Network Concepts

1. What is an IP address and what is it used for?
   - The number Identifier that allows information to be sent between devices, kinda like your computer's internet address I think
2. What is the difference between a local IP address and a global one?
   - A global IP address is meant to be publicly accessible from the Internet.
   - A local-scope IP address is not routable to the Internet.
     - o This means that if your device is assigned local-scope address, your device will not be able to access the Internet, however you will still be able to access campus network resources.

3. On the computer/internet connection that you are currently using:
4. What is your global IP number?
   - 184.145.27.85
5. What is your local IP number?
   - 192.168.2.43
6. What is the difference between a dynamic IP and a static IP?
   - The main different between dynamic and static Ips is how the Ip addresses are assigned.
   - Dynamic Ips are assigned automatically from a pool, change over time, and are commonly used in home networks and by ISPs.
   - Static Ips are manually assigned, remain constant, and are used when you need consistent and predictable addressing for specific devices or services.
7. What is a port?
   - A communication endpoint or interface through which data can be sent or received between different devices or software applications within a network.
   - Ports are identified by port numbers.
   - Port numbers help ensure data packets are sent to the correct app, service, or device.
8. What is port forwarding, a port forward?
   - Making a port accessible from outside the local server
9. Investigate commonly used port numbers.
   - 20 – File Transfer Protocol(FTP) Data Transfer
   - 21 – File Transfer Protocol(FTP) Command Control
   - 53 – Domain Name System(DNS) – translates domain names into IP addresses
   - 80 – HTTP – standard protocol for serving web pages on the internet
   - 443 – HTTPS (HTTP Secure) – encrypts data transmissions for secure web browsing

10. How you might select a relatively unused port number?
    - Check IANA Port Number Registry
    - Use ports in the ephemeral range – 49152/65535 ports are dynamic ports and less likely to be used in well known services
    - Using Random or High Level Ports

11. What is the OSI model?
    - Open System Interconnection Model - The OSI model is a conceptual framework that standardizes the functions of a telecommunications or networking system in to seven distinct layers.
        o Physical Layer
        o Data Link Layer
        o Network Layer
        o Transport Layer
        o Sessions Layer
        o Presentation Layer
        o Application Layer

12. Where in the OSI model do you suppose that us game developers will be working?
    - Mainly in the Application Layer, where design and implementation of the game networking aspects is done.
13. What is a socket?
    - Software abstraction
    - An endpoint for sending and receiving data over a network.
    - Provide an API for network communication
14. What is TCP? (Transmission Control Protocol)
    - One of the core protocols in the Internet Protocol suite (TCP/IP)
    - Ensures data is delivered accurately and in the correct order.
15. What is UDP? (User Datagram Protocol)
    - A protocol in the TCP/IP
    - Best-effort service, Doesn't guarantee reliability, ordering, or even error checking
    - Often used for real-time applications like online gaming
16. When is TCP best used?
    - Best used when data reliability is critical.
    - Emails, web browsing, and file transfer
17. When is UDP best used?
    - Best used then real-time communication and low latency are more important then guaranteed delivery.
    - Online gaming, video/voice streaming where small amounts of data loss can be tolorated