**CSC 5272 Assignment 1:**

**Objective:**

Answer the following questions:  
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**Answers:**

The LAN is the local area network, it represents the direct cable connections between the various devices in the system.   
  
WAN is the Wide Area Network, it represents wireless communications between the various devices in the system.

DMZ is a part of the LAN which acts as the ‘demilitarized zone’ between the LAN and the WAN. The DMZ acts as the buffer zone that handles all external connections and acts as the gatekeeper to ensure that only specified services are permitted between WAN and LAN.

The DC (Domain Controller) is the part of the server that manages security through controlling user access through policies. The functions that the Domain Controller performs includes authenticating user login credentials when the user attempts to login to a computer controller by the domain controller, authorizing what that user has access to (for instance a user might have access to managing server functionality, while a user may only be permitted to use permitted functions), the Domain Controller can also create security policies for directories to manage access, as well as group policies for sets of users.  
  
the PF sense node acts as the firewall – it looks at what network traffic is coming in or leaving and filters it based upon specified policies. PF sense also handles routing to connect devices. The pfSense-office node handles traffic directed towards the file server and virtual work station, while pfSense-dc handles communications for the WebServer01 and DomainController01. This is because the website is separate from office operations – so as a result its firewalls and routing are handled separately from the office.

Making a call to the website involves passing through pfSense-dc to WebServer01 this involves passing through 10.30.0.1 via ports 22/tcp 23/tcp and 179/tcp to 203.30.3.40 via ports 21/tcp 22/tcp 80/tcp 3000/tcp and 3306/tcp  
  
The Open Systems Interconnection model is a framework to describe communications between computers on a network. This framework breaks down each portion of communication down into layers:  
  
1.)Physical Layers: This is the layer where the information is physically – the wires, mechanical, and electrical aspects of communication.  
2.)Data Link: The data link layers involves transfer of data frames over the physical layer. The Data Link layer has physical addresses using Media Access Control addresses to identify connected devices on the network.   
3.)Network: The Network layer involves transporting packets of information from one source to the next – it is the ‘routing’ layer where information’s pathing is determined.  
4.)Transport: The transport layer involves breaking down larger pieces of data into smaller pieces that can be transferred. The transport layer also handles what happens when those smaller pieces get lost or corrupted in transit. The transport layer also handles flow of information – this is different from determining the best route as it involves making sure the information always keeps moving along its route.  
5.)Session: The session layer manages communications ‘sessions’ otherwise known as connections between applications. The session layer maintains synchronization during communication through methods such as checkpointing which allows recovery when data is lost or corrupted. The session layer handles security and authentication of those accessing it.  
6.)Presentation: The presentation layer handles encryption and decryption of information, this Is so that data can be translated between formats so that the sender and receiver can both understand the information being exchanged. The presentation layer also entails data compression and formatting as this is part of this layer’s role in ensuring that both sender and receiver can understand exchanged information.   
7.)Application: This is the layer that most users actually interact with. The application layer is responsible for user interface that allows users to actually interact with application and services. These user interfaces are both GUIs, CLI, and API interfaces. The application layer also involves communication between applications on different devices.