**Problem 1:**

Design a network in CISCO packet tracer to connect ACCOUNT and DELIVER departments through the following:

1. Each department should contain at least 2 PCs
2. Appropriate number of switch and routers should be used in the network.
3. Using the given network address 192.168.40.0, all interfaces should be configured with appropriate IP addresses, subnet mask and gateways.
4. All devices in the network should be connected using appropriate cables.
5. Test the connection between ACCOUNT and DELIVERY department PCs in DELIVERY department should be able to ping the PCs in ACCOUNT department.

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**Problem 2:**

XYZ Company is fast-growing company in Eastern Australia with more than 2 million customers globally. The company deals with selling and buying of food items, which are basically operated from the headquarters. The company is intending to open a branch near the local village Bonalbo. Thus, the company requires young IT graduates to design the network branch. The network to operate separately from the headquarter network.

Being a small network, the company has the following requirements during implementation;

1. One router and one switch to be used(all cisco products)
2. 3 departments(Admin/IT, Finance/HR and Customer Service/ Reception)
3. Each department is require to be different VLANS.
4. Each department is require to have wireless network for users.
5. Host devices in the network are required to obtain IPV4 address automatically.
6. Device in all the departments are required to communicate with each other.

Assume the ISP gave out a base network of 192.168.1.0, you as the young network engineer who has been hired, design and implement a network considering the above requirement

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**Problem 3:**

As a part of your end year networking project, you are required to design and implement Vic Modern Hotel network. The hotel has three floors; in the first floor there three departments (Reception, Store and Logistics), in the second floor there are three departments (Finance, HR and Sales/Marketing), while the third floor hosts the IT and Admin. Therefore, the following are part of the considerations during the design and implementation.

1. There should be three routers connecting each floor (all placed in the server room in IT department).
2. All routers should be connected to each other using DCE cable.
3. The network between the routers should be 10.10.10.0/30, 10.10.10.4/30, 10.10.10.8/30
4. Each floor is expected to have one switch (placed in the respective floor).
5. Each floor is expected to have WIFI networks connected to laptops and phones.
6. Each department is expected to have a printer
7. Each department is expected to be in different VLAN with the following details.

1st Floor;

* Reception – VLAN 80, Network of 192.168.8.0/24
* Store – VLAN 70, Network of 192.168.7.0/24
* Logistics – VLAN 60, Network of 192.168.6.0/24

2nd Floor;

* Finance – VLAN 50, Network of 192.168.5.0/24
* HR– VLAN 40, Network of 192.168.4.0/24
* Sales – VLAN 30, Network of 192.168.3.0/24

3rd Floor;

* Admin – VLAN 20, Network of 192.168.2.0/24
* IT – VLAN 10, Network of 192.168.1.0/24

1. Use OSPF as the routing protocol to advertise route.
2. All device in the network are expected to obtain IP address dynamically with their respective router configured as the DHCP server.
3. All the device in the network are expected to communicate with each other.
4. Configure SSH in all the routers for remote login.
5. In IT department add PC called Test-PC to port fa0/1 and use it remote login.
6. Configure port security to IT-dept. switch to allow only Test-PC to access port fa0/1 (Use sticky method to obtain mac-address with violation mode of shutdown).

**Problem 4:**

Albion University is a large university which has two campuses situated 20 miles apart. The university’s students and stuff are distributed in 4 faculties; these include the faculties of Heath and Sciences; Business; Engineering / Computing and Art/Design. Each member of stuff has a PC and students have access to PCs in the labs.

**Requirements:**

1. Create a network topology with the main components to support the following:

* Main Campus:
  + **Building A:** Administrative staff in the departments of management, HR and finance. The admin staff PCs are distributed in the building offices and it is expected that they will share some networking equipment (**Hint: use of VLANs is expected here**). The Faculty of Business is also situated in this building.
  + **Building B:** faculty of Engineering and Computing and Faculty of Art and Design
  + **Building C:** Students labs and IT department. The IT department hosts the university Web server and other servers
  + There is also an email server hosted externally on the cloud.
* Smaller Campus:
  + Faculty of Health and Science (staff and students labs are situated on separate floors)

1. You will be expected **to** configure the core device and few end devices to provide end-to end connectivity and access to the internal servers and the external server.

* Each department/faculty is expected to be on its own separate IP network
* The Switches should be configured with appropriate VLANs and security setting
* RIPv2 will be used to provide routing for the routers in the internal network and static routing for the external server.
* The device in building A will be expected to acquire dynamic IP addresses from a router-based DHCP server

**Tasks:**

**Task 1:** Your task is to plan, design, and prototype the network topology for Albion University’s network using Cisco Packet Tracer. Formative feedback will be given on this task in week 6.

**Task 2:** Configure in packet Tracer the network will appropriate settings to achieve the connectivity and functionalities specified in the requirements.

**Task 3:** produce a report (max 1500 words) including evaluation your proposed network design and critical appraised on your work. Your evaluation should include performance, scalability, reliability and security of your proposed network.