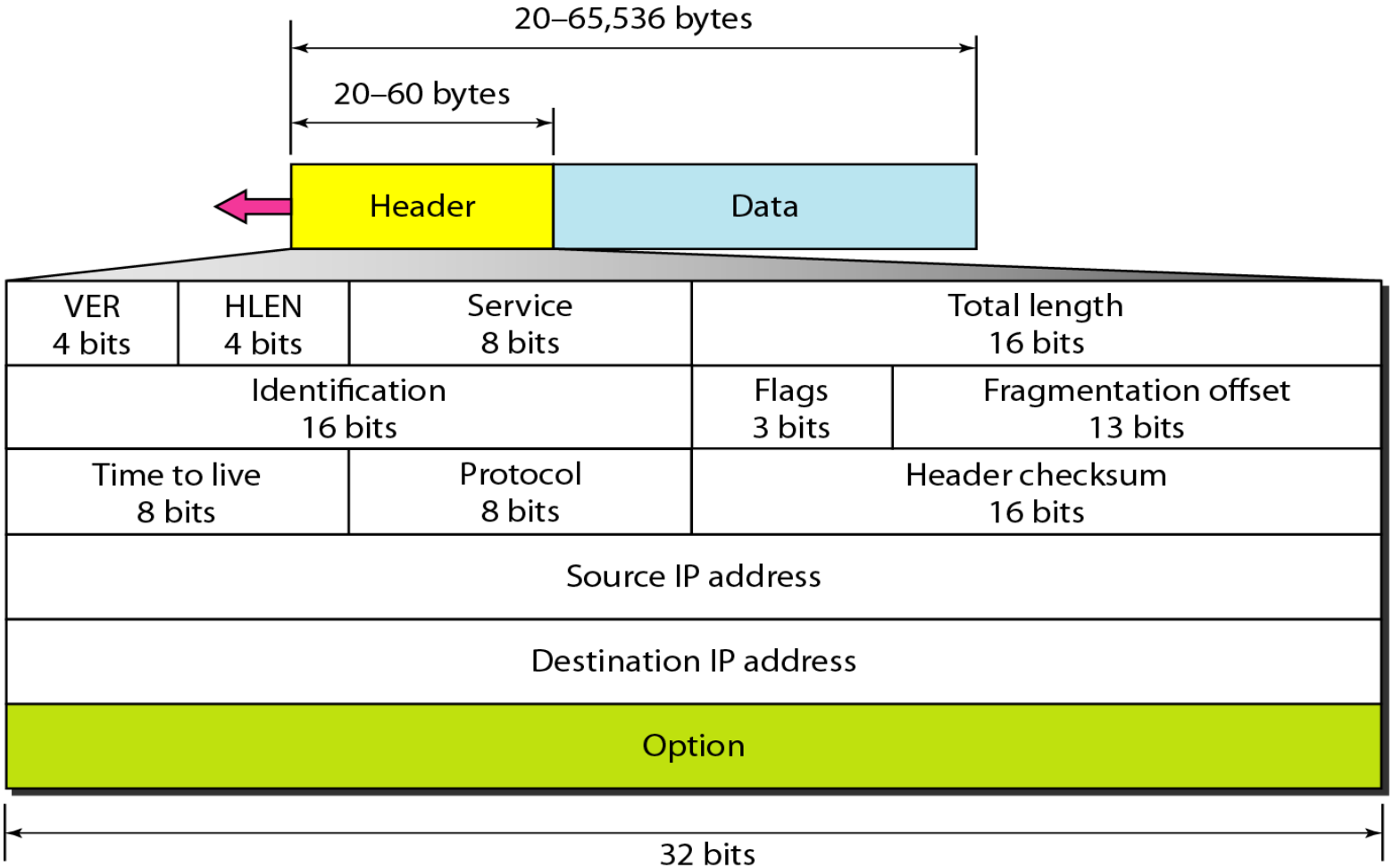
IP Packet Format

Packet Format



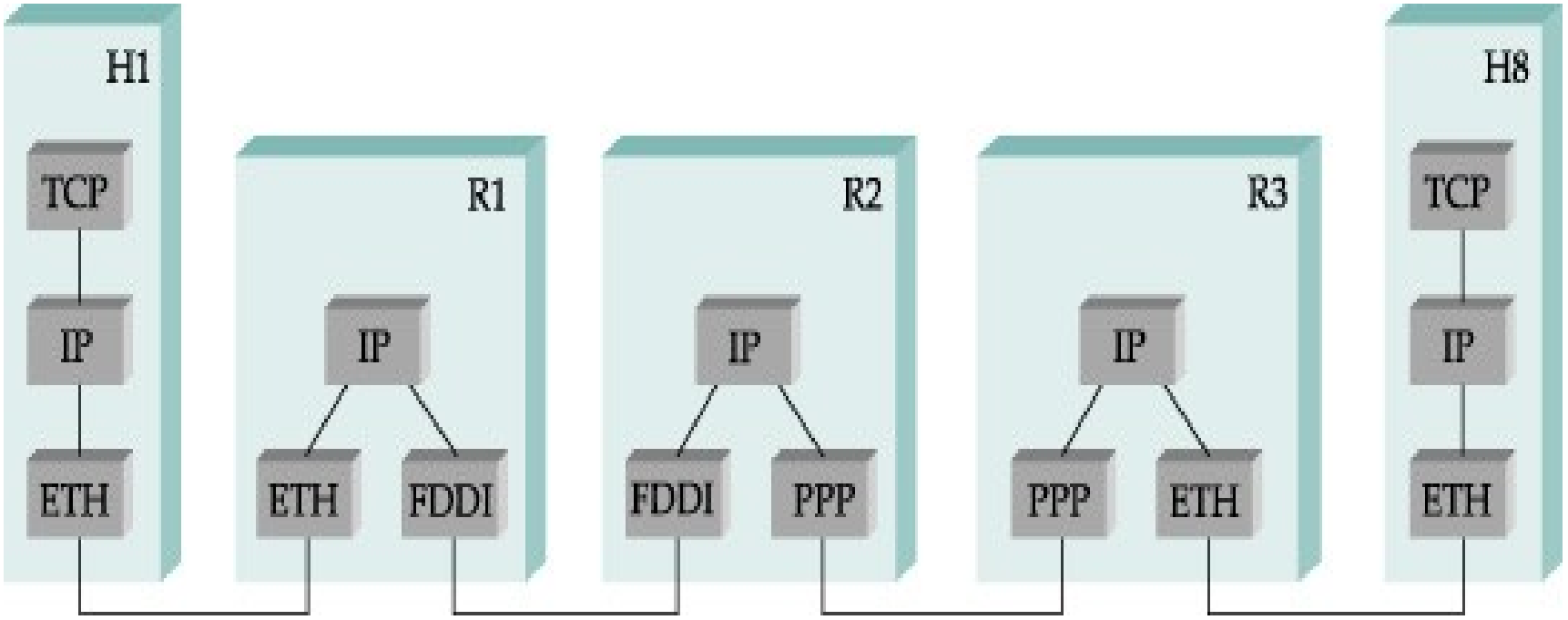
Packet Format Cont…

- Flags
  - Used in fragmentation
- Fragmentation Offset
  - Used in fragmentation
- Identification
  - Used in fragmentation

Fragmentation

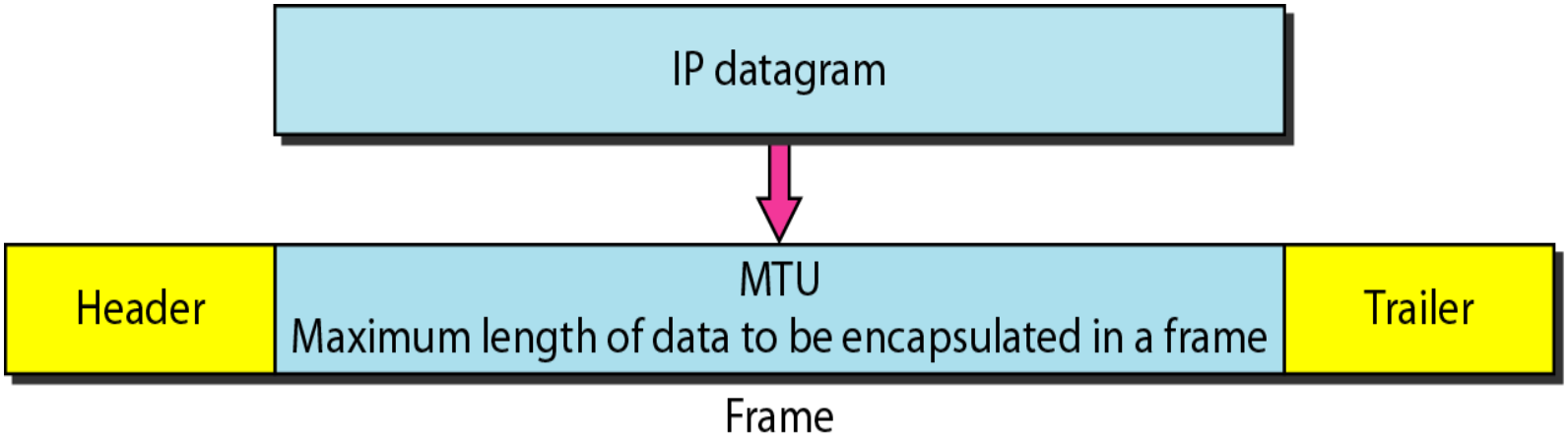
- Each router de-capsulates the IPv4 datagram from the frame it receives, process it and then encapsulates it in another frame.
- Received frame → frame format and and size depend on the protocol used by the physical network through which the frame has just traveled.
- Sent Frame → depends on the protocol used by the physical network through which the frame is going to travel.

Simple Internetwork



Maximum Transfer Unit (MTU)

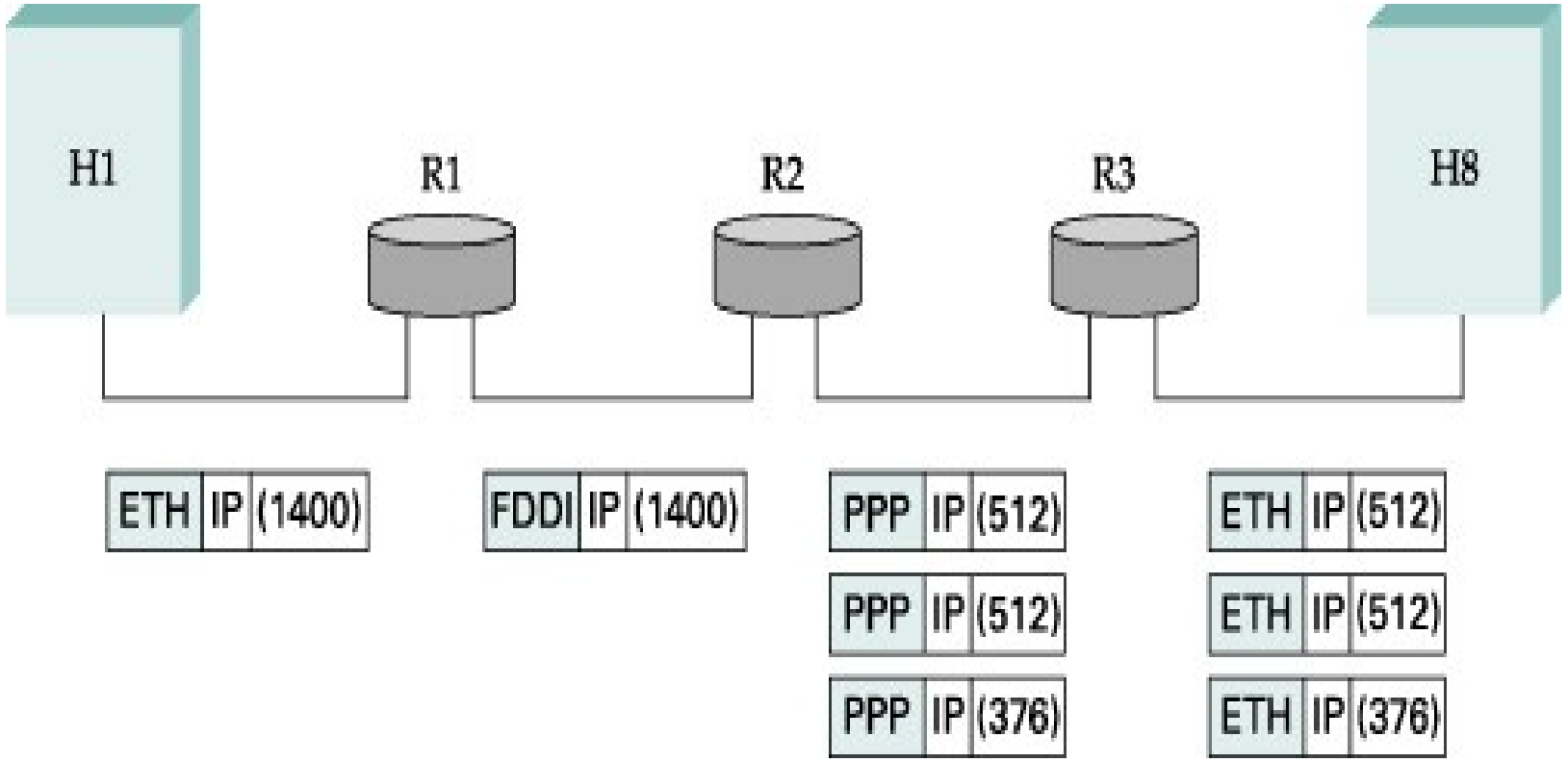
- Largest IP datagram that can carry in a frame.
- Each dll protocol has its own frame format.
- Therefore MTU is smaller than the largest packet size on that network because the IP datagram needs to fit in the payload of the DLL frame



Maximum Transfer Unit (MTU)

- MTU is 1500 bytes for the two Ethernets
- 4500 bytes for the FDDI network
- 532 bytes for the point-to-point network
- Data 1400 bytes.
- A 1420-byte datagram (20-byte IP header plus 1400 bytes of data) sent from H1 makes it across the first Ethernet

Maximum Transfer Unit (MTU)



Fields Related to fragmentation

- Identification
  - 16 bit field.
  - Identifies a datagram originating form the source host.
  - Combination of Identification number and the IP address uniquely identifies a datagram
  - Counter value initially a positive number
  - Copies the counter value to the identification field of the datagram.
  - Counter is incremented to 1.
  - Fragmentation happens copies the indentification value to all the fragments

Fields Related to fragmentation

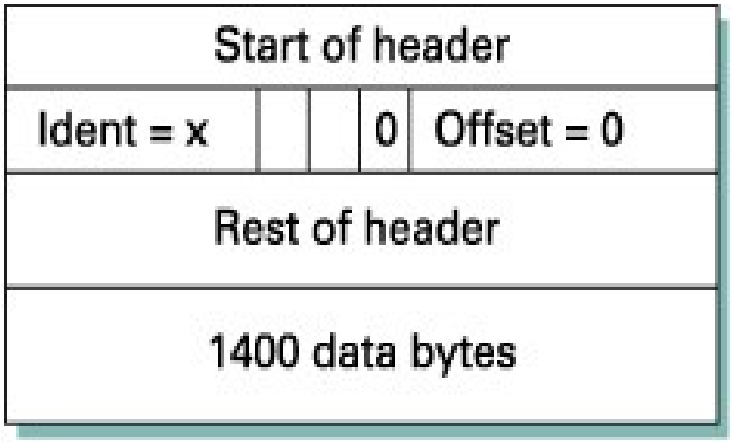
- Flags
  - D → set to 1 do not fragment
  - M → set to 1 more fragments following
    - 0 no more fragments

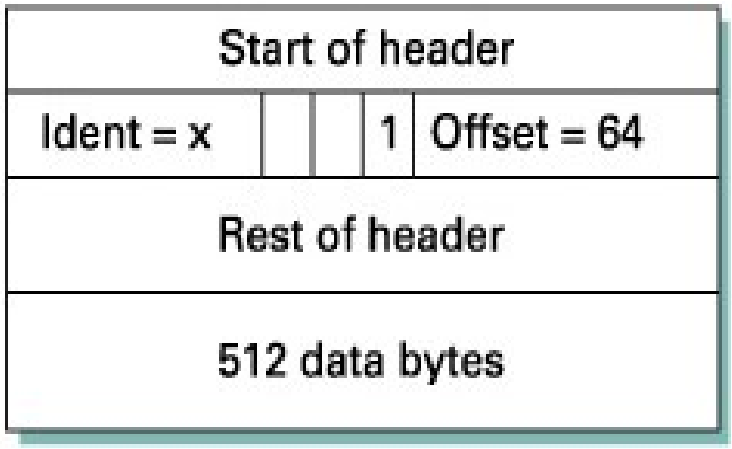
Reserved bit

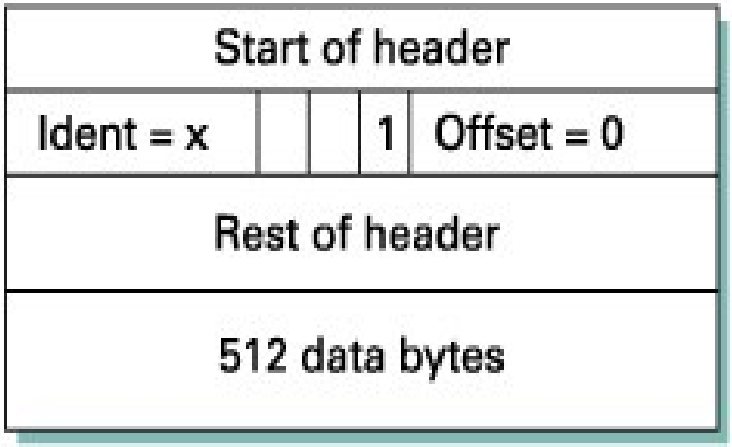
Fields Related to fragmentation

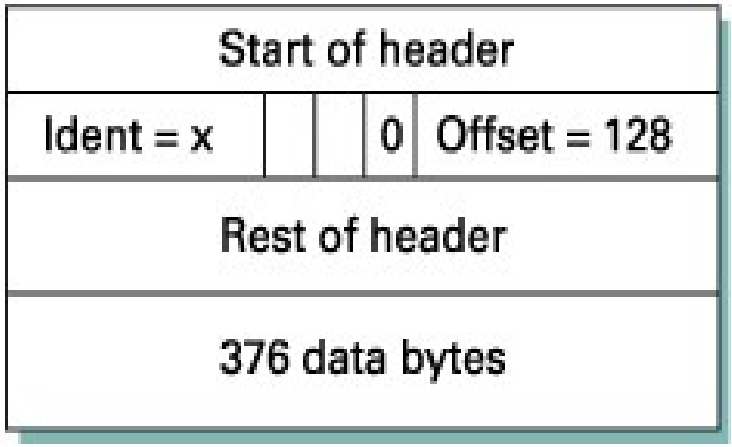
- Offset
  - 13 bit field
  - Shows the relative position of the fragmentation
  - Offset of data in original datagram measured in units of 8 bytes. (64 bits)
  - 13 bits - all ones - value - 8191
  - ie cannot represent sequence of bytes greater than 8191
  - 8191 * 8 is 65,528, just about the maximum size allowed for an IP datagram.

Fields Related to fragmentation

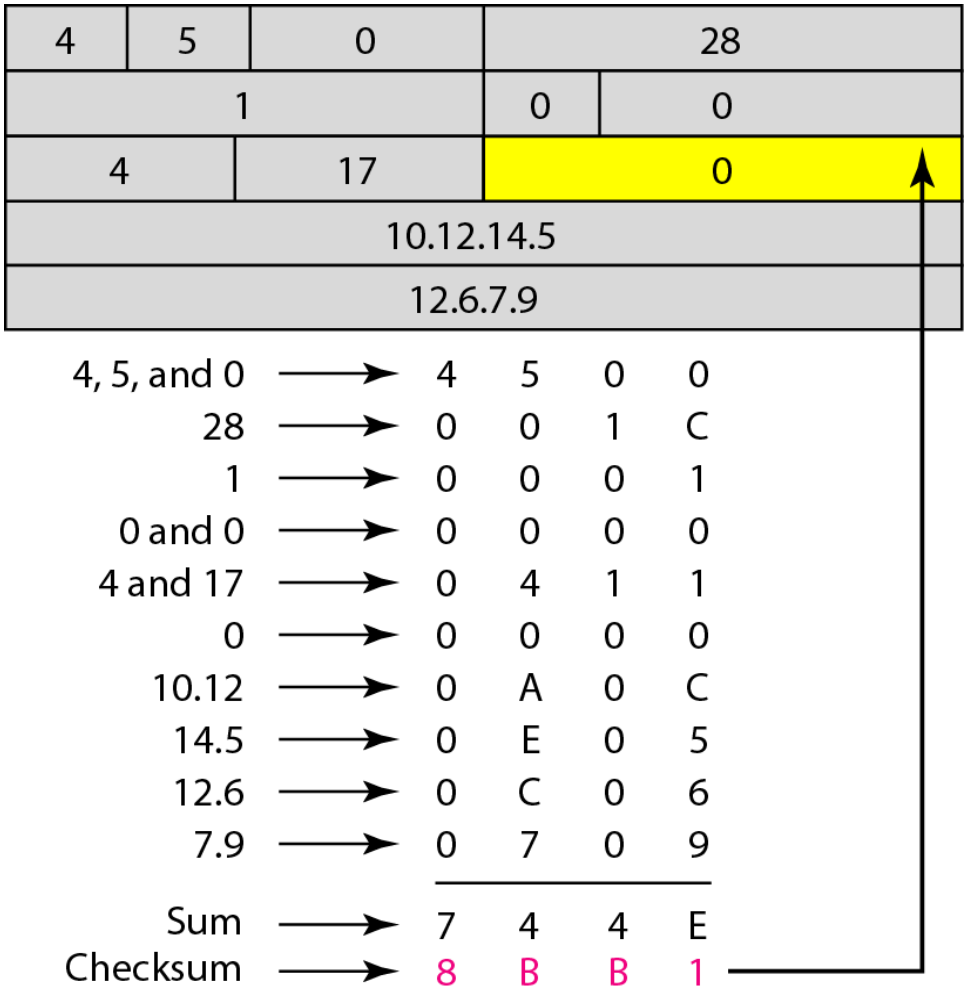








Checksum


4
5
0
28
1
0
0
4
17
0
10.12.14.5
12.6.7.9
4, 5, and 0
28
1
0 and 0
4 and 17
0
10.12
14.5
12.6
7.9
Sum
Checksum
4 5 0 0
0 0 1 C
0 0 0 1
0 0 0 0
0 4 1 1
0 0 0 0
0 A 0 C
0 E 0 5
0 C 0 6
0 7 0 9
7 4 4 E
8 B B 1