CSCI 4220 Lab 7

Lab 7: getaddrinfo() lookup

This lab will likely require using the man pages to look up details of the `getaddrinfo()` call. You can use `man getaddrinfo` in a Mac/Linux/WSL terminal to pull up the page, use the arrow keys and PgUp/PgDown to navigate, and `q` to quit.

Write a C (not C++) program that takes a single argument, the name of a host, and uses `getaddrinfo()` to output all IPv4 and IPv6 addresses associated with that host. Don't forget to handle global errors (use `perror`) *and* errors from the return value of the function, and remember to free any structures that are dynamically allocated. Be particularly careful about the results from `getaddrinfo()` since these are allocated for you but not deallocated automatically.

You may want to also look at `man 7 ip` and `man 7 ipv6` to see the members of `struct sockaddr_in` and `struct sockaddr_in6` respectively. Keep in mind that using `sockaddr.sa_data` will be incorrect because it will use the port and other fields as part of the address. For a refresher on `struct sockaddr`, you can look at `man bind`.

To test multiple IPs you might want to try www.youtube.com as well (note that youtube.com and www.youtube.com might give you a different number of results!)

Submit a single C file called `lab7.c` with your team's solution. The book code will not be included for this lab.

Output examples (you may get different IP addresses, and may not get the same number of addresses):

```
???@???:~/scratch$ ./a.out \"
getaddrinfo failed, interpreting return status code: Name or service not known
getaddrinfo failed, printing errno: Bad message

???@???:~/scratch$ ./a.out www.rpi.edu
128.113.0.2
2620:0:2820:4::2

???@???:~/scratch$ ./a.out www.google.com
108.177.121.105
108.177.121.147
108.177.121.103
108.177.121.106
108.177.121.104
108.177.121.99
2607:f8b0:4006:819::2004
```

Examples of buggy IPv6 output - usually from incorrect casting of data structures:

```
???@???:~/scratch$ ./a.out www.rpi.edu
(output omitted)
::2620:0:2820:4:0

???@???:~/scratch$ ./a.out www.google.com
(output omitted)
2607:f8b0:4006:819:0
```