IC221 System Programming
Spring 2015
HW14

NAME:_____

COLLABORATOR(S):_____

5/3/1/0 1. What are the two parts of packet? Which stores the address and what stores the data?

5/3/1/0 2. What makes addressing so important for packet switching networks?

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

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NAME: _____

5/3/1/0 4. An Internet address (version 4) is stored in how many bytes? What type would best store an IPv4 address in C?

5/3/1/0 5. A domain name, unlike a IP address, is more human usable, what protocol enables domain names to be resolved into IP addresses?

10/8/4/0 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

5/3/1/0 7. Rerun host again, does any of the IP addresses change? Why might a domain name want to resolve to multiple IP addresses?

5/3/1/0 8. What is the purpose of a port address? How many bytes and what C type would store a port address?

5/3/1/0 9. TCP provides reliable data transmission, but at what cost? Why might you want to use UDP over TCP?

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NAME: _____

10/8/6/3/0 10. Match the data types to their usage in network addressing:

struct in_addr ___	(a)	Specifies the address type, e.g. AF_INET, for the addrinfo structure
in_addr_t ___	(b)	Specifies the address type, e.g., AF_INET, for the sockaddr_in structure
s_addr ___	(c)	A type defined unint32
sturct sockaddr ___	(d)	A generic address structure for sockets
struct sockaddr_in ___	(e)	Structure to store a IPv4 internet address
sin_family ___	(f)	A unsigned short storing the port for a sockaddr_in
sin_port ___	(g)	Structure used to hint at IP addresses for resolving as well as storing results
sin_addr ___	(h)	Member of the sockaddr_in that stores the address
struct addrinfo ___	(i)	The sole member of the in_addr structure
ai_family ___	(j)	A generic socket address returned in a addrinfo
ai_addr ___	(k)	A specific address structure for sockets to store IP, port pairs

5/3/1/0 11. Explain the why the following cast is necessary:

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

5/3/1/0 12. The following functions are opposites, inet_ntoa() and inet_aton(), what are their purposes? Provide a small example.

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NAME: _____

5/3/1/0 13. What byte order does local hosts use and what does the network use? (That is, Big vs. Little Endian...)

5/3/1/0 14. When you are assigning a port to a socket address, which of these two conversion should use and why? htnos() or ntohs()?

5/3/1/0 15. Consider setting the address for 10.4.32.41 on port 22, set the fields appropriately:

```
stuct sockaddr_in saddr;
```

5/3/1/0 16. Label each of the arguments in this socket() and give a brief explanation of their meaning:

```
sock = socket(AF_INET, SOCK_STREAM, 0)
```

5/3/1/0 18. Label and provide a brief explanation for each of the arguments to this call to connect():

```
connect(sock, (struct sockaddr *) saddr_in, sizeof(*saddr_in)
```

5/3/1/0 19. Above, why must we cast **saddr_in** to **struct sockaddr**?

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