Networking Final Project **Name:** _____
Time Limit: 3 weeks Teaching Assistant _____

This project description contains 2 pages (including this cover page) and 5 questions. Total of points is 100.

This is projects has been designed to be fun and educational. OK, so without further ado, here is the problem: You can contracted by a secret government agency to setup a black-site. This black-site must support some basic functionality of internet but it must not be connected to internet. (So that it is harder to hack, you know.) Black site will only allow outgoing connections which must pass through an encrypted FM broadcast station. This secret agency does not trust anyone. So all the software will need to be developed from scratch. This includes, web servers, DNS Servers and the FM broadcasting station. Don't worry thought they will provide you with switches that implement the DHCP server. So you will not have to build that yourself.

Great so that is the big idea. The figure below shows the proposed topology of the network and the remain questions in the document are designed to help you get there.

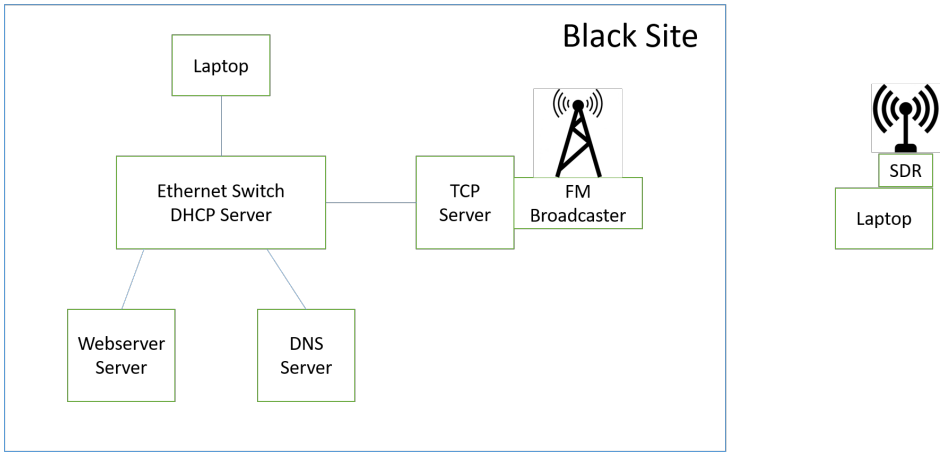

Figure 1: Black Site Topology

Grade Table (for teacher use only)

Question	Points	Score
1	15	
2	20	
3	20	
4	20	
5	25	
Total:	100	

1. (15 points) Implement a base webserver that responses to all web request with a simple html page that says: "Secret black Site" and displays the IP-Address of the requester. You can use the skeleton code that it attached with the project.

2. (20 points) The users of the back-site don't know the ip-address of all the webservers at the site. Instead the want to simply remember names of the servers at the site. Implement a DNS server. Provides the IP-Address for webserver you implemented above. (The URL for the server should be blacksite.secret). Test your DNS server by connecting to you network and typing blacksite.secrete into your browser. (You can configure your the machine running your webserver to have a static ip-address.

   Great people your network and now visit and interact with servers on your network using there browser. Other teams have build custom web applications, so this great we have an nice safe stack. Now let's all your black site to send data another external site using your custom FM broadcast station.

3. (20 points) The network contains a machine the that is connected to FM broadcaster. Any information that play on the soundcard of this machine will get automatically get broadcasted on FM 87.7. Write a TCP server that accepts incoming request on port 4000 and sends the Bytes directly to the sound card on the machine. Use your sound defined radio and SDR Sharp to verify the bytes are getting transmitted correctly. (The

4. (20 points) You want your receiver to be able to decode information in that you send so you decide great your own packet structure. You packet should in header length, check-sum, payload size.

5. (25 points) You don't want other people to be able to decode your packet so you encrypt the payload using a onetime pad. (Keys for your one time pad have been generated and share before hand – See key.txt file in project folder). (We send the packets 10 times just in case the get corrupted with a 10 second pause in between.

   Great Awesome you have done it.

1 Bonus (50 points and an A)

Now for the bonus points. Our FM station is broadcasting our encrypted packets but we want to do more. We want to be able to also decode these packets at some implement implement the python program that will interface with your SDR radio demodulate the signal, decode packets and decry pt the payload.