

## Homework #2 Solutions

Due Time: 2015/4/6 (Mon.) 17:00

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

### Submission

- Compress all your files into a file named “**<studentID>.zip**”, which contains two folders named **StudentID\_NA** and **StudentID\_SA** respectively.
- Folder **StudentID\_NA** should contain a pdf file of all your answers in *Network Administration Part*.
- Folder **StudentID\_SA** should contain a script file to do the task in *System Administration Part*.
- Submit your zip file to ceiba.

### 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.
- Problems below would be related to the material taught in the class and might be far beyond that. Try to search for additional information on the Internet and give an reasonable answer.
- Some problems below might not have standard solution. We would give you the point if your answer is followed by reasonable explanations.
- If you get stuck in problems below, feel free to contact TAs.
- **NO LATE SUBMISSION IS ALLOWED.**

## Network Administration

- We have studied in class about CSMA/CD, which is the MAC protocol specified in the IEEE 802.3 (Ethernet) standard. However, such protocol is now obsolete with modern Ethernet networks, and is even removed in the new 10 Gigabit Ethernet standard. Briefly explain why CSMA/CD is rarely used in modern applications.
- Briefly introduce the hidden terminal problem and the exposed terminal problem when CSMA is applied on a wireless channel.
  - Briefly explain how the RTS/CTS mechanism deals with both problems.
- To avoid broadcast storms in a bridged Ethernet LAN, loops should be prevented in the network. The Spanning Tree Protocol prevents possible loops by determining which links should be taken/discarded. Given the network topology and bridge IDs in Figure 1, determine the root bridge, the types (RP/DP/BP) of each bridge port, and the resulting spanning tree using STP. Assume all links has the same cost, and choose the neighbor with lower bridge ID for breaking

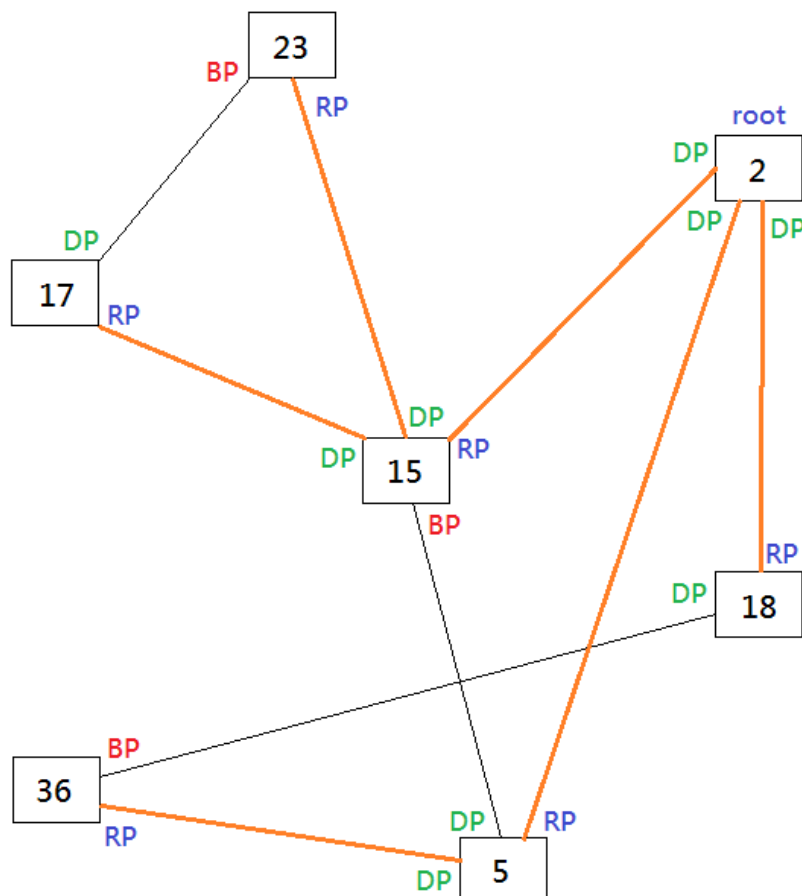


Figure 1

## System Administration

### Problem

There are two disks `/dev/sda`, `/dev/sdb` with size 200 GiB, 350 GiB, respectively.

Use `fdisk` command to partition `/dev/sda` such that it contains

- 1 primary partition with size 200 GiB and labeled as LVM

Use `parted` and `mkfs` command to partition `/dev/sdb` such that it contains

- 1 primary partition with size 300 GiB and FAT32 filesystem
- 1 logical partition with size 50 GiB and labeled as LVM

Use `pvcreate` and `vgcreate` command to create

- 1 volume group named `<your student ID>` with physical volumes the partitions marked as LVM

Use `lvcreate` and `mkfs` command to create

- 1 logical volume with size 150 GiB, name `<your student ID>` and ext4 filesystem
- 1 logical volume with size 100 GiB, name `<your student ID>-2` and ext4 filesystem

under your volume group.

Write a script to do the task. Do not include useless commands. For interactive part, you can use `<CR>` to represent the enter key for default settings.

For example:

```
fdisk /dev/sda
n
<CR>
<CR>
...
```

```
fdisk /dev/sda
```

```
n
```

```
<CR>
```

```
<CR>
```

```
<CR>
```

```
<CR>
```

```
t
```

```
8e
```

```
w
```

```
parted /dev/sdb mklabel msdos
```

```
parted /dev/sdb -a optimal mkpart primary 1MiB 300GiB
```

```
parted /dev/sdb -a optimal mkpart extended 300GiB 100%
```

```
parted /dev/sdb -a optimal mkpart logical $((300*1024+1))MiB 100%
```

```
parted /dev/sdb set 5 lvm on
```

```
pvcreate /dev/sda1 /dev/sdb5
```

```
vgcreate <ID> /dev/sda1 /dev/sdb5
```

```
lvcreate -n <ID> -L 150G <ID>
```

```
lvcreate -n <ID>-2 -l 100%FREE <ID>
```

```
mkfs -t vfat -F 32 /dev/sdb1
```

```
mkfs -t ext4 /dev/<ID>/<ID>
```

```
mkfs -t ext4 /dev/<ID>/<ID>-2
```