

## Homework #0

Due Time: 2015/3/2 (Mon.) 17:00

Contact TAs: [nasa@csie.ntu.edu.tw](mailto:nasa@csie.ntu.edu.tw)

### Instructions and Announcements

- Discussions with others are encouraged. However, you should write down your solutions **in your own words**. In addition, for each problem you have to specify the references (the Internet URL you consulted with or the people you discussed with) on the first page of your solution to that problem.
- **NO LATE SUBMISSION IS ALLOWED.**

## Network Administration Preliminary

### True / False

In each of the following question, please specify if the statement is **true** or **false**. Please briefly explain why it is true false.

1. There exists no two devices with identical IP in IPv4 in the world.
2. In general, an end device judges whether itself is the recipient of a packet by the value in the MAC address field.
3. The format of the packets in the 802.3 Wired Ethernet network is the same with the one in the WiFi network.
4. The format of the packets sent from the WAN port on your router is the same with the one sent from the LAN port.
5. TCP and IP is in the same layer of Internet protocol stack.
6. A switch is a hub with more ports.
7. The main difference between a router and a switch is the computational power and the price.
8. In general, a firewall is composed of several devices filtering the packets according to some rules.
9. If you get the IP from a DHCP server, all the traffics associate to this IP will definitely pass through the the DHCP server.
10. All the traffics from the end devices will definitely pass the gateway.
11. Theoretically, a single NAT server can host an arbitrary number of NAT entries if equipped with unlimited memory.
12. Theoretically, a single DNS server can host an arbitrary number of DNS entries if equipped with unlimited memory.

### Multiple Choice Question

In each of the following question, please choose the most appropriate answer.

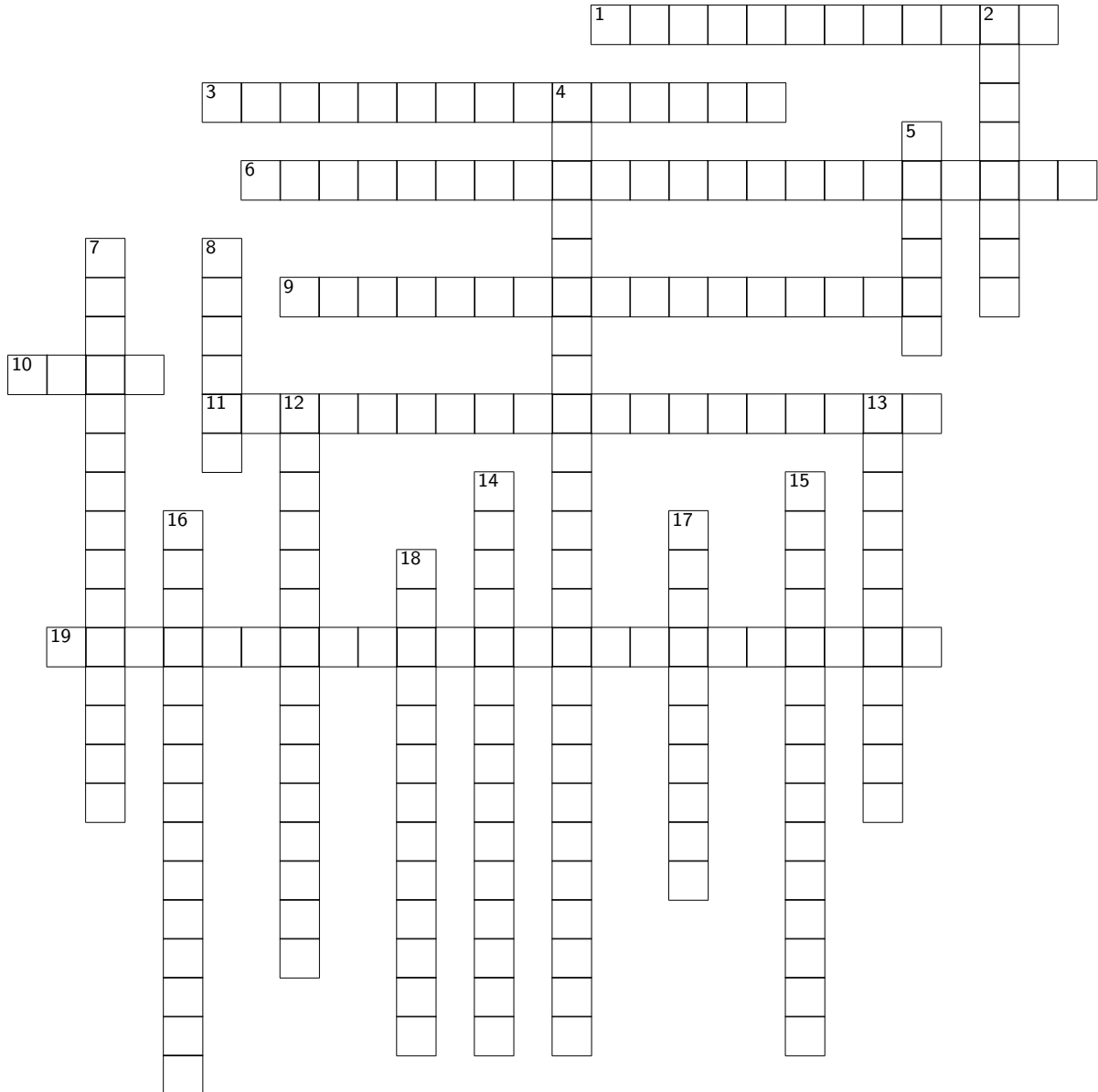
1. Which of the following systems is **NOT** in the Network Layer?  
*a) DHCP b) DNS c) VPN d) SSH tunnel*
2. Which valid IP is in the same subnet with 192.168.0.1/23?  
*a) 193.168.0.1 b) 192.167.0.1 c) 192.168.1.1 d) 192.168.0.0*
3. What's the first packet sent by an end device in the default Windows/ Linux setting when connected to the Ethernet?  
*a) DHCP b) ARP c) DNS d) HTTP*
4. Which functionality is not commonly seen on a wireless router  
*a) DHCP b) VPN c) NAT d) DNS*
5. Which mode is not commonly seen on a wireless router

- a)* Router : Act as a NAT server and route all LAN packets
  - b)* AP : Act as a wireless Hub/switch
  - c)* Bridge : Act as a repeater of the signal from other AP/router
  - d)* Link : Act as a directional repeater of the signal from the WAN port.
6. Which of the following term is not a kind of attack through network
- a)* DoS *b)* Broadcast Storm *c)* IP snooping *d)* DNS cache poisoning

# System Administration Preliminary

## 1. Word Puzzle

Complete the word puzzle with the clues below. All characters including space, @, -, ... etc are needed to fill into the boxes.



### Across

- 1 Remove the file `bleach` with no asking.
- 3 Use `ssh` to surf `ptt.cc` with unicode encoding.
- 6 Decompress the file `keroro.tar.gz` and extract files from this archive with listing files processed verbosely.
- 9 Create an archive `hw.tar` with the directory `hw` and all files in it.
- 10 This command can change the shell.
- 11 Install the package `gcc`. (In Debian/Ubuntu system)
- 19 Change the permission of the file `tinghaoder.sh` with owner can read/write/execute, and then both group and others can read.

**Down**

2 Change the working directory to the parent directory of the parent directory.

4 List all the process named `sp-hw2` of user `ninja`. (Hint: use `pipe` and `grep`) (Caution: the answer exists a space before the `pipe` and a space after the `pipe`)

5 This command can change the password of the user.

7 Copy the `shiny` file to a file named `chess2`.

8 List the all the directory contents with long listing format.

12 Get the output of the last 7 lines of the file `nyancat`.

13 Get the output of the entire file contents of `pusheen`.

14 Rename the file `kitty` with the name `melody`.

15 Create a new directory `QQ/TAT` with the directory `QQ` doesn't exist.

16 Give the file `kururu` the permission of execution.

17 Get the output of the environment variable `PATH`.

18 Remove the directory `naruto` and all files inside it without asking.

**2. Word Frequency**

Write a script or using `*nix` commands to print the words and their corresponding frequencies of occurrence whose frequencies of occurrence are among the `n` largest in order of decreasing frequency. Note that we don't care whether this character is uppercase or lowercase. In other words, the following words are the same: "BSD", "BSd", "bsd", .... Submit your script or write how you do this in detail, and make sure your script can be executed in CSIE Workstation.

**Input:**

- (a) a text file or text stream
- (b) an optional integer `n` (default 10)

**Execution Example:**

```
./mywordcount [n] < textfile (Note that n is an optional parameter)
```