

# Lab Exercises

1. Create the following network with DHCP server. Send DNS packets in your network

**Server1 Configuration:**

- Physical:** FastEthernet0
- Config:**
  - Port Status:** Bandwidth: 100 Mbps, Duplex: Full Duplex
  - MAC Address:** 000A.4125.E132
  - IP Configuration:** Static (IPv4 Address: 192.168.41.20, Subnet Mask: 255.255.255.0)
  - Link Local Address:** FE80::20A:41FF:FE25:E132
- Services:** DHCP (Interface: FastEthernet0, Service: On, Pool Name: serverPool, Start IP Address: 192, Subnet Mask: 255, Maximum Number of Users: 256)

**Server2 Configuration:**

- Physical:** FastEthernet0
- Config:**
  - Port Status:** Bandwidth: 100 Mbps, Duplex: Full Duplex
  - MAC Address:** 0001.C784.A577
  - IP Configuration:** Static (IPv4 Address: 192.168.41.21, Subnet Mask: 255.255.255.0)
- Services:** DHCP (Interface: FastEthernet0, Service: On, Pool Name: serverPool, Start IP Address: 192, Subnet Mask: 255, Maximum Number of Users: 256)

**Server3 Configuration:**

- Physical:** FastEthernet0
- Config:**
  - Port Status:** Bandwidth: 100 Mbps, Duplex: Full Duplex
  - MAC Address:** 0002.4A59.DDCC
  - IP Configuration:** Static (IPv4 Address: 192.168.41.22, Subnet Mask: 255.255.255.0)
- Services:** DHCP (Interface: FastEthernet0, Service: On, Pool Name: serverPool, Start IP Address: 192, Subnet Mask: 255, Maximum Number of Users: 256)

**PC0 Configuration:**

- Physical:** FastEthernet0
- Config:**
  - IP Configuration:** DHCP (IPv4 Address: 192.168.41.22, Subnet Mask: 255.255.255.0, Default Gateway: 0.0.0.0, DNS Server: 192.168.41.20)

**PC1 Configuration:**

- Physical:** FastEthernet0
- Config:**
  - IP Configuration:** DHCP (IPv4 Address: 192.168.41.1, Subnet Mask: 255.255.255.0, Default Gateway: 0.0.0.0, DNS Server: 192.168.41.20)

**PC2**

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

DHCP Static DHCP request successful.

IPv4 Address 192.168.41.3

Subnet Mask 255.255.255.0

Default Gateway 0.0.0.0

DNS Server 192.168.41.20

Root 07:36:00

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	3.819	Switch0
	5.816	-
eye	5.817	Switch0

Reset Simulation Constant Delay Capturing...

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

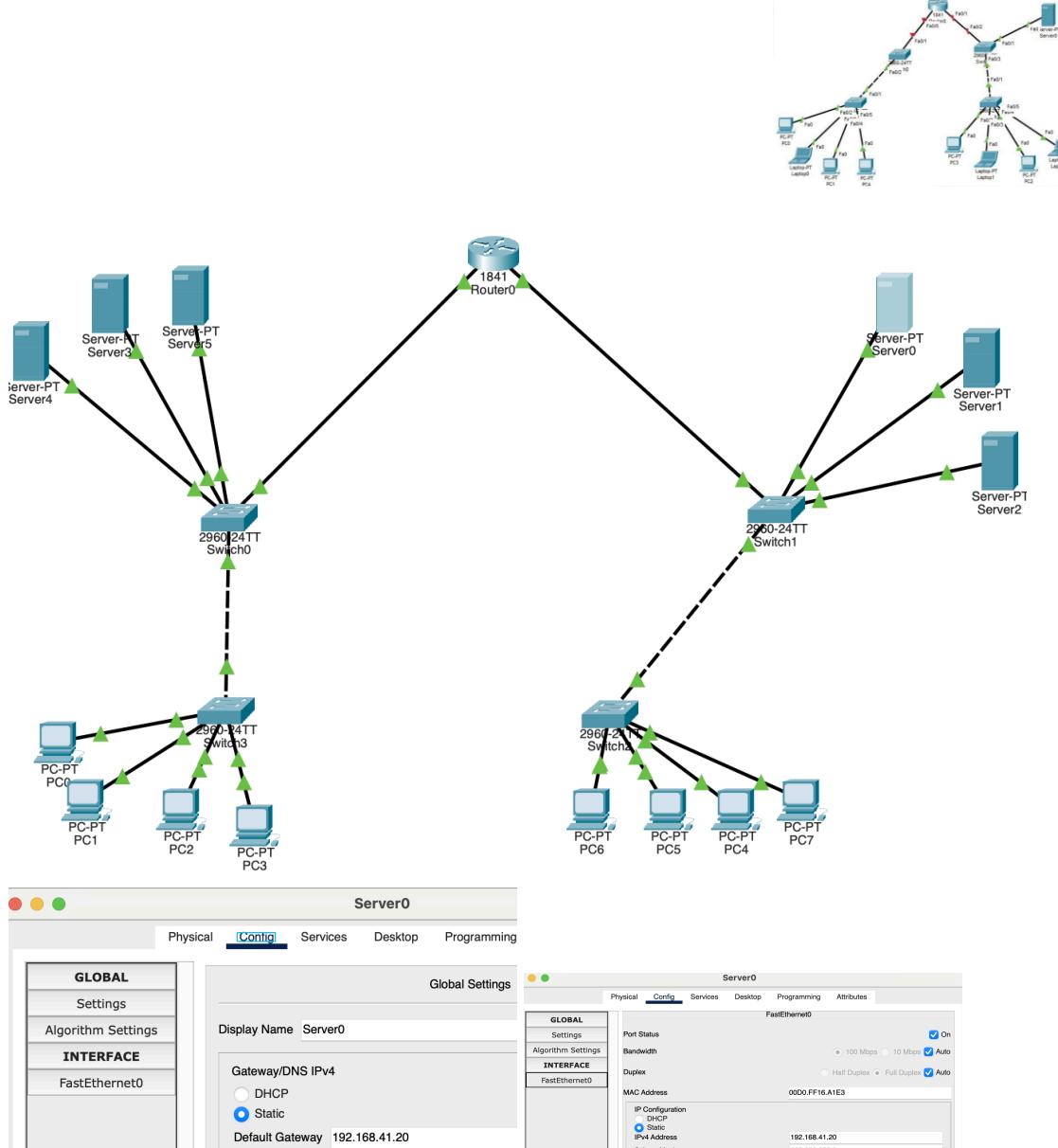
Event List Realtime Simulation

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Successful PC0 Server3 IC... 0.000 N 0 (...)

Scenario 0

2. Implement the given topology. Add some web servers in your network. Implement DNS & add records of your web servers.



**Server0**

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**DHCP**

Interface	FastEthernet0	<input checked="" type="checkbox"/>	Service	<input checked="" type="radio"/> On	<input type="radio"/> Off
Pool Name	serverPool				
Default Gateway	192.168.40.11				
DNS Server	192.168.41.20				
Start IP Address :	192	168	41	21	
Subnet Mask:	255	255	255	0	
Maximum Number of Users :	211				
TFTP Server:	0.0.0.0				
WLC Address:	0.0.0.0				
Add	Save	Remove			
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User
serverPool	192.168...	192.168...	192.168...	255.255...	211
	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0

**Server1**

Physical Config Services Desktop Programming Attributes

**GLOBAL**

- Settings
- Algorithm Settings

**INTERFACE**

- FastEthernet0

**Global Settings**

Display Name	Server1
Gateway/DNS IPv4	<input type="radio"/> DHCP <input checked="" type="radio"/> Static Default Gateway: 192.168.41.21
DNS Server	

**Server1**

Physical **Config** Services Desktop Programming Attributes

**GLOBAL**

- Settings
- Algorithm Settings

**INTERFACE**

- FastEthernet0

**FastEthernet0**

Port Status:  On

Bandwidth:  100 Mbps  10 Mbps  Auto

Duplex:  Half Duplex  Full Duplex  Auto

MAC Address: 0060.5C80.B6D4

**IP Configuration**

IP Configuration	<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.41.22	
Subnet Mask	255.255.255.0	

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**DHCP**

Interface	FastEthernet0	<input checked="" type="checkbox"/>	Service	<input checked="" type="radio"/> On	<input type="radio"/> Off
Pool Name	serverPool				
Default Gateway	0.0.0.0				
DNS Server	0.0.0.0				
Start IP Address :	192	168	41	0	
Subnet Mask:	255	255	255	0	
Maximum Number of Users :	256				
TFTP Server:	0.0.0.0				
WLC Address:	0.0.0.0				
Add	Save	Remove			
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User
serverPool	0.0.0.0	0.0.0.0	192.168...	255.255...	256
	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0

**Server2**

Physical **Config** Services Desktop Programming Attributes

**GLOBAL**

- Settings
- Algorithm Settings

**INTERFACE**

- FastEthernet0

**Global Settings**

Display Name	Server2
Gateway/DNS IPv4	<input type="radio"/> DHCP <input checked="" type="radio"/> Static Default Gateway: 192.168.41.21
DNS Server	

**Server2**

Physical Config Services Desktop Programming Attributes

**GLOBAL**

- Settings
- Algorithm Settings

**INTERFACE**

- FastEthernet0

**FastEthernet0**

Port Status:  On

Bandwidth:  100 Mbps  10 Mbps  Auto

Duplex:  Half Duplex  Full Duplex  Auto

MAC Address: 0040.0B44.DC1E

**IP Configuration**

IP Configuration	<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.41.23	
Subnet Mask	255.255.255.0	

**SERVICES**

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**DHCP**

Interface	FastEthernet0	<input checked="" type="checkbox"/>	Service	<input checked="" type="radio"/> On	<input type="radio"/> Off
Pool Name	serverPool				
Default Gateway	0.0.0.0				
DNS Server	0.0.0.0				
Start IP Address :	192	168	41	0	
Subnet Mask:	255	255	255	0	
Maximum Number of Users :	256				
TFTP Server:	0.0.0.0				
WLC Address:	0.0.0.0				
Add	Save	Remove			
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User
serverPool	0.0.0.0	0.0.0.0	192.168...	255.255...	256
	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0

**Server5**

Physical **Config** Services Desktop Programming Attributes

**GLOBAL**

- Settings
- Algorithm Settings

**INTERFACE**

- FastEthernet0

**Global Settings**

Display Name	Server5
Gateway/DNS IPv4	<input type="radio"/> DHCP <input checked="" type="radio"/> Static Default Gateway: 192.168.42.22
DNS Server	

**Server5**

**Physical** **Config** Services Desktop Programming Attributes

**GLOBAL**  
Settings  
Algorithm Settings

**INTERFACE**  
FastEthernet0

Port Status: On  
Bandwidth: 100 Mbps  
Duplex: Half Duplex  
MAC Address: 0001.64EE.A617

IP Configuration:  
DHCP (Static)  
IPv4 Address: 192.168.42.21  
Subnet Mask: 255.255.255.0

**Server5**

**Physical** **Config** **Services** Desktop Programming Attributes

**SERVICES**  
HTTP  
DHCP  
DHCPv6  
TFTP  
DNS  
SYSLOG  
AAA  
NTP  
EMAIL  
FTP  
IoT  
VM Management  
Radius EAP

**DHCP**

Interface	FastEthernet0	Service	On	Off
Pool Name	serverPool			
Default Gateway	0.0.0.0			
DNS Server	0.0.0.0			
Start IP Address :	192	168	41	0
Subnet Mask:	255	255	255	0
Maximum Number of Users :	256			
TFTP Server:	0.0.0.0			
WLC Address:	0.0.0.0			

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	192.168...	255.255...	256	0.0.0.0	0.0.0.0

**Server3**

**Physical** **Config** Services Desktop Programming Attributes

**GLOBAL**  
Settings  
Algorithm Settings

**INTERFACE**  
FastEthernet0

Display Name: Server3

Gateway/DNS IPv4:  
DHCP (Static)  
Default Gateway: 192.168.42.22

DNS Server:

**Server3**

**Physical** **Config** **Services** Desktop Programming Attributes

**INTERFACE**  
FastEthernet0

Port Status: On  
Bandwidth: 100 Mbps  
Duplex: Full Duplex  
MAC Address: 0090.0C0C.AB3A

IP Configuration:  
DHCP (Static)  
IPv4 Address: 192.168.42.45  
Subnet Mask: 255.255.255.0

**Server4**

**Physical** **Config** Services Desktop Programming Attributes

**GLOBAL**  
Settings  
Algorithm Settings

**INTERFACE**  
FastEthernet0

Display Name: Server4

Gateway/DNS IPv4:  
DHCP (Static)  
Default Gateway: 192.168.42.22

DNS Server:

**Server4**

**Physical** **Config** **Services** Desktop Programming Attributes

**SERVICES**  
HTTP  
DHCP  
DHCPv6  
TFTP  
DNS  
SYSLOG  
AAA  
NTP  
EMAIL  
FTP  
IoT  
VM Management  
Radius EAP

**DHCP**

Interface	FastEthernet0	Service	On	Off
Pool Name	serverPool			
Default Gateway	0.0.0.0			
DNS Server	0.0.0.0			
Start IP Address :	192	168	42	0
Subnet Mask:	255	255	255	0
Maximum Number of Users :	256			
TFTP Server:	0.0.0.0			
WLC Address:	0.0.0.0			

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	192.168...	255.255...	256	0.0.0.0	0.0.0.0

**Server4**

**Physical** **Config** Services Desktop Programming Attributes

**GLOBAL**  
Settings  
Algorithm Settings

**INTERFACE**  
FastEthernet0

Port Status: On  
Bandwidth: 100 Mbps  
Duplex: Full Duplex  
MAC Address: 00E0.F79B.B653

IP Configuration:  
DHCP (Static)  
IPv4 Address: 192.168.42.23  
Subnet Mask: 255.255.255.0

Physical Config CLI Attributes

iOS Command Line Interface

This product contains cryptographic features and is subject to United States and other country regulations. Cisco reserves the right to restrict sale, transfer, and use of Cisco cryptographic products based on applicable laws, regulations, and restrictions. Cisco and its partners do not warrant or guarantee performance of these products in combination with non-Cisco products or non-Cisco software interfaces. Third-party hardware or software products and services are responsibility of their manufacturers, suppliers, and users. Cisco and its partners are responsible for compliance with U.S. and local country laws. By using this product, you agree to indemnify, defend, and hold Cisco and its partners harmless from claims to comply with U.S. and local laws, resulting from your use of this product.

A summary of U.S. law governing Cisco cryptographic products may be found at: <http://www.cisco.com/warp/export/crypto/cryptcrlscrg.html>

If you require further assistance, please contact us by sending email to: [export@cisco.com](mailto:export@cisco.com).

```
CISCO IOS! revision 9.0 with 114687K/14384K bytes of memory.
Processor board ID FTK949731E
M680 processor; part number 0, mask 49
2 FastEthernet ports, 1 S0/2.3 interface(s)
1 LAN type of WIC
Cisco IOS Software, 1941 Software (C2960-NM-1SERVICESK9-M), Version 12.4(18)T1, RELEASE SOFTWARE
[fc2]
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1999-2001 Cisco Systems, Inc.
Compiled Wed 13-Jul-07 04:52 by pt_team
```

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]:

Press RETURN to get started!

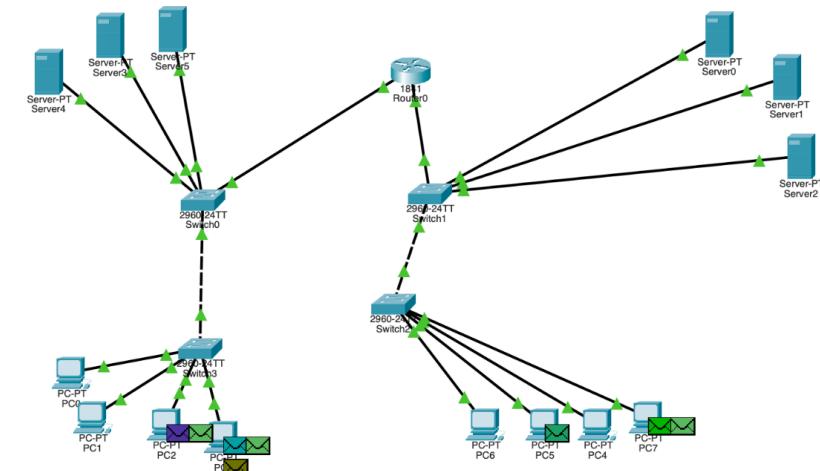
Router>

Router# Router(config) # Enter configuration commands, one per line. End with CNTL/D.
Router(config)interface fa/0
Router(config)ip address 192.168.1.100

Services Desktop Programming Attributes

File Name: index.html

```
<html>
<center><font size=+2 color=blue>Cisco Packet Tracer</font></center>
<br>Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
<p>Quick Links:</p>
<h>Hey This Google</h>
<br><a href="helloworld.html">A small page</a>
<br><a href="copyrights.html">Copyrights</a>
<br><a href="image.html">Image page</a>
<br><a href="cscoptlogo177x111.jpg">Image</a>
</html>
```



PLAY CONTROLS: Event List Realtime Simulate

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
In Progress		PC3	Server0	IC...	<span style="background-color: cyan;"></span>	0.000	N	0	(...)	(delete)
In Progress		PC3	Server5	IC...	<span style="background-color: darkgreen;"></span>	0.000	N	1	(...)	(delete)
In Progress		PC2	PC6	IC...	<span style="background-color: purple;"></span>	0.000	N	2	(...)	(delete)
In Progress		PC5	Server0	IC...	<span style="background-color: darkblue;"></span>	0.000	N	3	(...)	(delete)
In Progress		PC7	Server5	IC...	<span style="background-color: red;"></span>	0.000	N	4	(...)	(delete)

Screenshot Automatically Choose Connection Type

### 3. In caching, what is the difference between the age header and expires?

- **Age Header:** Indicates the time in seconds since the resource was fetched from the origin server (used by caches to determine freshness).
- **Expires Header:** Specifies an absolute date/time after which the resource is considered stale.

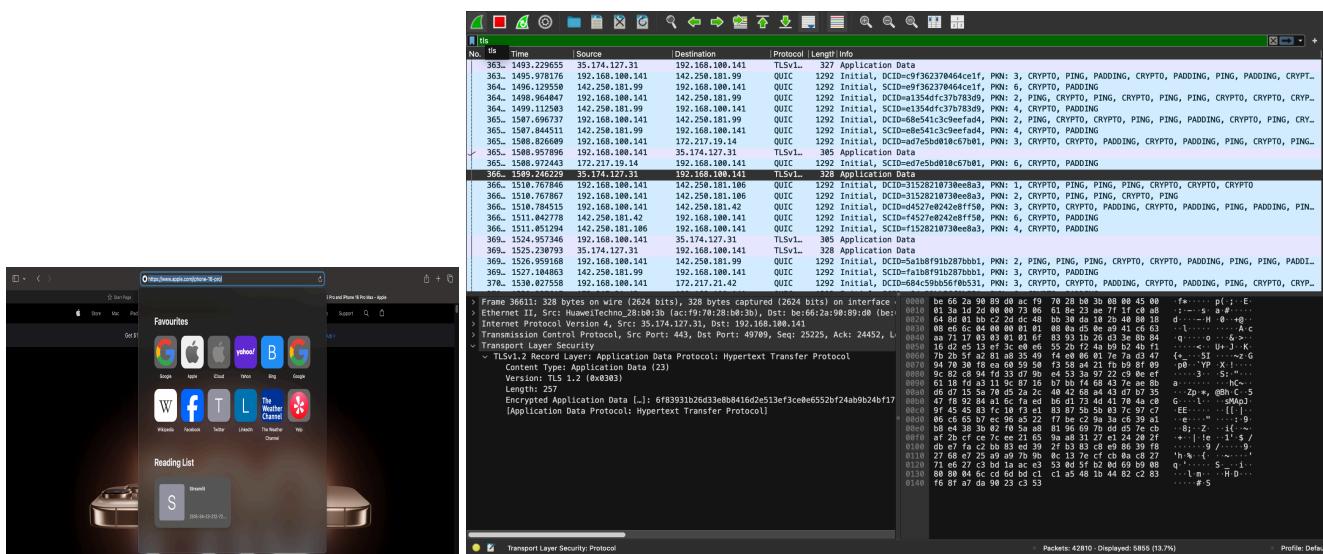
### 4. What are the four groupings of HTTP headers?

1. **General:** Apply to both requests and responses (e.g., Date, Cache-Control).
2. **Request:** Sent by the client (e.g., User-Agent, Accept).
3. **Response:** Sent by the server (e.g., Server, Content-Type).
4. **Entity:** Describe the content of the resource (e.g., Content-Length, Last-Modified).

## Wireshark Lab Exercise

1. Follow the above step for HTTPS. Take Snapshot of each Step, and Submit in docx file/pdf with one line answer, what you understand here?

**Explanation:** HTTPS uses TLS/SSL encryption (port 443) to secure data between client and server.



## 2. Observe the difference between HTTP and HTTPS and answer in one line with proper snapshots?

- **HTTP: Unencrypted (port 80), visible plaintext data.i.e Form item: "uname" = "test", Form item: "pass" = "test"**
- **HTTPS: Encrypted (port 443), uses TLS/SSL for security.**

The left screenshot shows a web application interface with a search bar and a sidebar for navigation. A form is displayed with fields for Name, Credit card number, E-Mail, Phone number, and Address. The Address field contains a SQL injection payload: '04 streetsddddddddd... and 6=3 or 1=1-(SELECT SLEEP(3)) or "1="". The right screenshot shows a browser window for <https://www.apple.com/phone-16-pro/>. The address bar shows the URL with 'https://'. The page content includes a 'Favourites' section with links to various websites like Google, Apple, iCloud, Yahoo, Bing, and Google. Below it is a 'Reading List' section with a single entry for 'Streamit'.

The left screenshot displays a NetworkMiner tool capturing traffic on port 80. It shows numerous HTTP requests, many of which contain sensitive information such as user names ('uname'), passwords ('pass'), and session identifiers ('sid'). The right screenshot shows a NetworkMiner tool capturing traffic on port 443. The same requests are shown, but all the data is now encrypted, appearing as long strings of hex and ASCII characters. This demonstrates that HTTPS protects the confidentiality of the transmitted data.