Course Project

- **Project Scenario:** Each team is asked to design and simulate a network linking our ANU new campus getting into consideration that we have only two class C networks which are 193.158.1.0 and 2.0 covering specific number of hosts in 4 buildings and one server in a fifth building namely the data center building. All IP addresses are distributed in these 5 different locations with 4 different topologies in the four building networks. Each team shall select the topologies, implement them, sub-net them, protect them with NAT methods and try at least one routing methods to test their functionality of the network such as OSPF.
- **Project Tool:** CISCO Packet Tracer
- **Project Team:** Only 3 members.
- **Project Requirements**

1. Select **4 different LAN network topologies** and implement them on CISCO Packet Trace (PT) with the following requirements: **(2 Grades)**
   a. Each LAN shall be connected to one router.
   b. Each LAN shall contain at least the following:
      i. Bus shall contain at least 3 switches.
      ii. Ring / Token Ring contain at least 5 switches.
      iii. Tree contain at least 5 switches.
      iv. STAR topology contain only one switch.
      NB: LAN topology shall be illustrated on switches.
   c. At least one LAN shall contain Virtual LANs. **(1 Grade)**
   d. All LANs are sub-netted with class C IPs only in networks 193.168.1.0 & 193.168.2.0 referring to the number of hosts as the following: **(4 Grades)**
      i. Building A
         1. Number of Hosts: 212 Hosts
      ii. Building B
         1. Number of Hosts: 36 Hosts
      iii. Building C
         1. Number of Hosts: 47 Host
      iv. Building D
         1. Number of Hosts: 125 Hosts
      v. Data Center Building:
         1. Contains ONE server.
   NB: These are the internal IP sub-netting for LANs.
   e. All router external interfaces are chosen to be in the class A network 10.0.0.0.
2. The server shall be added on a fifth network with the IP 172.125.12.9 (class B).
   NB: Connecting the 5 routers could be any topology chosen.
3. All IPs and subnet mask shall be documented in a table in the project report.
4. Three types of NAT shall be illustrated as the following:
   a. PAT on the server LAN. **(3 Grades)**
5. One type of dynamic routing shall be illustrated in the project. It's recommend to choose the Open Shortest Path First (OSPF) **(3 Grades)**
6. **Additional bonus can be added such as: (1 Grade Bonus for each)**
   a. Using other dynamic routing protocol such as RIP or eIGRB.
   b. Using Static NAT.
   c. Using Dynamic NAT.

      d. Router authorization with at least one layer of passwords. (Passwords shall be hashed with any algorithm such as MD5 and encryption technique such as RSA/vigenere cipher)

      e. Creating a Firewall for each network.

      f. Using DHCP server.

      g. Using DNS server.

      h. Using FTP server.

      i. Adding SSH server.

      j. Adding telnet server.

      k. Using VLSM.

      l. Using port forwarding.

      m. Using web server with a designed HTML page.

      n. Using more port security on all switches.

      o. Adding extra LANs.

      p. Any other extra work is also appreciated.

- **Project Deliverables: (3 Grades)**
  - Each team shall deliver the following before the project discussion:
    - Detailed report with all steps at least 10 pages. **(**
    - All packet tracer files.
    - A Demo Video illustrating the project testing with maximum length of 120 seconds.
- **Project Deadline:** Delivery shall be on classroom before 18th of May, 2024 11:59 P.M.
- **Project Discussion**: Each team shall attend an offline discussion with the TA on the 19th, 21st, 23rd of May, 2024 during section timing. **(4(3 Grades) Grades)**
- **NB**: During the discussion be read to:
  - Show run all routers and switches.
  - Test all connection using ping command or message simulation.
  - Answer any question regarding your work.