Topic 1

Wonders of Wakanda

When your country is hidden from the outside world and its history is mired in mystery and intrigue for those aware of its existence, it's easy to say that there are places native to your country that aren't known to the average individual. Particularly when these places have some connection to not just the construction of your home but also to its history. This would apply to Wakanda, the fictitious nation featured in the Marvel film Black Panther. Wakanda and its surroundings are marvels of magnificence and valleys of foul in both the comic book world and the real world, ranging from religious, technical, and even hostile territory. There are a certain number of residents in each of these places. They will create a specific network to facilitate connection between these locations using their superior technologies. Your mission is to create this unique network between the six locations listed below so that residents of those locations may connect with one another. The distance (Km) from each unique location and the number of persons are listed in brackets next to each entry's name in the table below.

	Jabari Village(1024)	**Techno Organic Jungle (511)**	**The Wall Of Knowledge (254)**	**The Necropolis (2049)**	**N'Jadaka Village (256)**	**The Royal Palace of Wakanda (9020)**
Jabari Village (1024)	0					
Techno Organic Jungle (511)	789	0				
The Wall Of Knowledge (254)	892	584	0			
The Necropolis (2049)	1220	689	459	0		
N'Jadaka Village (256)	120	420	553	180	0	
The Royal Palace of Wakanda (9020)	420	260	150	500	720	0

*The numbers in brackets () specify the number of devices in the place and the values in the table specifies the distance (in kilometers) between places. *

While creating the network infrastructure you were provided with certain restrictions and rules that you need to follow:

- Choose an appropriate network address and create subnets to assign to each of the areas with the least amount of waste.
- However, keep in mind that only the odd IP numbers from a network address's available IP range can be used as host IP addresses. For example, 192.168.14.0/24 has 256 potential IP addresses, but you can only use 192.168.14.1/24, 192.168.14.3/24, 192.168.14.5/24, etc. as host IP addresses.
- Assign IP addresses to all the devices and interfaces. **Jabari Village, The Wall Of Knowledge, The Necropolis** and **The Royal Palace of Wakanda** will use private addressing while the other two places (**Techno Organic Jungle, N'Jadaka Village**) will use public addressing. You can use NAT/PAT to convert Private IP address into global or public IP address. You have to show the NAT addressing technique only in the ISP router (configuration commands are given in the theory lecture slides). No need to show the whole NAT process instead only the addressing part.
- One DHCP server to assign Ip addresses to all the places except **The Wall Of Knowledge and The Royal Palace of Wakanda**.
- The Royal Palace of Wakanda **(9020)** has a web server to convey announcements to all other places.
- Establish connections among the networks with the shortest route possible
    - ➢ Must have one floating route.
    - ➢ Remember that the default route can not be used while exchanging packets within the topology. Data will be delivered using static or dynamic routes only.
    - ➢ For communicating with an ISP router you can use the default route only. but for communicating among the given networks in the above table you have to use static or dynamic routing.
    - ➢ Configure at least one network to be routed dynamically and one to be routed statically.
- Showing 2 end devices per network is good enough to represent the whole population.
- **The Royal Palace of Wakanda (9020)** can communicate with **Jabari Village** and **The Wall Of Knowledge** with email only. So, set up an email server for sending and receiving emails among themselves.
- You need to be able to ping from each network to other networks after all setups are complete.

Deliverables

- The network mentioned above should be implemented in packet tracer, with necessary devices and full configuration.

- After completion you should be able to test the conditions imposed.

- As hardcopies, you will have to submit the followings:
    - Network topology diagram with proper labels
    - The configurations of all the routers that you have implemented.
    - VLSM/Network address table.
    - IP address table