Gotham City Police Department

The city of Gotham is not only the home of the world's greatest detective, The Batman but also a shelter for many infamous supervillains. The Batman and the Gotham City Police Department (GCPD), led by Commissioner Gordon, constantly fight to establish justice and bring peace to the city. The Joker and the Riddler have recently teamed up to disrupt every law and order. A few moments ago, a cyber-attack completely damaged the city's computer networks of 6 major police precincts. The riddles left by Riddler indicate possible terrorist attacks on these places. Hence, Batman and Commissioner Gordon are patrolling the high-threat locations, Arkham Island and City Hall District, respectively.

At this moment, it is crucial to reestablish the networks between these six precincts. Now, it is your job to help GCPD create the network architecture. The six precincts are - Arkham Island, City Hall District, Crime Alley, Financial District, East End, and Diamond District.

	Arkham Island	City Hall District	Crime Alley	Financial District	East End	Diamond District
Arkham Island (160)	0					
City Hall District (1024)	68	0				
Crime Alley (312)	57	18	0			
Financial District (128)	65	19	44	0		
East End (522)	78	15	25	35	0	
Diamond District (230)	95	26	24	17	19	0

*The numbers in brackets () specify the population/device number in the precinct, and the values in the table specify the distance (in miles) between precincts. *

While creating the network infrastructure, there are certain restrictions and rules that you need to follow:
- Consider each location as a separate LAN network connected by routers.
- Choose an appropriate network address and create subnets to assign to each precinct with the least amount of waste.

- But remember, you can use only half of the available IP addresses from the network address, i.e., 192.168.1.0/24 has 254 possible IP addresses, but you can use only 127, which is half of that.
- Don't choose reserved addresses as your network address. Example: 0.0.0.0 0.0.0.0
- Crime Alley and Financial District will need static IP addressing to ensure security. Other precincts will use the DHCP server to get IP addresses.
- East End has a web server and a DNS server used by every precinct. The web server is hacked by the riddler. Accessing the URL "www.riddlemethis.com" shows this message, "The more there is of me, the less you see. What am I?".
- Diamond District and Crime Alley precincts have set up printers to keep records of the Joker's thugs they have caught.
- Commissioner Gordon wants to communicate with Batman. So, an email server needs to be set up for sending and receiving emails between Arkham Island and City Hall District.
- Establish connections among all the precincts with the shortest route possible. Take any precinct/router as the source and run a shortest path algorithm like Dijkstra to implement the shortest path. DO NOT make a fully connected network where every router is connected with one another.
    - Must have at least one floating route.
    - Remember that the default route cannot be used while exchanging packets. Data will be delivered using static or dynamic routes only.
    - Financial District, Crime Alley, and Diamond District precincts need to be configured with Dynamic Routing, and the rest of the precincts with Static Routing.
- Showing 2 end devices per network is good enough to represent the whole population.
- You need to be able to ping each precinct from another after all the setups are complete.

Deliverables

- The network mentioned above should be implemented in packet tracer, with necessary devices and complete configuration.
- After completion, you should be able to test the conditions imposed.
- You will have to submit the following:
    - Network topology diagram with proper labels.
    - The configuration commands of all the routers that you have implemented.
    - VLSM tree
    - IP address table