Vanier College

# Burnaby Inc. Network Environment

## Workgroup Assignment

*Generally, the following college courses involved in the entire project includes Operating Systems & Network I.*

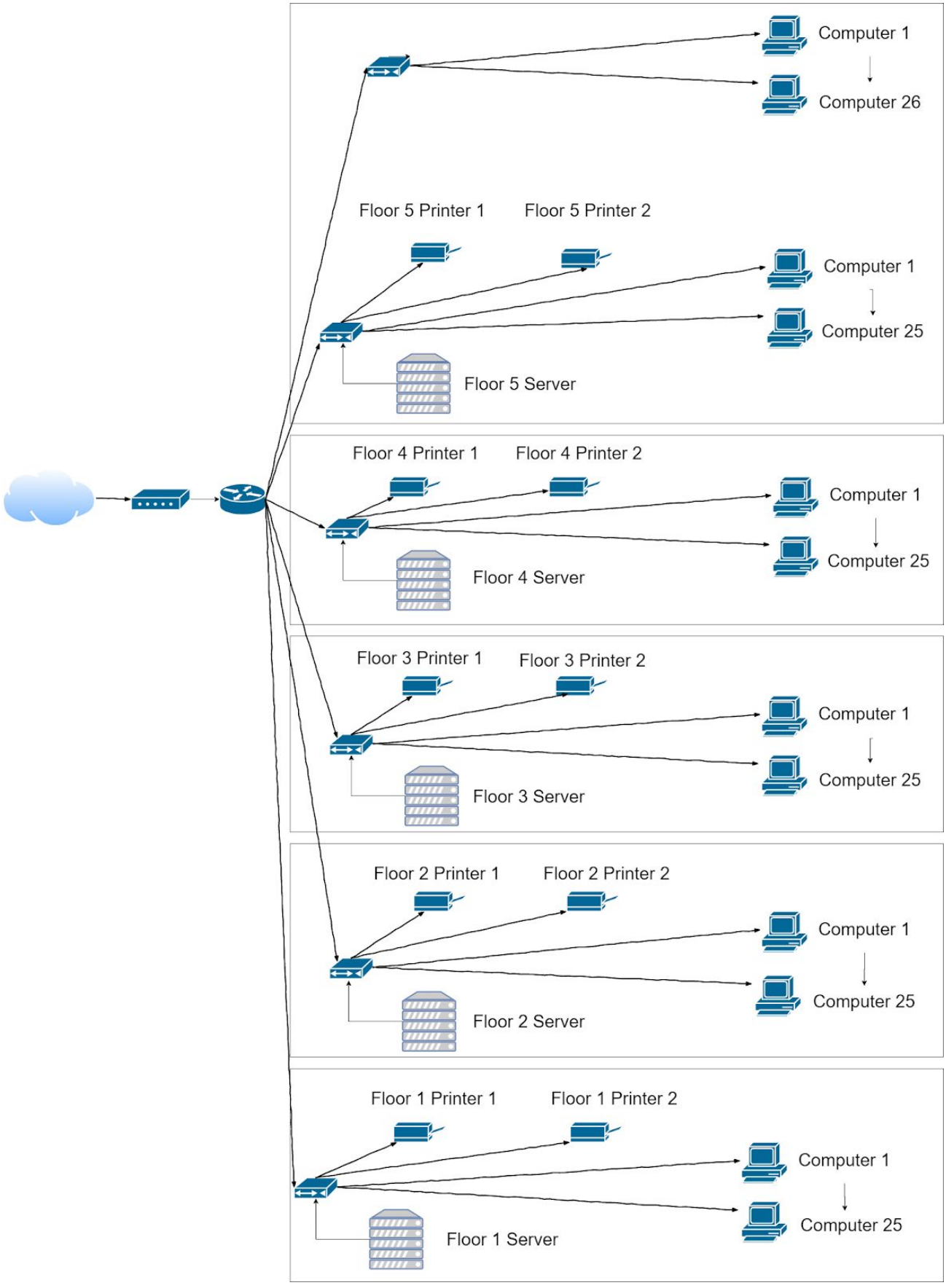
I, **Marissa Gonçalves**, certify that I have contributed to $33.\overline{3}$ % of the assignment.
Signature: _____

I, **Bryan Diego-Rivas**, certify that I have contributed to $33.\overline{3}$ % of the assignment.
Signature: _____

I, **Hao Yuan Zhang**, certify that I have contributed to $33.\overline{3}$ % of the assignment.
Signature: _____

**Course Title:** Advanced Network
**Professor:** Florin Vladimir Pilat
**Course Number:** 420-530-VA (Section: 00002)
**Due Date:** Friday, March 6, 2020

# Network Environment Diagram



# Answers to Questions

1. *How many directly connected network entries will the routing table of your router be containing?*

   There are 6 network entries.

2. *How many NIC cards do you need? Why?*

   173 NIC cards, which are for every computer, printer, switch and server in the diagram.

3. *How many subnets do you find as being necessary? Explain why?*

   We need 8 subnets since we only use 6 subnets, which is 3 bits.
   There are 2 connections between router and switch, 2 printers, 1 server and 25 computers per floor.

   (151 - (5 × 25)) = 26 computers

   Also, we use one switch for each floor and another switch for the other 26 computers for the employees.

4. *What is the subnet mask you found? How did you find that value?*

   210.150.150.0 is categorized in Class C, which has 24 network bits. So, we have 8 bits remaining.

   $S = 2^3 = 8$ subnet bits
   $H = 8 - 3 = 5$ host bits
   $2^5 = 32$ hosts
   $256 - 32 = 224$

   Subnet Mask: 255.255.255.224

5. *If six consecutive class C of the above network addresses, starting with 210.150.150.0/28, 210.150.150.16/28, 210.150.150.32/28 and up to 210.150.150.80/28, are to be summarized. What is the subnet mask used by a router to access them at once? Show the calculations.*

   210.150.150.0 /28
   210.150.150.16 /28
   210.150.150.32 /28

210.150.150.48 /28
210.150.150.64 /28
210.150.150.80 /28

Because we are summarizing 6 network addresses,
$2^x >= 6$
$x = 3$
So, we remove 3 bits from /28 = /25
Subnet Mask : 255.255.255.224 /25

6. *If we want to combine 6 class C adjacent addresses 210.150.152.0/24, 210.150.153.0/24, 210.150.154.0/24, 210.150.155.0/24, 210.150.156.0/24, 210.150.157.0/24, what will be the supernet (CIDR) mask? Why? Show the calculations.*

210.150.152.0 /24
210.150.153.0 /24
210.150.154.0 /24
210.150.155.0 /24
210.150.156.0 /24
210.150.157.0 /24

Because we are combining 6 addresses,
$2^x >= 6$
So, $x = 3$ and we remove 3 bits from 24,
/24 - 3 = /21

7. *The range of valid IP addresses for each of your network segments.*

Segment 1: 210.150.150.1 - 210.150.150.30
Segment 2: 210.150.150.33 - 210.150.150.62
Segment 3: 210.150.150.65 -210.150.150.94
Segment 4: 210.150.150.97 - 210.150.150.126
Segment 5: 210.150.150.129 - 210.150.150.158
Segment 6: 210.150.150.161 - 210.150.150.190

8. *Indicate the broadcast address for each network.*

Segment 1: 210.150.150.31 /27
Segment 2: 210.150.150.63 /27

Segment 3: 210.150.150.95 /27
Segment 4: 210.150.150.127 /27
Segment 5: 210.150.150.159 /27
Segment 6: 210.150.150.191 /27

9. *Show the filter table for one of your switches.*

| **Port** | **MAC Address** |
|---|---|
| 1 | 7C:70:AD:F8:D8:2A |
| 2 | 3E:A5:9D:13:17:61 |
| 3 | 63:09:04:F2:F2:0A |
| 4 | FE:90:BB:0C:7A:1E |
| 5 | 7F:D0:EE:99:AE:ED |
| 6 | 49:09:10:5b:CC:4D |
| 7 | 47:10:A2:DC:01:A0 |
| 8 | 22:07:9B:83:03:24 |
| 9 | A9:AA:F4:31:74:72 |
| 10 | 8C:13:A8:70:7C:60 |
| 11 | 3A:96:61:2A:A9:AF |
| 12 | 13:97:6A:23:8A:72 |
| 13 | 50:54:02:BD:63:DE |
| 14 | 27:E7:85:EC:96:03 |
| 15 | B6:2D:BD:95:9F:96 |
| 16 | D5:40:9D:DC:11:C3 |
| 17 | DC:AC:04:5E:67:AF |
| 18 | 7D:1D:7E:8B:81:C7 |

| | |
|---|---|
| 19 | 76:CA:0F:85:DD:75 |
| 20 | F2:86:A2:D0:75:0E |
| 21 | BC:E6:36:A4:89:95 |
| 22 | 90:AC:81:13:69:84 |
| 23 | 5E:CD:B7:90:94:61 |
| 24 | A1:B1:2E:0A:F1:19 |
| 25 | E7:B4:E8:56:39:C0 |
| 26 | 7A:C2:CB:3E:DC:4B |

10. *What kind of patch cables do you have to use?*

    We would use straight-through cables for the network diagram.

11. *How many collision domains and broadcast domains do you have in your design?*

    Broadcast Domains: 6 broadcast domains

    Collision Domains:
    Floor 1: 2 printers + 1 server + 25 computers + 2 connection to router = 30 connections
    Floor 2: 2 printers + 1 server + 25 computers + 2 connection to router = 30 connections
    Floor 3: 2 printers + 1 server + 25 computers + 2 connection to router = 30 connections
    Floor 4: 2 printers + 1 server + 25 computers + 2 connection to router = 30 connections
    Floor 5: 2 printers + 1 server + 25 computers + 2 connection to router = 30 connections
    Extra segment : 26 computers + 1 connection to router = 27
    $(30 \times 5) + 27 =$ 177 collisions domains