+-----+-----+-----+-----+
+-----+-----+-----+-----+
D1 = | 10000000 | 00000000 | 00000000 | 11111111 |
+-----+-----+-----+-----+

```

Operation: **ADD.L D0, D1**

(add byte operands in D0 and D1 and store in D1)

After the operation:

```

+-----+-----+-----+-----+
D0 = | 10000000 | 00000000 | 01111111 | 11111111 |
+-----+-----+-----+-----+
+-----+-----+-----+-----+
D1 = | 00000000 | 00000000 | 10000000 | 11111110 |
+-----+-----+-----+-----+

```

Flags in PSR:

N = 0
Z = 0
V = 1
C = 1

○ **DEMO:** [click here](#)

