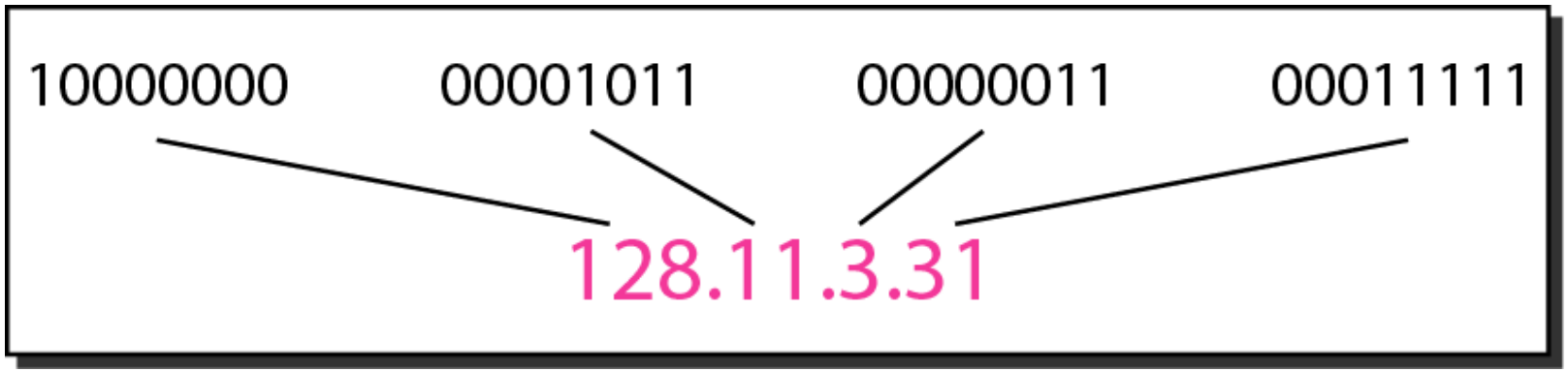
IP Addressing

IPv4 Addresses

- An IPv4 address is a 32-bit address that uniquely and universally defines the connection of a device (for example, a computer or a router) to the Internet.
- The address space of IPv4 is 2^{32} or 4,294,967,296.

Dotted-decimal notation



Example

Change the following IPv4 addresses from dotted-decimal notation to binary notation.

a. 111.56.45.78

b. 221.34.7.82

Solution

We replace each decimal number with its binary equivalent

a. 01101111 00111000 00101101 01001110

b. 11011101 00100010 00000111 01010010

Example

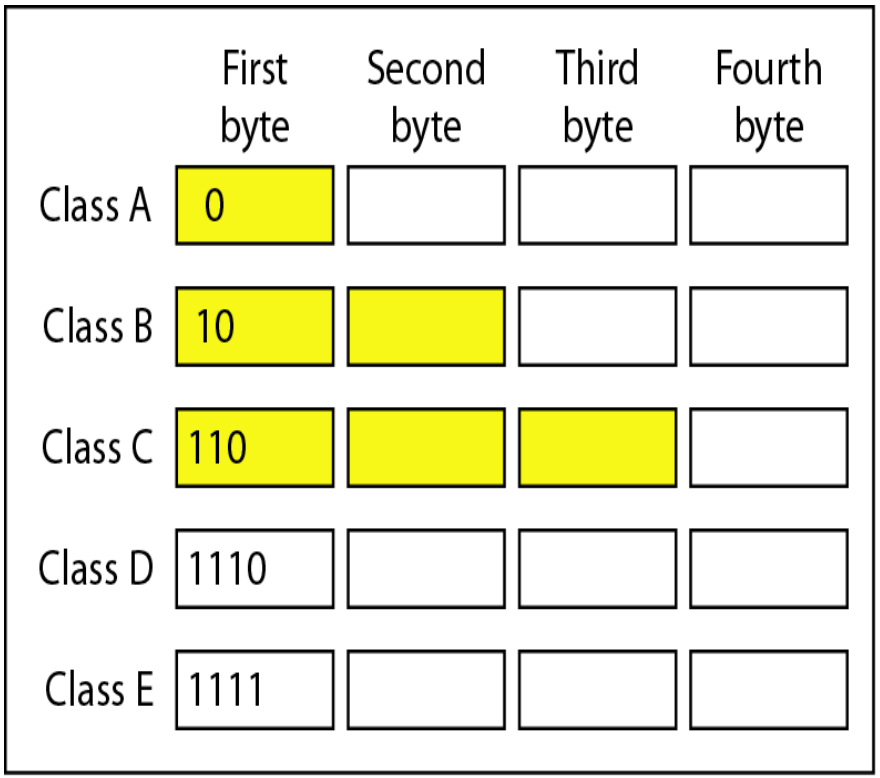
Find the error, if any, in the following IPv4 addresses.

a. 111.56.045.78
b. 221.34.7.8.20
c. 75.45.301.14
d. 11100010.23.14.67

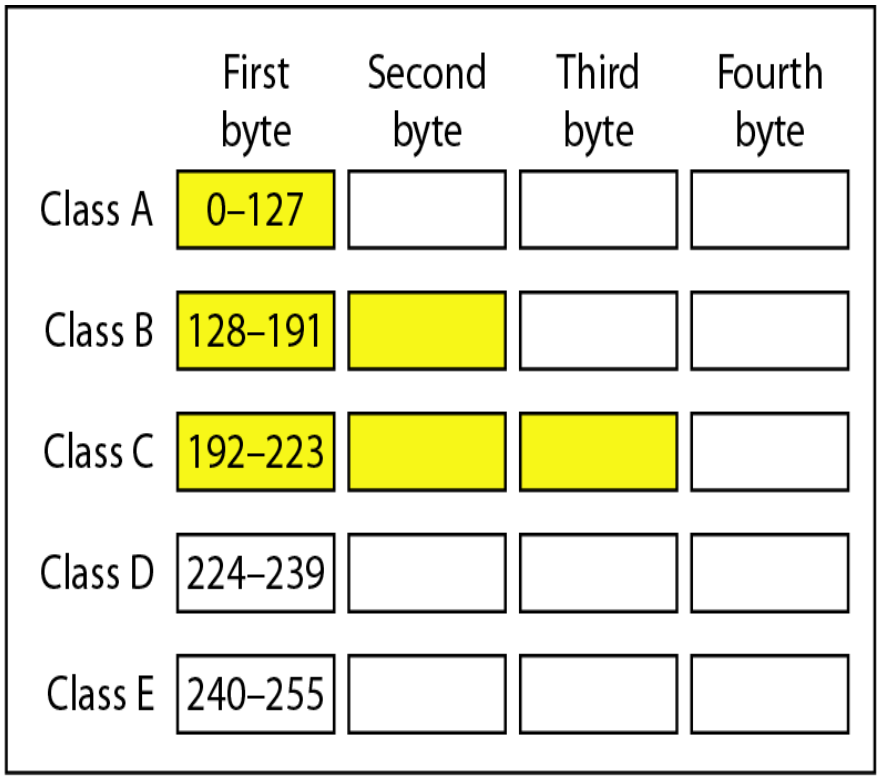
Classful Addressing

- In classful addressing, the address space is divided into five classes:
  - A, B, C, D, and E.

Classful Addressing



a. Binary notation



b. Dotted-decimal notation

Network vs. Host

- Every IP address has 2 parts:
  - 1 identifying the network it resides on
  - 1 identifying the host address on the network

- The class of the address and the subnet mask determine which part belongs to the network address and which part belongs to the host address

Example

Find the class of each address.

a. **0**0000001 00001011 00001011 11101111

b. **110**00001 10000011 00011011 11111111

c. **14**.23.120.8

d. **252**.5.15.111

Classes and Blocks

Class	*Number of Blocks*	*Block Size*	*Application*
A	128	16,777,216	Unicast
B	16,384	65,536	Unicast
C	2,097,152	256	Unicast
D	1	268,435,456	Multicast
E	1	268,435,456	Reserved