**Домашняя работа.**

**Разложения IP-адреса на адрес сети и адрес хоста(устройства).**

IPv4-адрес: 172.20.10.10  
Маска подсети 255.255.255.240.

**Нахождение адреса сети**

**1. Перевод IP-адреса из десятичной в двоичный вид.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |

172 = 10101100

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

.20 = .00010100

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |

.10 = .00001010

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |

.10 = .00001010

**2. Перевод маски подсети из десятичного в двоичный вд**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

255 = 11111111

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

.255 = .11111111

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

.255 = .11111111

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |

.240 = .11110000

**3. Находим адрес сети, путем наложение маски подсети на IP-адрес, с применением логического оператора «И».**

IP-адрес в двоичном виде:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | .0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | .0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | .0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |

**И**

Маска подсети в двоичном виде:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |

**=**

Результата наложения маски подсети:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | .0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | .0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | .0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

* *В крайнем октете находятся только нулю, значит первый 3 октета это и есть адрес сети*.

**4. Перевод результата из двоичного вида в десятичный.**

10101100.00010100.00001010.00000000

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |

10101100 = 172

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

.00010100 = .20

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |

.00001010 = .10

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

.00000000 = .0

172.20.10.0

В полученном результате 172.20.10 является адресом сети.

**Нахождение номера хоста(устройства).**

**1. Переводим маску подсети в двоичный вид.**

255.255.255.240 = 11111111.11111111.11111111.11110000

**2. Переводим IP-адрес в двоичный вид.**

172.20.10.10 = 10101100.00010100.00001010.00001010

**3. Применяем логический оператор «НЕ» к маске подсети.**

**НЕ**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | .1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |

**=**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

**Полученная маска нужна для отделения адреса сети и выделения адрес хоста.**

**4. Находим адрес хоста, путем наложения полученной маски, с использование логического оператора «И».**

IP-адрес в двоичном виде:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | .0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | .0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | .0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |

**И**

Маска подсети в двоичном виде:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

**=**

Результата наложения маски подсети:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |

* *Все октеты содержат 0, кроме последнего. Это и есть адрес хоста(устройства).*

**5. Перевод результата из двоичного вида в десятичный.**

00000000.00000000.00000000.00001010 = 0.0.0.0.10

В полученном результате .10 является адресом хоста(устройства).