|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **IP Addresses** |  |

|  |
| --- |
| **Your Tasks** |
| * Watch the Video: IP Address and DNS * Define key vocabulary * Explain the parts of an IPv4 address * Compare IPv4 and IPv6 * Recieve credit for the group portion of this lab |

* **Watch the Video: IP Addresses and DNS**
* Navigate to the following link and watch the video: IP Addresses and DNS

<https://www.youtube.com/watch?v=5o8CwafCxnU&feature=youtu.be>

* **Define key vocabulary**

Refer to the video above or a search engine to define the following,

**IP Address**

|  |
| --- |
|  |

**IPv4**

|  |
| --- |
|  |

**IPv6**

|  |
| --- |
|  |

**IP Packet**

|  |
| --- |
|  |

* **Explain the parts of an IPv4 address**

IPv4 uses 32 bits for addressing. The 32 bits are split into **4 bytes** and each byte is separated by a dot(.). So it is of this form:

**00000000.00000000.00000000.00000000**

A typical IP address in decimal form appears like this:

**192.168.0.1**

What is the range of decimal numbers for each part of an IPv4 address?

|  |
| --- |
|  |

How many IPv4 addresses are there?

|  |
| --- |
|  |

An IP address has two components – A, network component, and a node component.

As an analogy, if you think of the street address of your house it is of the form,

**House Number + Street Name (e.g. 12 King Street)**

For computer networks the network number is equivalent to the street name and the house number is the Node Address.

How networks and nodes are allocated in the address depends on the size of the network. For example a very large network (like a large company) might be allocated as follows. Because large networks have lots of computers on them, we need more nodes to accommodate them.

**net.node.node.node**

Where as a medium network, would be allocated as,

**net.net.node.node**

And a small network, would be allocated as,

**net.net.net.node**

|  |
| --- |
| To which of the following networks could you connect the most devices? Explain. |
| **(a) net.node.node.node**  **(b) net.net.node.node**  **(c) net.net.net.node** |

* **Compare IPv4 andIPv6**

The IPv4 system for addressing Internet connected devices cannot keep up with the rapidly growing Internet. The IPv6 system however can accommodate more devices than grains of sand on the earth – that’s a lot of devices!

In a previous exercise, you determined the number of possible connections using IPv4. To understand the number of connections in IPv6 you must first be aware that instead of using binary, each part of the IPv6 address using hexadecimal (base 16) – that is 24.

IPv6 addresses are represented as eight groups, separated by colons, of four [hexadecimal](https://en.wikipedia.org/wiki/Hexadecimal) digits

Given 4 places, how many possible combinations are there in a base 16 system. Recall (baseplace)

|  |
| --- |
|  |

Below is an example of a full IPv6 address

FE80:0000:0000:0000:0202:B3FF:FE1E:8329

How many IPv6 addresses are possible.

|  |
| --- |
|  |

How many IPv6 addresses are possible than IPv4 addresses?

|  |
| --- |
|  |

* **Have Ms. Pluska check off your round of battleship**

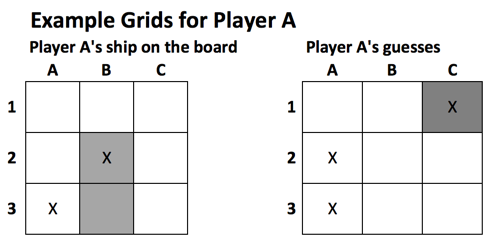


Before you continue have Ms. Pluska check off your round of battleship

Do not continue until you have Ms. Pluska’s (or her designated TA’s) signature \_\_\_\_\_\_\_\_\_\_\_\_

* **Invent a Binary Protocol for Battleship**

In the previous rounds of Battleship, you came up with a method for exchanging messages on an open broadcast channel to play multiple games of Battleship at once. Now that you’ve played Battleship this way, with your group or with a partner, ***describe an efficient binary protocol for playing a 3 or 4-person game of Battleship that can be played accurately over the Internet Simulator.***

******

Let “efficient” mean that your protocol uses the smallest reasonable number of bits (0s and 1s) to make messages for Battleship that still contain all of the necessary information for playing the game.

List all of the information (data) that you will need to communicate in order to play Battleship.For example you need to know who is firing, along with the x-coordinate and y-coordinates, whether or not they hit or missed, etc.

|  |
| --- |
|  |

Explain your protocol. How will you use 0s and 1s to communicate the information above. Don’t worry about coming up with a “correct” protocol -- just one that works! Make sure you explain your protocol well enough that another group could follow it. Also, provide some example encodings that could be used to exchange information during game play.

|  |
| --- |
|  |

* Test out your protocol with another round of battleship.
* **Play Broadcast Battleship Round 3 – Internet Simulator (Binary)**
* Play another round of Battleship using only the Internet Simulator
* Make sure you have Binary selected AND ASCII deselected under the “My Devices Tab”
* NO TALKING
* **Have Ms. Pluska check off your round of battleship**



Before you continue have Ms. Pluska check off your round of battleship

Do not continue until you have Ms. Pluska’s (or her designated TA’s) signature \_\_\_\_\_\_\_\_\_\_\_\_

* **Critique your binary protocol**

Critique the success of your binary protocol using the criteria below,

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria** | **Yes** | **No** | **Comments** |
| All members new who was firing and who was getting fired at. |  |  |  |
| The person firing communicated the coordinates on the game board |  |  |  |
| Hit and missed shots were communicated |  |  |  |
| Whether or not a ship had sunk was communicated |  |  |  |
| All members new when game play ended |  |  |  |

* **Reflect**

For a 3 – person game of Battleship how my bits do you need to address each player? Explain.

|  |
| --- |
|  |

What does the activity have to do with the actual Internet?

|  |
| --- |
|  |

* **Receive Credit for the group portion of this lab**



1. Indicate the names of all group members.
2. Have Ms. Pluska check your Need for Addressing lab
3. Submit your lab to the needs to be graded folder to receive credit for the group portion of this lab.

Do not submit your lab until you have Ms. Pluska’s (or her designated TA’s) signature \_\_\_\_\_\_\_