Part E Explanation:

###Logic behind the program:

For this part of the assignment we were tasked with generating the network counters. I found this to be four parameters, 1. The number of **packets** sent **to** an ip address of a video service, 2.The number of **packets** sent **from** an ip address of a video service, 3. The number of **bytes** sent **to** an ip address of a video service, and 4. The number of **bytes** sent **from** an ip address of a video service.

I received the IP addresses corresponding to the youtube servers that were being utilized from part D. I calculated the network counters for each individual ip address, and then for the total. My local device IP was taken to be: "192.168.5.10".

Please note that the problem had asked specifically for the network counters between the local machine and youtube's servers, therefore, this part is only done for the trace of a laptop connected to wifi displaying a youtube video.

###How to run the program:

The program can be run through the command: python partDEF.py in the terminal. The program relies on a file called generalFile.py, which was taken from the previous assignment (written by me), with minor alterations, in order to make the input packets into a human readable form.
The file partDEF.py contains code for all three parts, since information from one part is used in another. The functions used for this part include: findIPAddresses(), youtubeNetworkCounter(listOfUsedIpAddr), and printYoutubeNetworkCounter(ipDic).

When the command python partDEF.py is written into the terminal, the terminal will prompt the user to provide the name of the file and then which information the user would like. In this example, the answer to the later should be “2”, representing “Calculate Youtube Network Counters.”

Doing all of this provided the output:

```
Youtube server 172.217.21.238:
        OUT COUNT: 148
        IN COUNT: 148
        OUT BYTES: 45206
        IN BYTES: 47669
```

```
Youtube server 213.202.89.141:
        OUT COUNT: 24
        IN COUNT: 26
        OUT BYTES: 9590
        IN BYTES: 3662

Youtube server 172.217.21.206:
        OUT COUNT: 59
        IN COUNT: 61
        OUT BYTES: 38516
        IN BYTES: 6729

Youtube server 172.217.22.14:
        OUT COUNT: 88
        IN COUNT: 82
        OUT BYTES: 88860
        IN BYTES: 7586

Youtube server 213.202.89.144:
        OUT COUNT: 443
        IN COUNT: 285
        OUT BYTES: 615183
        IN BYTES: 29481

Youtube server 172.217.22.46:
        OUT COUNT: 27
        IN COUNT: 27
        OUT BYTES: 4709
        IN BYTES: 10105

Youtube server 216.58.207.86:
        OUT COUNT: 126
        IN COUNT: 123
        OUT BYTES: 131922
        IN BYTES: 15634

TOTAL:
        TOTAL OUT COUNT: 915
        TOTAL IN COUNT: 752
        TOTAL OUT BYTES: 933986
```

```
        TOTAL IN BYTES: 120866
        TOTAL PACKETS EXCHANGED: 1667
        TOTAL BYTES EXCHANGED: 1054852

***IN is considered from local IP to Youtube server
***OUT is considered from Youtube server to local IP
```

We can see that Youtube server 213.202.89.144 provided the greatest amount of out bytes, most likely meaning that this server is the one responsible for the video session.