In [1]:

```
import pandas as pd
import numpy as np
from datetime import datetime, timezone

from sklearn.linear_model import LogisticRegression, LogisticRegressionCV

import matplotlib.pyplot as plt
%matplotlib inline

# Allow us to load modules from the parent directory
import sys
sys.path.append(r'C:\Users\dell\ML\ml-networking\lib')
from parse_pcap import pcap_to_pandas, send_rates
```

In [2]:

```
pcap = pcap_to_pandas(r'C:\Users\dell\ML\HW3lab.pcap')

# Pandas Dataframe with only DNS packets
dns_packets = pcap.loc[pcap['is_dns'] == True];
dns_packets.head(n=5)
```

Out[2]:

	datetime	dns_query	dns_resp	ip_dst	ip_dst_int	ip_sr
22	2021-03-02 21:38:36	b'nf5.boom.party.'	None	202.102.213.68	3.395737e+09	192.168.0.10
23	2021-03-02 21:38:36	b'nf5.boom.party.'	b'nf5.boom.party.'	192.168.0.105	3.232236e+09	202.102.213.6
185	2021-03-02 21:38:56	b'cjhd.mediav.com.'	None	202.102.213.68	3.395737e+09	192.168.0.10
186	2021-03-02 21:38:56	b'cjhd.mediav.com.'	b'cjhd.mediav.com.'	192.168.0.105	3.232236e+09	202.102.213.6
196	2021-03-02 21:38:56	b'static-ssl.mediav.com.'	None	202.102.213.68	3.395737e+09	192.168.0.10

In [3]:

```
dns_ft = dns_packets.loc[:,['length','dns_resp']]
dns_ft.head(10)
```

Out[3]:

	length	dns_resp
22	74	None
23	434	b'nf5.boom.party.'
185	75	None
186	370	b'cjhd.mediav.com.'
196	81	None
198	76	None
199	318	b'static-ssl.mediav.com.'
201	308	b's0.ssl.qhres.com.'
235	74	None
236	434	b'n77.boom.party.'

In [4]:

```
dns_ft.shape
```

Out[4]:

```
(129, 2)
```

In [5]:

```
dns_ft['response'] = dns_ft['dns_resp'].astype(bool)
dns_ft['response'] = dns_ft['response'].astype(int)
dns_ft.head(10)
```

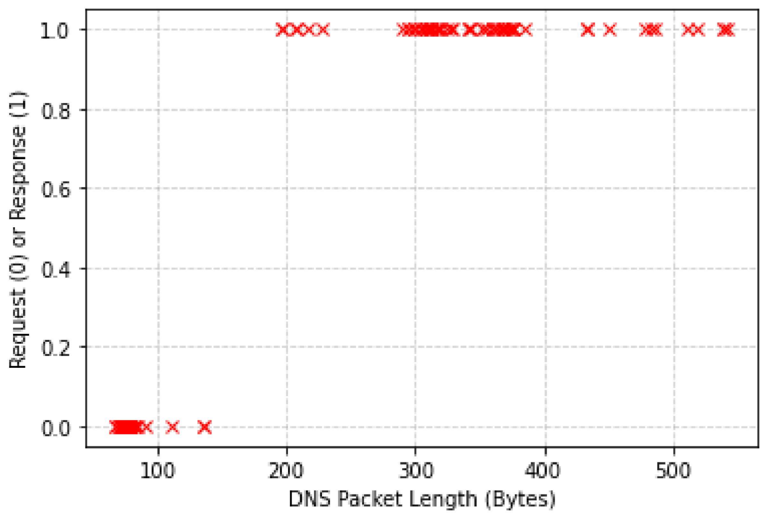
Out[5]:

	length	dns_resp	response
22	74	None	0
23	434	b'nf5.boom.party.'	1
185	75	None	0
186	370	b'cjhd.mediav.com.'	1
196	81	None	0
198	76	None	0
199	318	b'static-ssl.mediav.com.'	1
201	308	b's0.ssl.qhres.com.'	1
235	74	None	0
236	434	b'n77.boom.party.'	1

In [6]:

```
x = dns_ft['length'].values
y = dns_ft['response'].values

plt.plot(x,y, 'x', color='red')
plt.ylabel("Request (0) or Response (1)")
plt.xlabel("DNS Packet Length (Bytes)")
plt.grid(linestyle='--', alpha=0.6)
plt.show()
```



In [7]:

```
regr = LogisticRegression(solver='lbfgs', C=1)
regr.fit(x.reshape(-1,1),y)
```

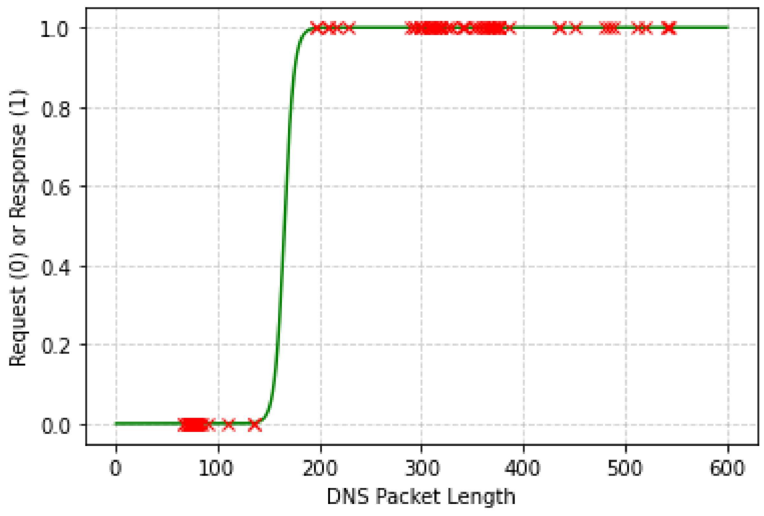
Out[7]:

```
LogisticRegression(C=1)
```

In [8]:

```
# Plot data
# z is a simple number line 1 to 600
z = np.arange(1, 600, 0.5).reshape(-1, 1);

# prediction: plot the number line against the predictions for those values
plt.plot(z, regr.predict_proba(z)[:, 1], color='green');
plt.plot(x,y, 'x', color='red')
plt.ylabel("Request (0) or Response (1)")
plt.xlabel("DNS Packet Length")
plt.grid(linestyle='--', alpha=0.6)
plt.show()
```



In [ ]: