

1. What are the two parts of packet? Which stores the address and what stores the data?

5/3/2/0

2. What makes addressing so important for packet switching networks?

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3. What are the different layers of the protocol layer and what purpose do they serve in delivering packets?

10/8/6/3/0

Layer Name

Role in Delivering Packets

NAME: \_\_\_\_\_

4. An Internet address (version 4) is stored in how many bytes? What type would best store an IPv4 address in C?

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5. A domain name, unlike a IP address, is more human usable, what protocol enables domain names to be resolved into IP addresses?

5/3/2/0

6. Using the host command line tool, resolve the following domain names to an IPv4 addresses. Circle those that also have an IPv6 address.

www.cis.upenn.edu

www.cs.swarthmore.edu

www.usna.edu

facebook.com

microsoft.com

8/5/3/0

7. Rerun host again, does any of the IP addresses change? Why might a domain name want to resolve to multiple IP addresses?

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8. What is the purpose of a port address? How many bytes and what C type would store a port address?

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9. TCP provides reliable data transmission, but at what cost? Why might you want to use UDP over TCP?

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10. Using netcat as a client to connect to 10.53.33.232 on port 2016. What is the response from the server? What is the domain name of the computer you connected to?

(HINT: trying using host on the ip address)

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11. SSH into a lab computer, and run **netstat -ln**: What IPv4 ports are being listened on?

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12. Match the data types to their usage in network addressing:

- |  |   |
|--|---|
| <p>struct in_addr ___</p> <p>in_addr_t ___</p> <p>s_addr ___</p> <p>sturct sockaddr ___</p> <p>struct sockaddr_in ___</p> <p>sin_family ___</p> <p>sin_port ___</p> <p>sin_addr ___</p> <p>struct addrinfo ___</p> <p>ai_family ___</p> <p>ai_addr ___</p> | <p>(a) Specifies the address type, e.g. AF_INET, for the addrinfo structure</p> <p>(b) Specifies the address type, e.g., AF_INET, for the sockaddr_in structure</p> <p>(c) A type defined uint32</p> <p>(d) A generic address structure for sockets</p> <p>(e) Structure to store a IPv4 internet address</p> <p>(f) A unsigned short storing the port for a sockaddr_in</p> <p>(g) Structure used to hint at IP addresses for resolving as well as storing results</p> <p>(h) Member of the sockaddr_in that stores the address</p> <p>(i) The sole member of the in_addr structure</p> <p>(j) A generic socket address returned in a addrinfo</p> <p>(k) A specific address structure for sockets to store IP, port pairs</p> |
|--|---|

13. Explain the why the following cast is necessary:

```
saddr = (struct sockaddr_in *) result->ai_addr;
```

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14. The following functions are opposites, `inet_ntoa()` and `inet_aton()`, what are their purposes? Provide a small example.

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15. What does "endianess" mean with respect to data storage? What are the two types of "endianess"?

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16. When you are assigning a port to a socket address, which of these two conversion should use and why? `htnos()` or `ntohs()`?

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17. Consider setting the address for 10.4.32.41 on port 22, set the fields appropriately:

```
stuct sockaddr_in saddr;
```

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