Samuel Adly 8/30/24

CSCI 355 HW#1

1. Explain what each level of the OSI model does (a sentence or two is enough).

**Physical layer:** the physical layer transmits the raw bit stream over through physical things that we can touch like cables

**Data link layer**: The data link layer transfers data frames from one node to the other

**Network layer:** The network layer controls which route the data takes to reach the desired device

**Transport layer:** The transport layer ensures that data is sent and received without error and in the correct sequence. Basically, makes sure you receive what you should be receiving.

**Session layer:** The session layer controls the connections between devices/computers

**Presentation layer:** The presentation layer prepares the data for the final layer

**Application layer:** The application layer allows users and applications to access the services

1. What is the difference between a scripting language, a compiled language, and JIT (just in time)?

Scripted languages differ from compiled languages in that they do not need a compiler to run. Scripted languages are executed by an interpreter while compiled languages need to be turned into machine code before compiled. JIT does this by compiling the code at run time.

1. HTML5 encourages *semantic markup*.  What does that mean?

Semantic markup makes it easier to understand what each part of the code does. Rather than have a <div> and others not know what its purpose is, the developer can create a <header> to specify its function.

1. What is the DOM (<https://developer.mozilla.org/en-US/docs/Web/API/Document_Object_Model/Introduction)>?

DOM or Document Object Model is similar to a tree’s roots. The very top is the document followed by boxes of elements inside that document. For instance if the html document has a head and a body the roots will split into head and body boxes and then split again for each object in the code. So if the body has <h1> and <h2> it will go into detail showing those two.

1. (For windows machines) Go to Command Prompt (type cmd) and ping three different places outside the United States. To do this: In the Command Prompt window, type ping followed by the destination, either an IP address or a domain name and press enter. Copy and paste the results to a document and explain the discrepancy in times.

I think the time for the pings represents the latency for the website to send and receive data. It might be different depending on the user traffic, my own network connection, and the quality of the domains servers.

1. Why would a ping not work?  Why is a ping an important network tool?

A ping would not work if there is no network connection from the user or the domains side. Also, it might not work if the host is down. A ping is an important network tool because it ensures that the two entities have a connection and lets us know how well it is.

1. Use the tracert command on the three above websites from question #5 (and record your results). To use, go to cmd and type tracert followed by a hostname or IP address, and press Enter. Explain the path of the hops.

The hops go from my router to the Verizon routers since I have Verizon internet. They then go through another network before they go to the website or the servers that the website is hosted on like Akamai.

1. Discuss the concept and three different benefits to Layered Security (bullet points is fine): [link](http://image1.cc-inc.com/pcm/marketing/symantec/White%20Paper_Layered%20Security%20and%20Why%20it%20Works.pdf)

**Layered Security:** Consists of 5 layers, network controls, antivirus, reputation, behavioral analysis, and detection and remediation. This helps organizations protect/slow from attacks before they can cause serious damage to the system.

**Benefits:**

* Slows down or deters attackers
* If one layer fails, there are others to support it
* Forms a reliable security system so users’ data is safe

1. Why is the Principle of Least Privilege so important: [link](https://www.youtube.com/watch?v=bY4qZH3Mpn8)

If you have to manage large amounts of users, system, or applications it can be challenging to determine and grant them only what they. Each user would need access to certain files, locations, tools, and other things that with large amounts of people as well as new hires and terminations, can be really difficult to keep track of.