Design Project – INFR1411U

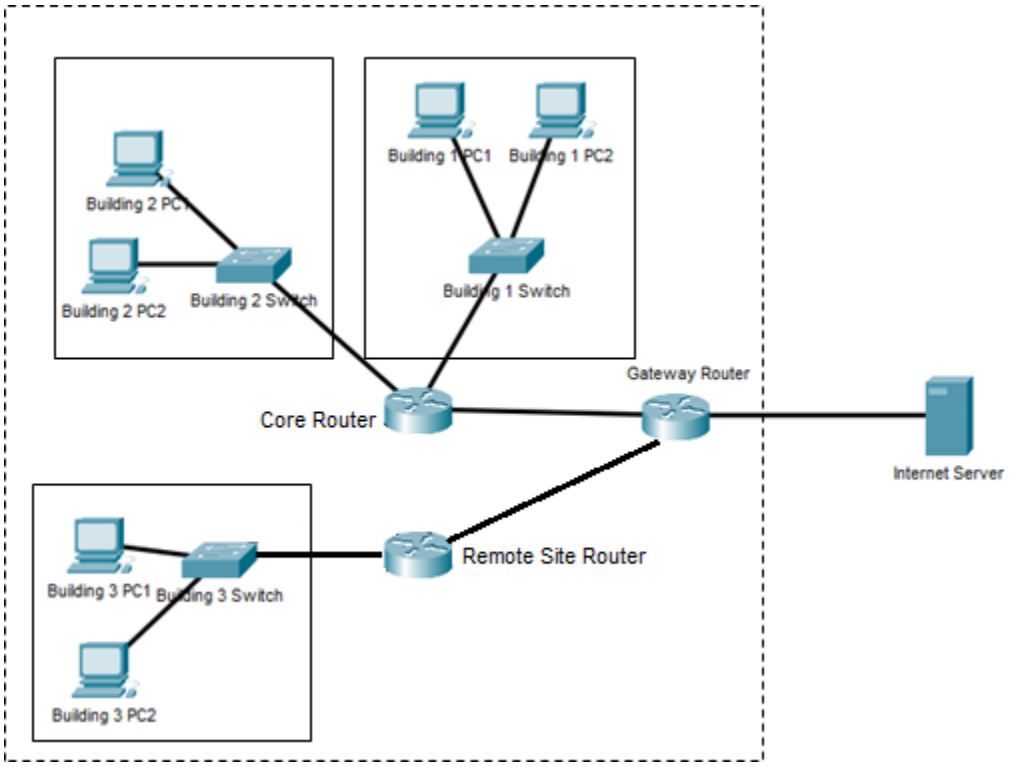
Instructions:

This is a group assignment. You will work on this assignment with your lab partner.

Each member of a lab team will submit **the same copy of the design assignment** through Canvas.

Design project)

The following diagram shows the topology of a corporate network consisting of three buildings. Each building contains a number of PCs and a switched LAN.



Two buildings are connected to a core router, which is connected to a Gateway router. A remote site (Building 3) is connected to a remote site router that is connected separately to the Gateway router. The Gateway router has a single connection to an Internet server with IP address **108.0.0.1**. The link between the Gateway router and the Internet server uses the subnet **108.0.0.0/30**. You can find the network map in the following:

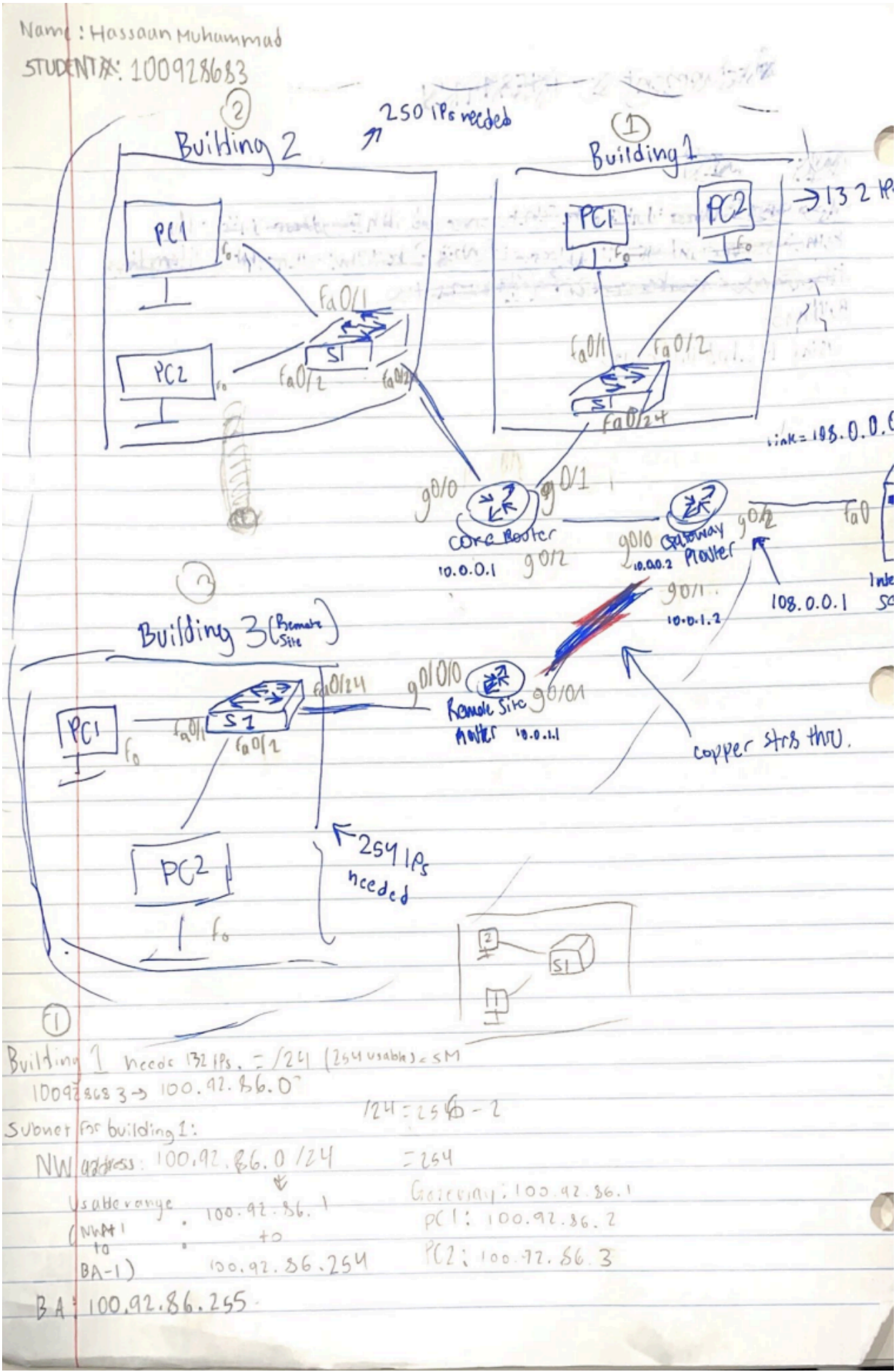
The following list include IP address space requirement for each building (hosts and network devices), excluding the routers:

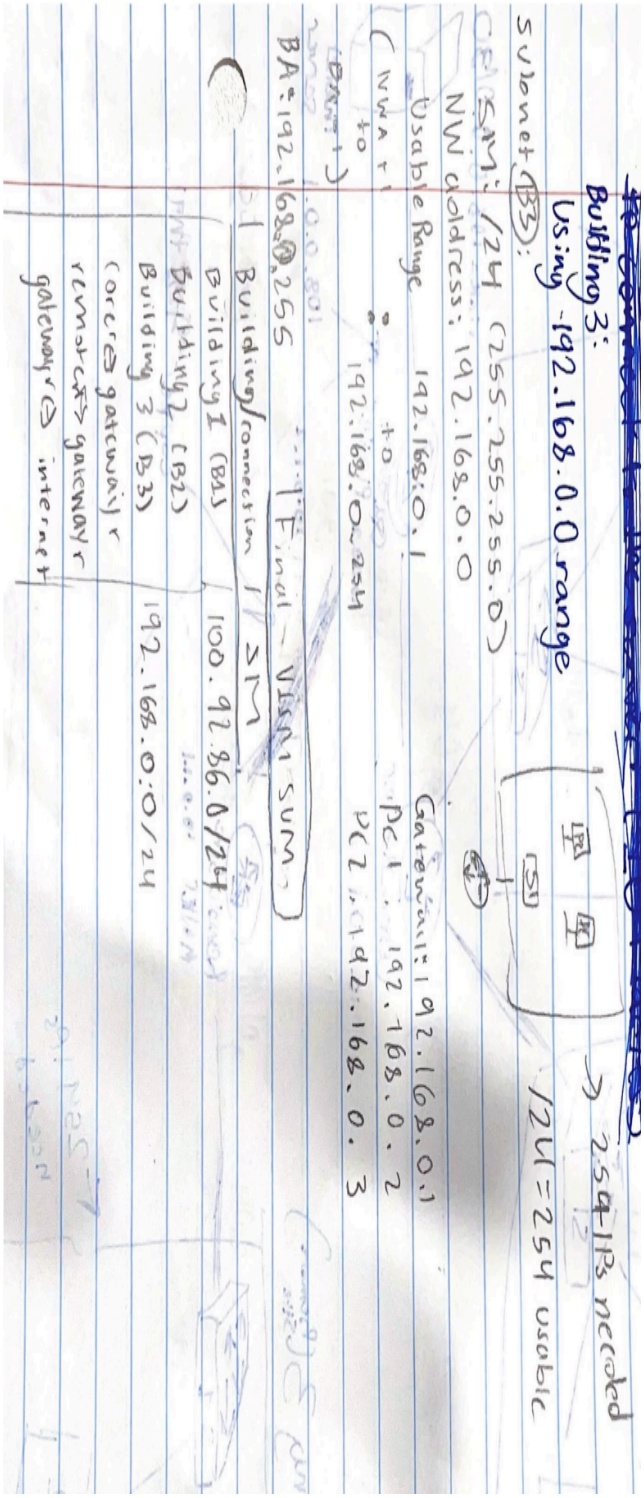
Building 1	132 IP addresses
Building 2	250 IP addresses

Building 3	254 IP addresses

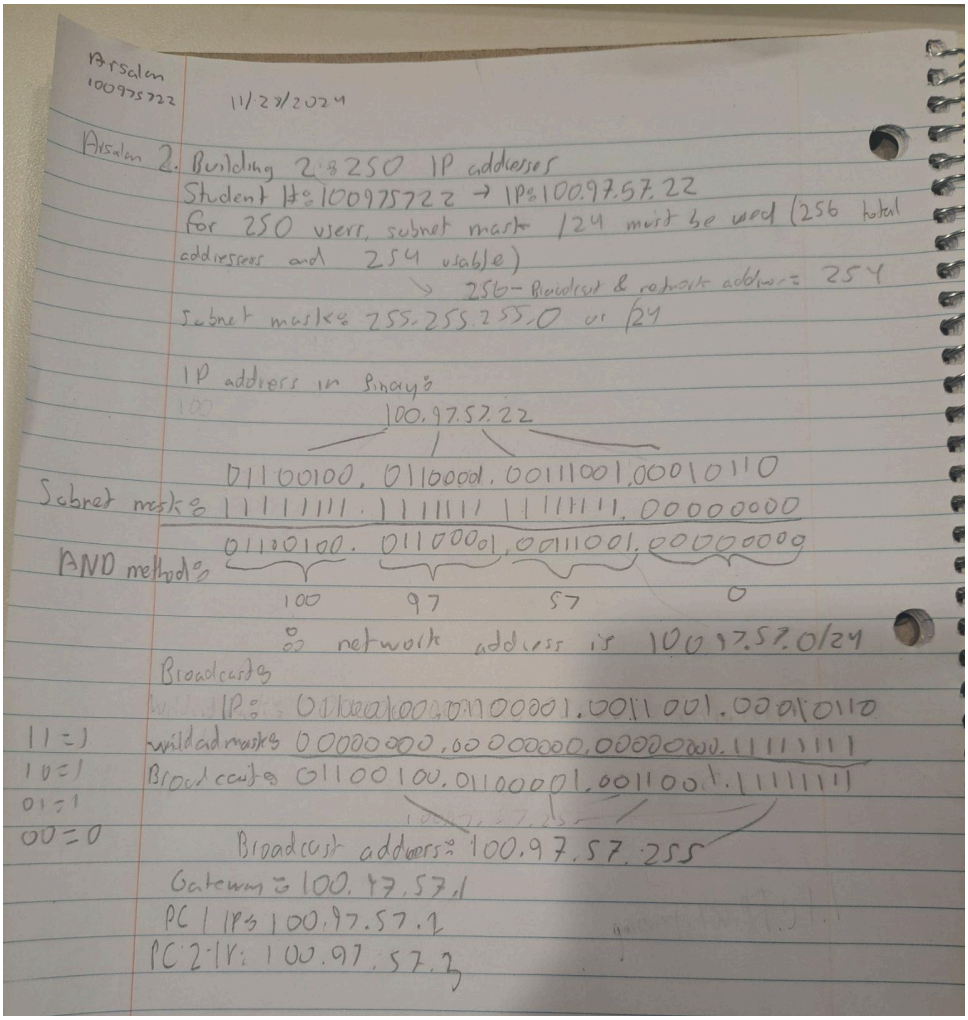
VLSM is implemented. In order to determine the base network address for each building, use your and your partner's student ID numbers for the buildings in the following way:

1. Take your nine-digit student ID 100xxyyzz, and create an IP address in form of 100.xx.yy.zz from it, and calculate the network address associated with this IP address and the corresponding subnet mask for Building 1 for accommodating the hosts in Building 1.


Name : Hassaan Muhammad
STUDENT#: 100928683
2
Building 2
250 IPs needed
PC1
PC2
Fa0/1
Fa0/2
S1
1
Building 1
PC1
PC2
Fa0/1
Fa0/2
S1
Fa0/24
g0/0
g0/1
Core Router
10.0.0.1
g0/2
g0/0
Gateway Router
10.0.0.2
g0/1
10.0.1.2
108.0.0.1
3
Building 3 (Remote Site)
Fa0/24
g0/0/0
Remote Site Router
10.0.1.1
g0/0/1
PC1
Fa0/1
Fa0/2
S1
PC2
254 IPs needed
copper strs thru.
1
Building 1 needs 132 IPs. = /24 (254 usable) < SM
100928683 → 100.92.86.0
Subnet for building 1:
NW address: 100.92.86.0 /24
Usable range (NW+1 to BA-1): 100.92.86.1 to 100.92.86.254
BA: 100.92.86.255
/24 = 256 - 2
= 254
Gateway: 100.92.86.1
PC1: 100.92.86.2
PC2: 100.92.86.3



2. Your lab partner should do the same for building 2 (decide between yourselves who will design which building).



3. For building 3, assign all addresses from the **192.168.0.0** range with the appropriate subnet mask.
4. Choose private IP addresses of your choice for the connection between the routers.

Core router to gateway router

subnet: 10.0.1.0/30

network address: 10.0.1.0

usable # of ips: 2

IP 1(Core router) : 10.0.1.1

Ip 2 (Gatway router): 10.0.1.2

broadcast address: 10.0.1.2

Remote site router to Gateway router

Subnet: 10.0.2.0/30

network address: 10.0.2.0

usable IPs: 2 (4 minus network address and broadcast address)

IP 1 (Remote site router): 10.0.2.1

IP2 (Gatway router) : 10.0.2.2

broadcast address: 10.0.2.3

Gatway router to Internet Server

Subnet: 108.0.0.0/30

Network address: 108.0.0.0

Internet Server IP address: 108.0.0.1

Gatway Router IP: 108.0.0.2

Assignment

a. Based on the above requirements, design an IPv4 addressing scheme for all the hosts/PC in this network. Your scheme should include the IP address for each PC (02 PCs) and DGW (Default gateway).
(25 Marks)

b. Determine and show the static routes required at each router to allow successful pings between PCs in different buildings, and from each PC to the Internet server. Do NOT deploy any dynamic routing protocol. Also, show the content of the routing table at each router
(25 Marks)
Core Router:

```
CoreRouter>
CoreRouter>en
CoreRouter#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.0.1.0/30 is directly connected, GigabitEthernet0/2
L       10.0.1.1/32 is directly connected, GigabitEthernet0/2
S       10.0.2.0/30 [1/0] via 10.0.1.2
     100.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       100.92.86.0/24 is directly connected, GigabitEthernet0/1
L       100.92.86.1/32 is directly connected, GigabitEthernet0/1
C       100.97.57.0/24 is directly connected, GigabitEthernet0/0
L       100.97.57.1/32 is directly connected, GigabitEthernet0/0
     108.0.0.0/30 is subnetted, 1 subnets
S       108.0.0.0/30 [1/0] via 10.0.1.2
S    192.168.0.0/24 [1/0] via 10.0.1.2
```

Gateway Router:

```
GatewayRouter>en
GatewayRouter#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 108.0.0.1 to network 0.0.0.0

     10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.0.1.0/30 is directly connected, GigabitEthernet0/0
L       10.0.1.2/32 is directly connected, GigabitEthernet0/0
C       10.0.2.0/30 is directly connected, GigabitEthernet0/1
L       10.0.2.2/32 is directly connected, GigabitEthernet0/1
     100.0.0.0/24 is subnetted, 2 subnets
S       100.92.86.0/24 [1/0] via 10.0.1.1
S       100.97.57.0/24 [1/0] via 10.0.1.1
     108.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       108.0.0.0/30 is directly connected, GigabitEthernet0/2
L       108.0.0.2/32 is directly connected, GigabitEthernet0/2
S    192.168.0.0/24 [1/0] via 10.0.2.1
S*   0.0.0.0/0 [1/0] via 108.0.0.1
```

Remote Router:

```
RemoteRouter>en
RemoteRouter#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.0.2.2 to network 0.0.0.0

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.2.0/30 is directly connected, GigabitEthernet0/0/1
L       10.0.2.1/32 is directly connected, GigabitEthernet0/0/1
     100.0.0.0/24 is subnetted, 2 subnets
S       100.92.86.0/24 [1/0] via 10.0.2.2
S       100.97.57.0/24 [1/0] via 10.0.2.2
     192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.0.0/24 is directly connected, GigabitEthernet0/0/0
L       192.168.0.1/32 is directly connected, GigabitEthernet0/0/0
S*   0.0.0.0/0 [1/0] via 10.0.2.2
```

c. Implement this network in Packet Tracer using two hosts for each building. Use your addressing design from (a) and static routes from (b). Confirm that the hosts in different buildings can ping each other and the Internet server. Ask your lab instructor to verify and confirm the pings.
(40 Marks)

d. Submit a feedback and reflection report (separate file)
(10 marks)

Deliverables

Each team member must submit a zip file containing the following through Canvas:

- An MS-word file containing your answers to (a) and (b).
- The packet Tracer file for (c). You will receive zero mark for part (c) if the packet tracer file is not attached, even if your instructor confirms the work.
- A completed feedback and reflection report.

(End)