Problem 1 – 15:

1	2	3	4	5	6	7	8	9	10
False	True	True	True	True	True	True	True	True	True
11	12	13	14	15					
True	True	True	True	False					

Problem 16:

Code:

See the q16.cpp file.

Output:

```
osboxes@osboxes:~/Desktop$ g++ q16.cpp -lpthread
osboxes@osboxes:~/Desktop$ ./a.out
Philosopher 1 takes chopsticks 5 and 1 up
Philosopher 1 puts chopsticks 5 and 1 down
Philosopher 5 takes chopsticks 4 and 5 up
Philosopher 2 takes chopsticks 1 and 2 up
Philosopher 5 puts chopsticks 4 and 5 down
Philosopher 4 takes chopsticks 3 and 4 up
Philosopher 2 puts chopsticks 1 and 2 down
Philosopher 1 takes chopsticks 5 and 1 up
Philosopher 4 puts chopsticks 3 and 4 down
Philosopher 3 takes chopsticks 2 and 3 up
Philosopher 1 puts chopsticks 5 and 1 down
Philosopher 5 takes chopsticks 4 and 5 up
Philosopher 3 puts chopsticks 2 and 3 down
Philosopher 2 takes chopsticks 1 and 2 up
Philosopher 5 puts chopsticks 4 and 5 down
Philosopher 4 takes chopsticks 3 and 4 up
Philosopher 2 puts chopsticks 1 and 2 down
Philosopher 1 takes chopsticks 5 and 1 up
Philosopher 4 puts chopsticks 3 and 4 down
Philosopher 3 takes chopsticks 2 and 3 up
Philosopher 1 puts chopsticks 5 and 1 down
Philosopher 5 takes chopsticks 4 and 5 up
Philosopher 3 puts chopsticks 2 and 3 down
Philosopher 2 takes chopsticks 1 and 2 up
Philosopher 5 puts chopsticks 4 and 5 down
Philosopher 4 takes chopsticks 3 and 4 up
Philosopher 2 puts chopsticks 1 and 2 down
Philosopher 1 takes chopsticks 5 and 1 up
Philosopher 4 puts chopsticks 3 and 4 down
Philosopher 3 takes chopsticks 2 and 3 up
Philosopher 1 puts chopsticks 5 and 1 down
Philosopher 5 takes chopsticks 4 and 5 up
Philosopher 3 puts chopsticks 2 and 3 down
Philosopher 2 takes chopsticks 1 and 2 up
Philosopher 5 puts chopsticks 4 and 5 down
```

Problem 17:

(a)

172.16.0.0/12 => 10101100.00010000.00000000.00000000/12

Starting IP : 10101100.00010000.00000000.00000001 => 172.16.0.1

Ending IP : 10101100.00011111.11111111.11111110 => 172.31.255.254

The number of devices is : $2^{32-12}-2=2^{20}-2$

(b)

The valid IP range is: 172.16.0.1 - 172.31.255.254

173.16.0.1 is **not** a valid IP since it is not in the range.

172.17.0.5 is a valid IP since it is in the range.

(c)

Sure, he can connect to my wireless network even if I disabled DHCP.

Problem 18:

Code: See the myQ18.cpp file.