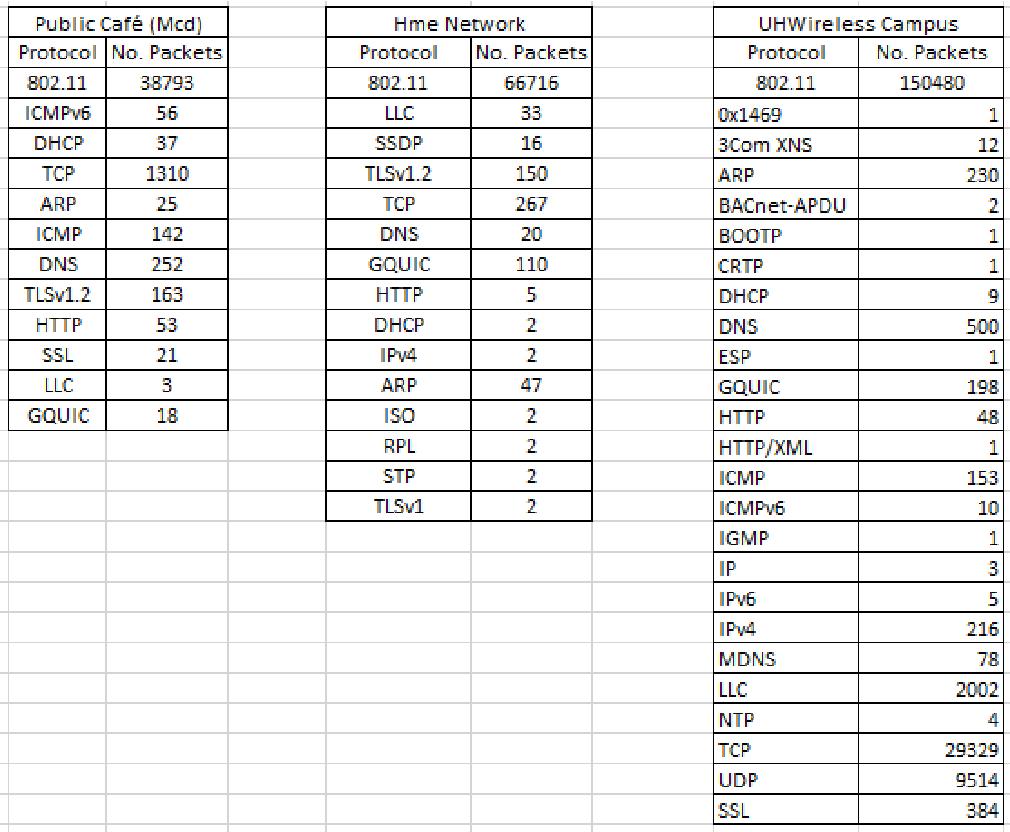
Monitoring Network Packets

For capturing packets, I have used Wireshark in Ubuntu 18.0 OS. To enable monitor mode I have used following commands.

1. sudo iwlist channels
2. sudo airmon-ng start wlp3s0 <channel number>
3. sudo airmon-ng stop wlp3s0mon

1. I have captured three traces of packets in 1. Home network, 2. Campus network 3.McD cafe with monitor mode enabled in Wireshark for the duration of 2 mins.

Following are my observations.
Each trace has captured different types of protocols and have different number of packets transferred. Protocol and No of packets it transferred under the protocol are captured and kept in the following tables.

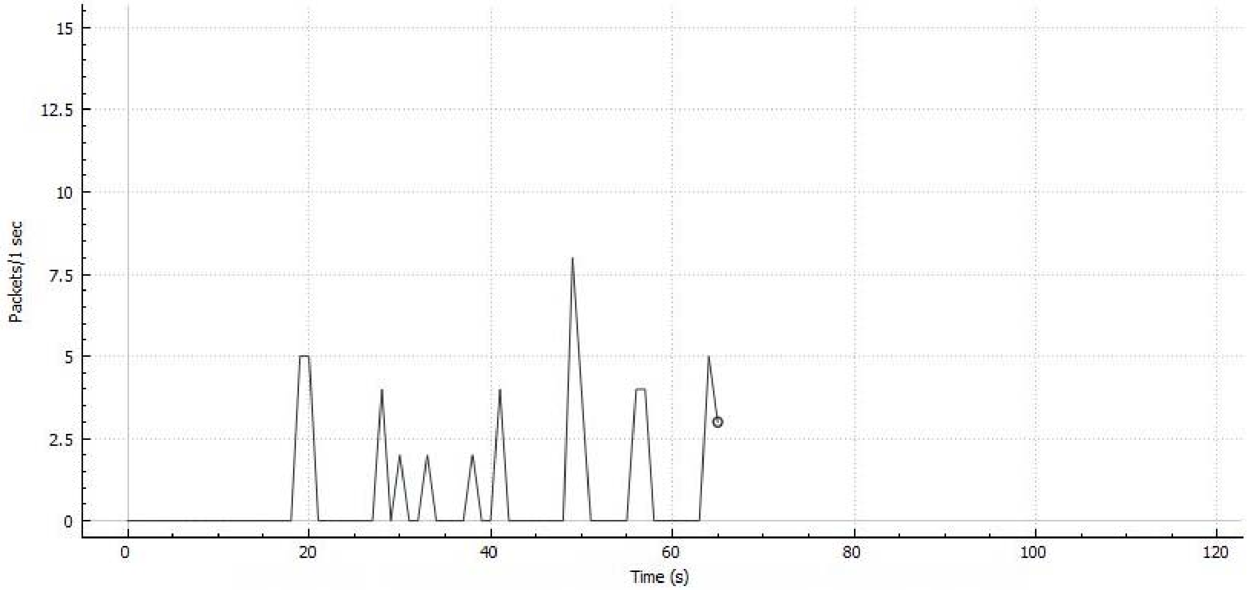


Public Café (Mcd)	
Protocol	No. Packets
802.11	38793
ICMPv6	56
DHCP	37
TCP	1310
ARP	25
ICMP	142
DNS	252
TLSv1.2	163
HTTP	53
SSL	21
LLC	3
GQUIC	18

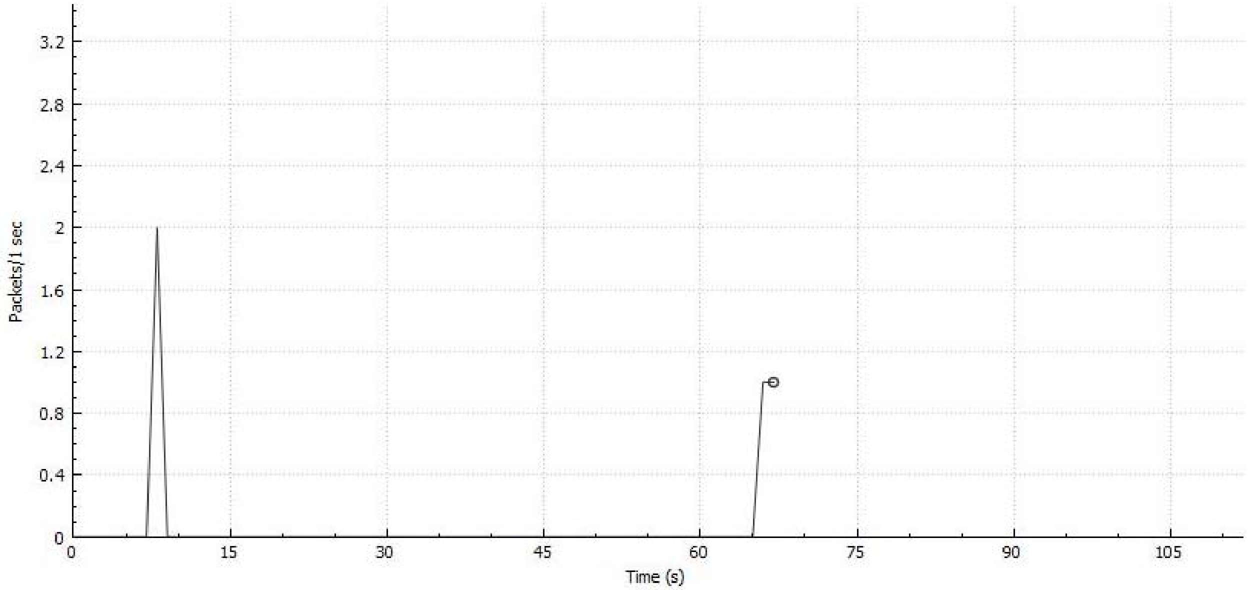
Hme Network	
Protocol	No. Packets
802.11	66716
LLC	33
SSDP	16
TLSv1.2	150
TCP	267
DNS	20
GQUIC	110
HTTP	5
DHCP	2
IPv4	2
ARP	47
ISO	2
RPL	2
STP	2
TLSv1	2

UHWireless Campus	
Protocol	No. Packets
802.11	150480
0x1469	1
3Com XNS	12
ARP	230
BACnet-APDU	2
BOOTP	1
CRTP	1
DHCP	9
DNS	500
ESP	1
GQUIC	198
HTTP	48
HTTP/XML	1
ICMP	153
ICMPv6	10
IGMP	1
IP	3
IPv6	5
IPv4	216
MDNS	78
LLC	2002
NTP	4
TCP	29329
UDP	9514
SSL	384

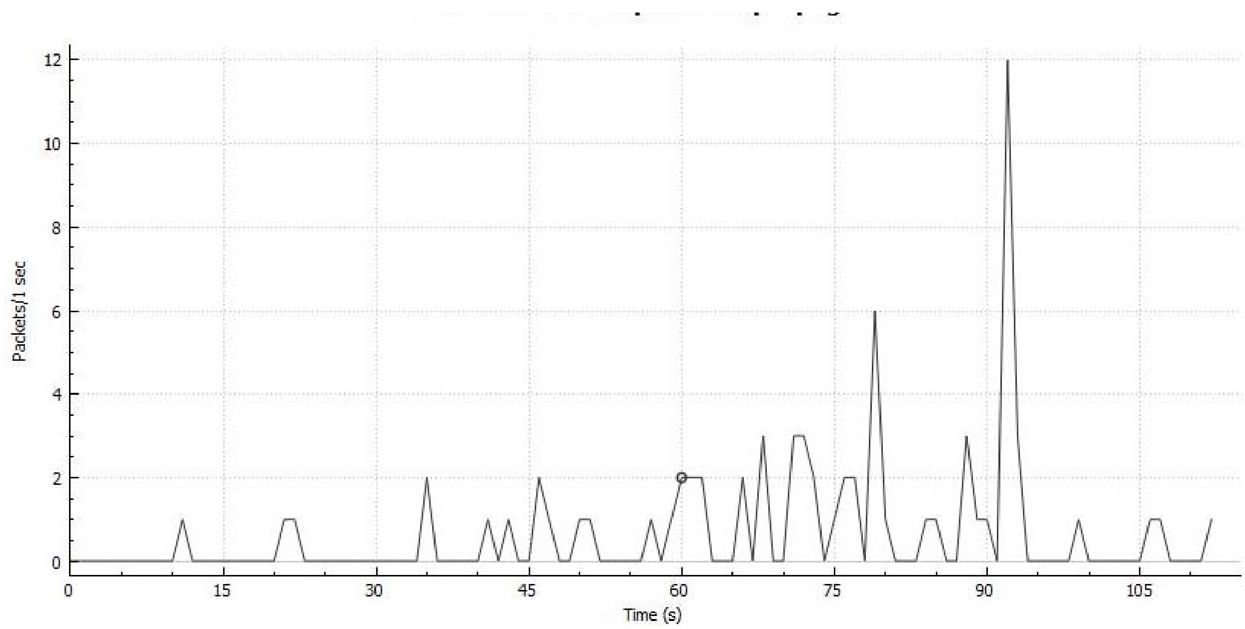
2. I have calculated the total number of HTTP packets per second on Time and recorded on below graphs.



a.Home Network.



b. Public cafe Network



c. UHWireless Network

3. I have counted the number of people in McD café and started capturing the packets in monitor mode. What I observed is number of different MAC addresses show in wireshark is significantly equal to the number of people in the café. There are 2 to 3 other MAC address are shown but I ignored in counting since there may be other entities connected to same network but not present in café.

4. I have took the sample packets captured in campus on UHWireless network and exported the packets in CSV file format. The csv file is the input to my program. Looping through every row in the input I have calculated baseline level by calculating average of total number of packets by total time frame. Then calculated surge levels by calculating sudden increase in the number of packets per second that are greater than pervious time frame. Then recorded the surge start time and surge end time. Recorded the surge level by number of packets in surge by time frame. Then noted the IP address of node that created the surge.