Bryce Loftin

Computer Science - Morriss

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The Internet

The Internet is undeniably part of everyone’s daily life, nowadays. We use it on our phones, our laptops, our computers, and even some cars. But what is the Internet? Is it some magical place that only our computers can go to? Well no, not really. The internet is just a web of systems and protocols that allow users create websites and communicate with other websites or networks. A user connects to the internet using wifi, and wifi is provided by a company like at&t. But that’s not all that you need to connect to the internet. Every device capable of using the internet is given an IP address. An IP address is a unique number used to identify that device while it is using the internet, so that it can receive or send data just like you would need an address to mail a letter or a package to someone. An IP address generally looks like a simple four numbers all ranging from 0 to 255, and all separated by decimals. But that means that there are only about 4 billion possible combinations of those numbers which causes some problems. IP addresses have to be unique to each device so that two devices don’t share the same one, and data is not sent to the wrong device. However, there are more than 7 billion people living in the world today, and most have multiple devices, that means that eventually some IP addresses will start to overlap. So how do we get around this problem? Well we can use a new version of IP called IPv6 addresses. These are similar to old IP addresses but now instead of having only 4 numbers that can only go up to 255, it has 8 numbers that can each go up to 65,535. This gives people trillions upon trillions more options for IP addresses. Another way around this problem is through the use of routers. Routers act as a hub for devices to connect to the internet. An IP address is assigned to a router and then multiple devices can wirelessly connect to that router, to then connect with the internet without actually having their own IP address. In other words, all of the devices using the router would do so under its IP address. But how do we get IP addresses? You obviously can’t just make them up, or else they would overlap. That’s why a Dynamic Host Configuration Protocol (or DHCP) server exists. This server assigns unique IP address to devices so that there is no confusion or overlapping.

So now that the device is connected to the internet, it can visit all kinds of websites with their own IP addresses. But nobody is going to remember hundreds of IP addresses just to surf the internet, so to make it easier, DNS was invented. DNS or Domain Name System translates websites IP addresses into actual words and names that refer to certain IP addresses and can be used to find websites on the internet. So in a sense, DNS is like an address book or the phone app on most smartphones that save the phone numbers of people you know so that you just have to remember their names.

Now, once you know how to access a website your device has to be able to connect to it. It connects to other servers through something called internet protocol or IP. This basically just a set of rules dictating how information is transmitted from network to network. There are thousands of networks all over the world that all communicate with each other and for the most part it has to be through physical wires to be able to send and receive data. This means that usually, when an action is performed, data passes through multiple networks and routers that are connected to other routers which can be connected to multiple networks. IP ensures that the data goes through the fastest route to its destination the same way a GPS does. Another protocol called Transmission Control Protocol is again just a set of rules or instructions except it describes what the receiving device should do with information. For example, if someone were trying to access a website, after typing in the domain that would take them to that IP address, the information sent using IP, will also use TCP as a kind of packaging that tells the website that a user is trying to navigate there on their device. Finally, there is another protocol called Hypertext Transfer Protocol or HTTP that is a set of rules describing how websites are accessed. So when that user finally got information to a website and told the website what to do with it, now the website would use HTTP to know how to send the user its website.