COP5615: Distributed Oper Sys Princ, Fall 18

Bonus Project 1

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Introduction:

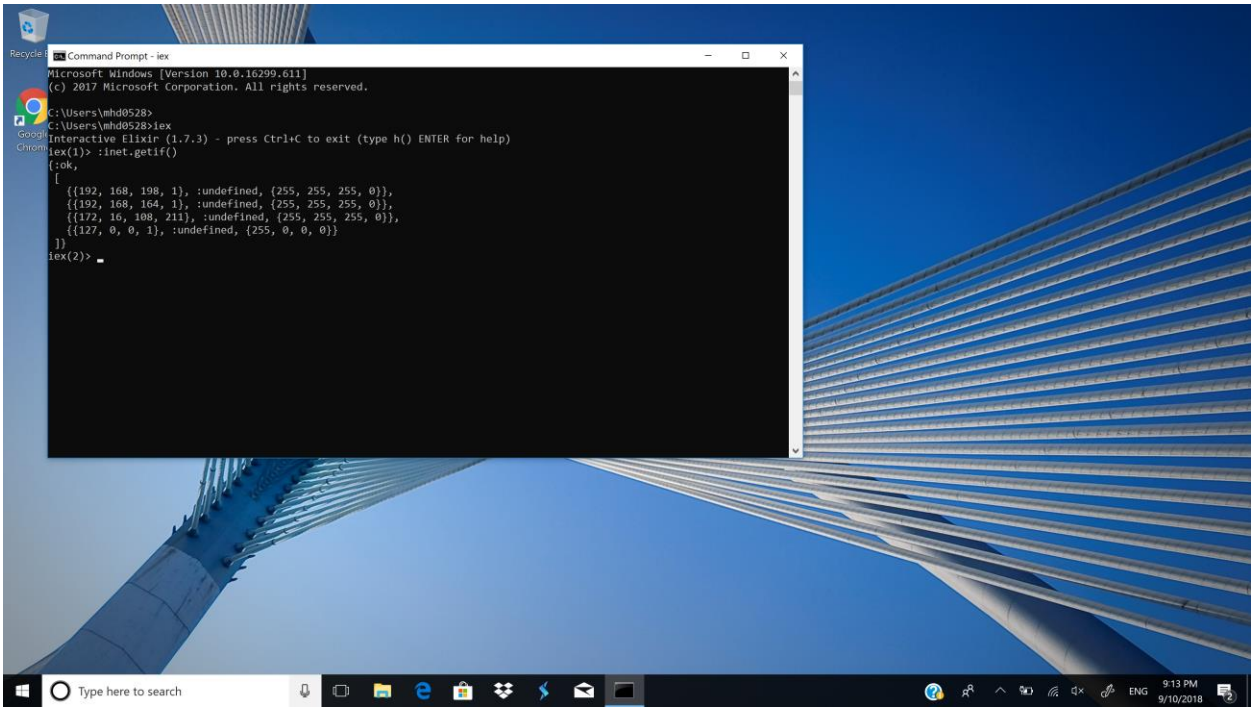
The goal of this project is to use Elixir and the actor model to build a good solution to the Lucas Square Pyramid problem that runs well on 2+ machines using remote actors.

Assumptions and Key Points to note:

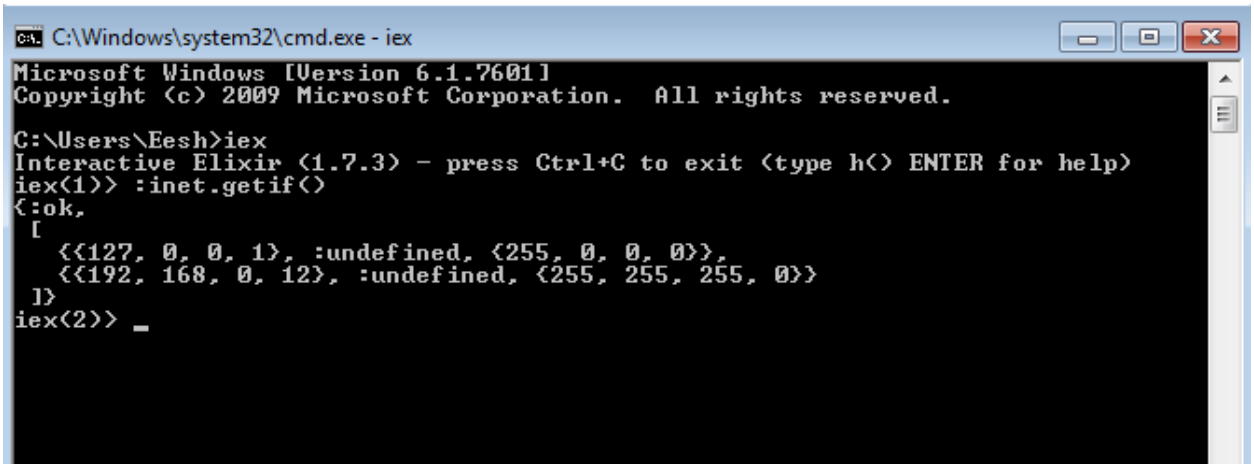
1. The program is designed to run only on 2 machines.
2. The server must start before client.
3. It is assumed that the number of machines is known before running the program.
4. Before running the project, the command 'epmd –daemon' must be run on all machines.
5. The code can run on more than 2 machines but some minor changes must be made.

6. The program will not run on systems where Virtual Box or VMWare is installed. Why?

   VMware and Virtual Box create IP addresses for adapters so when we run :inet.getif/0 command more than 2 IP addresses are returned. In the below image, the first 2 IP addresses in the first 2 tuples are created by VMWare. The 3rd IP Address in the 3rd tuple is the IP Address is assigned when the machine is connected to the LAN.

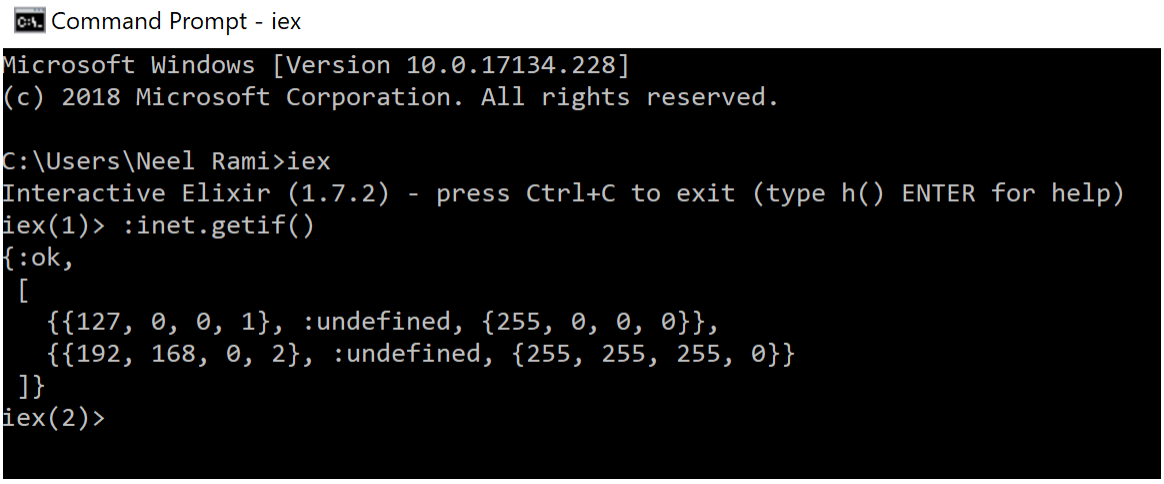


7. Also the code will not run on systems which have Windows 7 and old versions of Windows 10. Why?

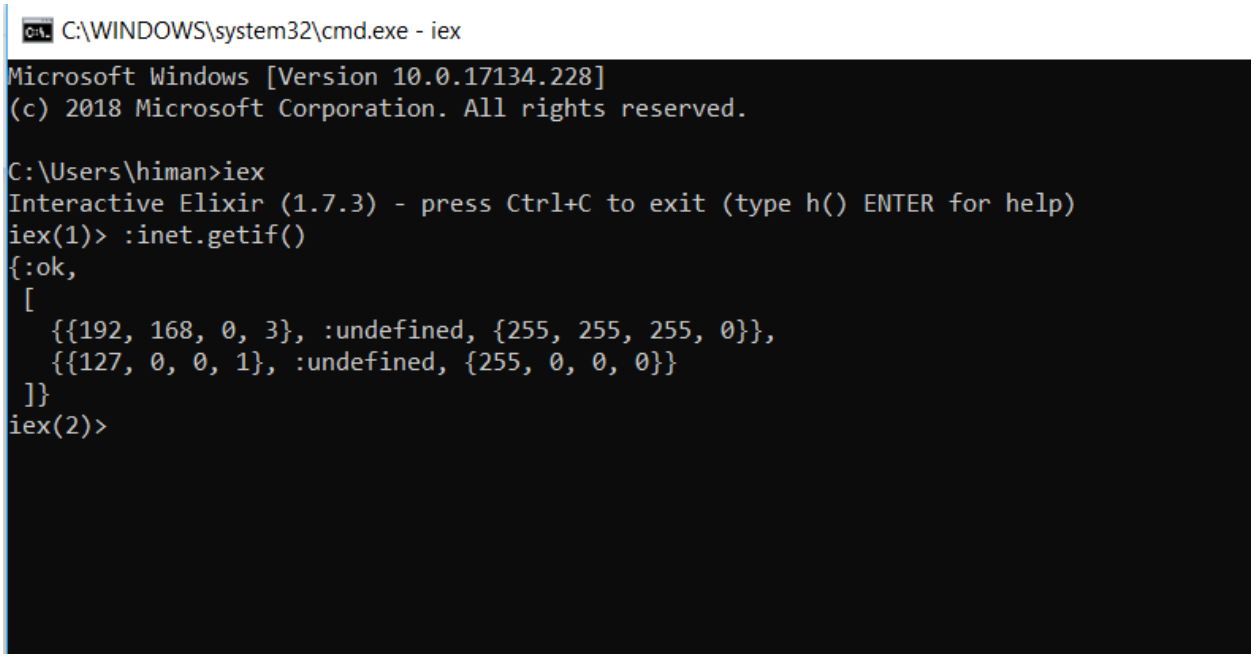


In Windows 7 and some old versions of Windows 10, the IP Address is located in the second element of the tuple which is returned by :inet.getif/0 function whereas in new version of Windows 10, the IP Address is located in the first element of the tuple which is returned by :inet.getif/0 function.

Old Version of Windows 10.



New Version of Windows 10.



Results:

1. **Instructions for running the Server and Client Code on Ubuntu based Systems**
    a. Running the Server code
        i. Get the IP address of the Server Node using ifconfig command
        ii. Go to the project directory.
        iii. Type the command: 'epmd –daemon'
        iv. Type the command in the terminal: mix escript.build (Optional)
        v. Type the command in the terminal: ./bonusproj1 100000000 20
        vi. Here the first command line argument is the value of 'n'
        vii. Here the second command line argument is the value of 'k'
        viii. General command: ./bonusproj1 <n> <k>

    b. Running the Client Code
        i. Go the project directory
        ii. Type the command: 'epmd –daemon'
        iii. Type the command in the cmd: mix escript.build (Optional)
        iv. Type the command in the cmd: ./bonusproj1 10.192.225.165
        v. Here the first command line argument is the IP Address of the Server Machine.
        vi. General command: ./bonusproj1 <IP Address of the Server Machine>

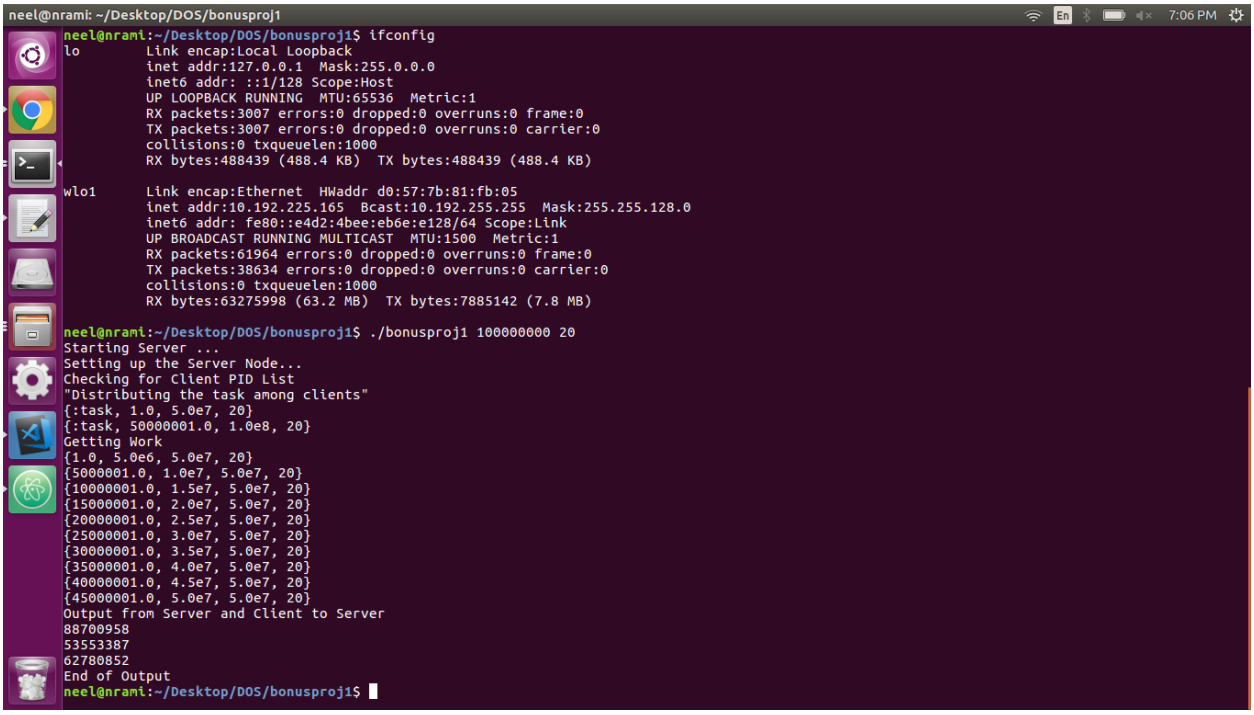
2. **Instructions for running the Server and Client Code on Windows**
    a. Running the Server code
        i. Get the IP address of the node using ipconfig command
        ii. Go to the project directory.
        iii. Type the command: 'epmd –daemon'
        iv. Type the command in the terminal: mix escript.build (Optional)
        v. Type the command in the terminal: escript .\bonusproj1 100000000 20
        vi. Here the first command line argument is the value of 'n'
        vii. Here the second command line argument is the value of 'k'
        viii. General command: escript .\bonusproj1 <n> <k>

    b. Running the Client Code
        i. Go the project directory
        ii. Type the command: 'epmd –daemon'
        iii. Type the command in the cmd: mix escript.build (Optional)
        iv. Type the command in the cmd: escript .\bonusproj1 10.192.225.165
        v. Here the first command line argument is the IP Address of the Server Machine.

vi. General command: escript .\bonusproj1 <IP Address of the Server Machine>

3. Result of running the program

Command given: **./bonusproj1 100000000 20**



4. Output Format

a) After the line 'Output from Server and Client to Server' is printed, then numbers will be printed one after the one line by line.
b) Then 'End of Output' is printed.
c) When only 'End of Output' is printed, it means no number was printed.
d) The list of numbers is not printed in sorted order.

5. Our Solution to this problem

a. Here the task is divided among 2 machines.
b. For e.g. if the value of n is 100, then 1st machine will work for numbers from 1 to 50 and 2nd machine will work for numbers from 51 to 100.
c. In each machine, 10 actors are created.

d. Then the task is each machine is further divided among the actors.