# Bytefield

## Colored Example

| 0 | | 8 | | | 24 | | 31 |
|---|---|---|---|---|---|---|---|

| Test | Break |
|------|-------|

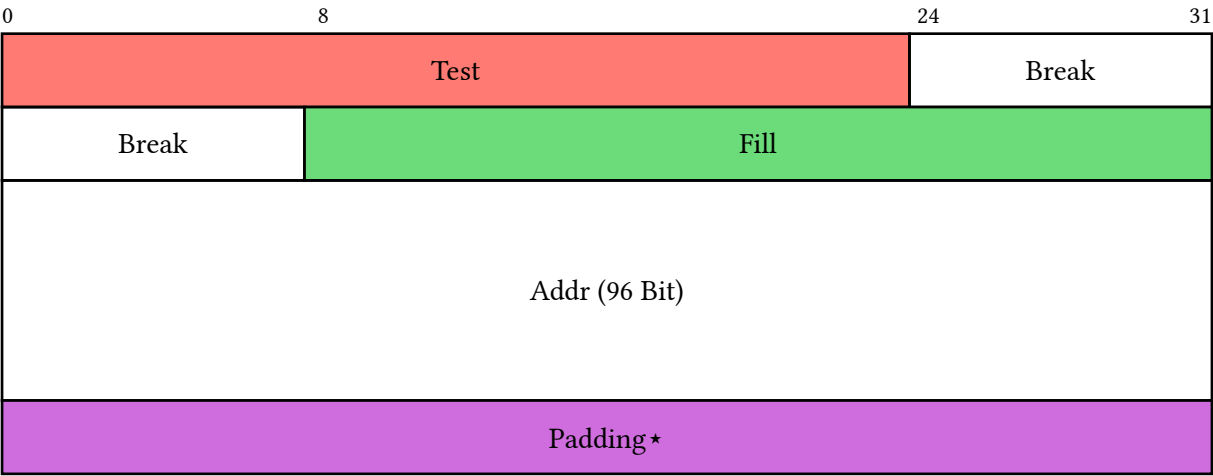| Break | Fill |
|-------|------|

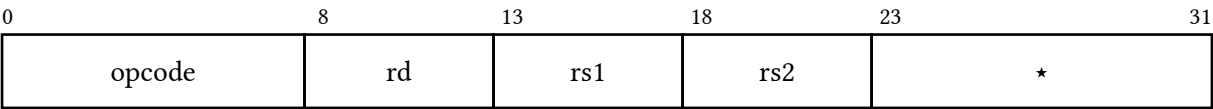| Addr (96 Bit) |
|---------------|

| Padding ⋆ |
|-----------|

## Show all bits in the bitheader

Show all bit headers with `bitheader: "all"`

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B31 | B30 | B29 | B28 | B27 | B26 | B25 | B24 | B23 | B22 | B21 | B20 | B19 | B18 | B17 | B16 | B15 | B14 | B13 | B12 | B11 | B10 | B9 | B8 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
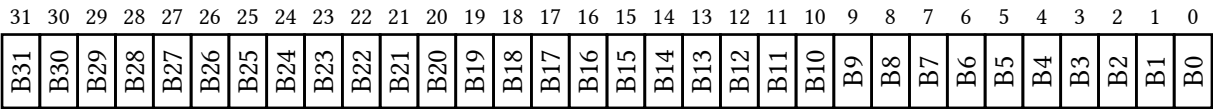
## Smart bit header

Show start bit of each bitbox with `bitheader: "smart"`.

| 0 | | 8 | 13 | 18 | 23 | | 31 |
|---|---|---|----|----|----|---|----|

| opcode | rd | rs1 | rs2 | ⋆ |
|--------|----|----|----|----|

## Reversed bit order

Select `msb_first: true` for a reversed bit order.

| 31 | 23 | | 7 | 6 | | 0 |
|----|----|---|---|---|---|---|

| MSB | Two | URG | LSB |
|-----|-----|-----|-----|
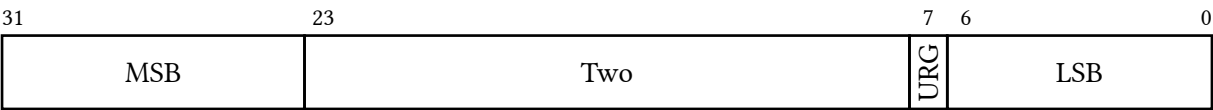
## Custom bit header

Pass an `array` to specify each number.

| 0 | | 5 | 6 | 7 | 8 | | 12 | | 15 |
|---|---|---|---|---|---|---|----|---|----|

| First | Duo | Five | Last |
|-------|-----|------|------|
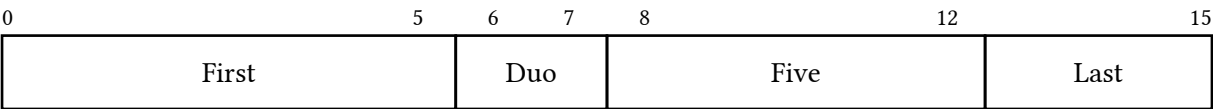
Pass an `integer` to show all multiples of this number.

| 0 | | 3 | | 6 | | 9 | | 12 | | 15 |
|---|---|---|---|---|---|---|---|----|---|----|

| First | Duo | Five | Last |
|-------|-----|------|------|
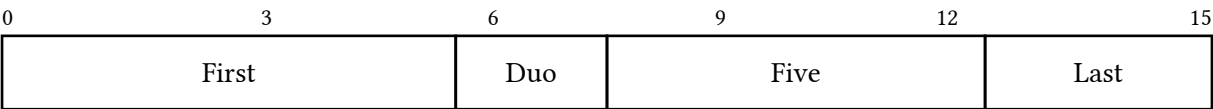
## Text header instead of numbers [WIP]

Pass an `dictionary` as bitheader. Example:

```
#let myCustomTextBitheader = (
  "0": "LSB_starting_at_bit_0",
  "13": "test",
  "24": "next_field_at_bit_24",
  "31":"MSB",
  angle: -40deg,
  marker: auto // or none
)
```
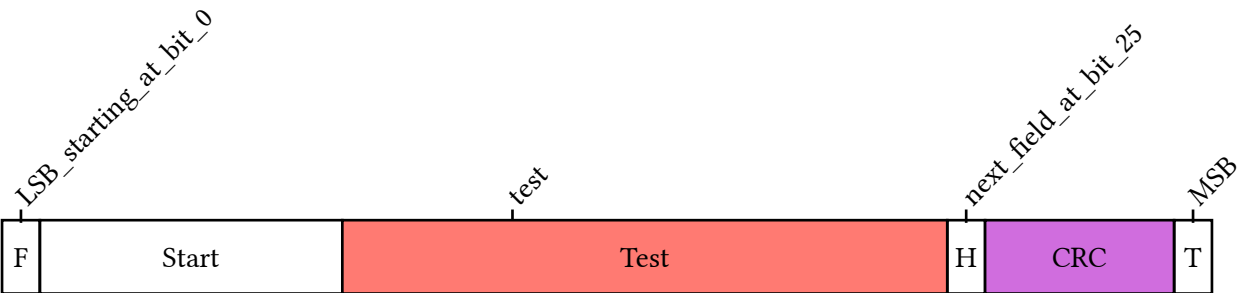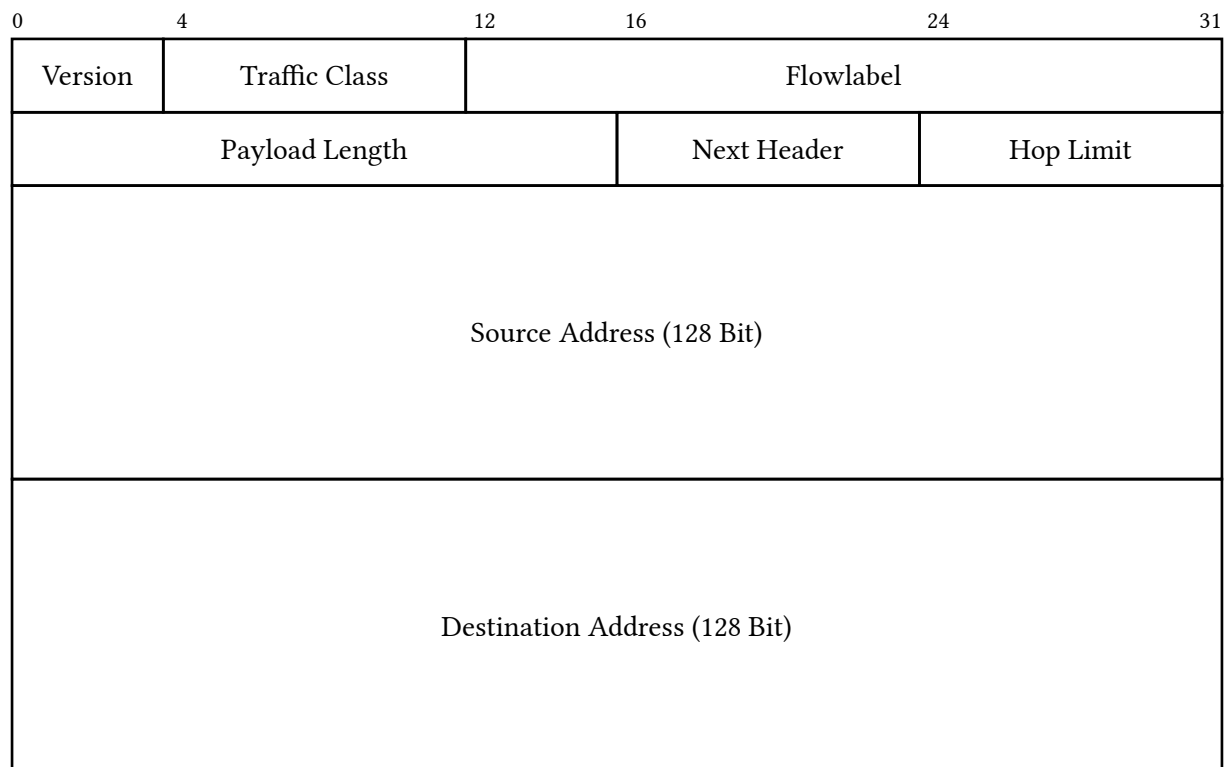


## Some predefined network protocols

### IPv4

| 0 | 4 | 8 | 16 | 19 | 24 | 31 |
|---|---|---|---|---|---|---|
| Version | TTL | TOS | | Total Length | | |
| Identification | | | Flags | | Fragment Offset | |
| TTL | | Protocol | | Header Checksum | | |
| Source Address | | | | | | |
| Destination Address | | | | | | |
| Options | | | | | Padding | |

## IPv6

| Version | Traffic Class | Flowlabel | | |
|---|---|---|---|---|
| Payload Length | | Next Header | Hop Limit | |
| Source Address (128 Bit) | | | | |
| Destination Address (128 Bit) | | | | |

## ICMP

| Type | Code | Checksum | |
|---|---|---|---|
| Identifier | | Sequence Number | |
| Optional Data ⋆ | | | |

## ICMPv6

| Type | Code | Checksum | |
|---|---|---|---|
| Internet Header + 64 bits of Original Data Datagram ⋆ | | | |
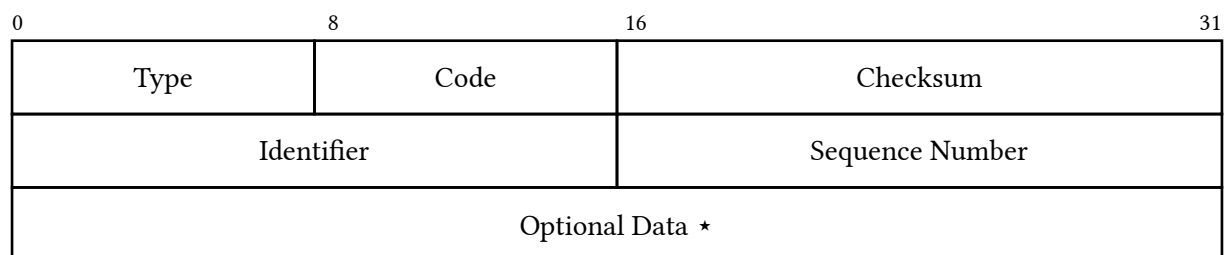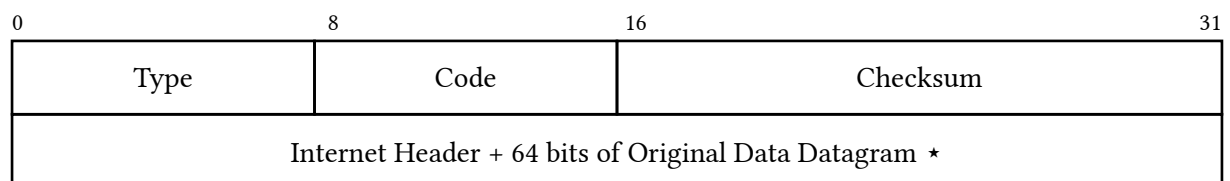
# DNS

| 0 | 16 | 31 |
|---|---|---|
| Identification | | Flags |
| Number of Questions | | Number of answer RRs |
| Number of authority RRs | | Number of additional RRs |
| Questions (64 Bit) | | |
| Answers (variable number of resource records)  (64 Bit) | | |
| Authority (variable number of resource records)  (64 Bit) | | |
| Additional information (variable number of resource records)  (64 Bit) | | |

# TCP

| 0 | 4 | 10 | 16 | 24 | 31 |
|---|---|---|---|---|---|

| Source Port | Destinatino Port |
|---|---|
| Sequence Number | |
| Acknowledgment Number | |

| Data Offset | Reserved | Flags | Window |
|---|---|---|---|

| Checksum | Urgent Pointer |
|---|---|

| Options | Padding |
|---|---|

| ...DATA...★ |
|---|

| 0 | 4 | 10 11 12 13 14 15 16 | 24 | 31 |
|---|---|---|---|---|

| Source Port | Destinatino Port |
|---|---|
| Sequence Number | |
| Acknowledgment Number | |

| Data Offset | Reserved | URG | ACK | PSH | RST | SYN | FIN | Window |
|---|---|---|---|---|---|---|---|---|

| Checksum | Urgent Pointer |
|---|---|

| Options | Padding |
|---|---|

| ...DATA...★ |
|---|

# UDP

| 0 | 16 | 31 |
|---|---|---|

| Source Port | Destinatino Port |
|---|---|
| Length | Checksum |
| ...DATA...★ | |