FACULTY OF COMPUTING DEPARTMENT OF COMPUTER SCIENCE

COURSE PROJECT ON DATA COMMUNICATION AND COMPUTER NETWORKS

GROUP MEMBER SIZE: 4

MAX-WEIGHT: 30%

TARGET-GROUP: 3RD COMPUTER SCIENCE

SUBMISSION DATE: PRIOR TO FINAL EXAM

Suppose that you are the CEO of a **WiN-Network-Solution** which deals with network configuration for various sectors. You have given your project assignment to configure the network for three different colleges in such a way that all nodes in each college must be able to communicate with each other as well as with all the nodes of any other colleges.

The colleges are named as **Blue-Nile, Poly-Technique** and **Alkan College**.

- **ALKAN** has 5 Rooms with 14, 30, 6, 29, 17 and 2 hosts in each room.
- **BLUE-NILE** has 3 Rooms with 2 nodes in the first room, 60 PCs in the second room and 30 on the third room.
- **POLY-TECHNIQUE** has 1 meeting hall with 156 PCs, 1 server and 8 switches in a room.

The IP regulating college has assigned the following IP network addresses to each of the college:

College	**Given IP**
Blue-Nile	172.16.0.0
Poly-Technique	10.0.0.0
Alkan	192.168.1.0

As part of the agreement, all three colleges have asked you to bear the expense of all the switches and routers used to interconnect all the computers in a merged network for three colleges and further instructed you that all the PCs in the **POLY-TECHNIQUE COLLEGE** must be on the same network, and then subnetting may not require. Each room for **BLUE-NILE COLLEGE** will be assigned a different sub-network after sub-netting the address of 172.16.0.0 and each room should have handled equal number of IP address in the network.

The **ALKAN** college has further informed you that the college has a plan to configure the given network using variable length subnetting technique.

You, being cleverly economical, decide to install new switches (Generic Switches in Cisco Packet Tracer may expire) and routers (different routers models available in Cisco Packet Tracer) to configure the network for three colleges in such a way that you use as much less routers and switches as possible. You have also subscribed the following IP network address for the serial communication between different routers which will be connecting different Inter-college and Intra-college subnets. You plan to form the subnets of the following address in order to provide the serial communication between all the routers: **Routers Serial Communication: 200.200.200.0**

BUSINESS RULES

As per lab exercises and sessions we have done, you have to simulate the topology on Cisco Packet Tracer in order to optimally design the network considering the number of devices (switches, routers, servers, wi-fi access points and PCs etc.) used to maximize the profit margins of these colleges. However, you must simulate the topology strictly following rules and regulations described below:

1. Use Straight Through wires, wireless routers, Cross Over cables or Serial DCE wires where necessary and applicable.
2. Use nodes (Router, PCs, Servers, Smart devices and wireless tabs) for your design
3. Use Switches such that you attach only required ports out of the 24 or less available Ethernet Interfaces for a single switch, however, you can attach as many switches considering optimal design.
4. You have to assign IPs to the PCs using **Static and dynamic IP allocation technique**.
5. Your network design must provide DNS, POP3 (Email Service), HTTP and FTP services.
6. Although you can to use GUI of the router to configure its interfaces but you must use **CLI** of the router to configure the RIP Protocol for Classful IP addressing and Classless Addressing