# ISEC 325 Homework 01

Answer the following questions based on your reading of the text books, the module key points, and the instructor’s presentation.

1. [10 points] For each layer of the TCP/IP model (layers 7, 4, 3, and 2 in the OSI model) describe the following
   * The responsibilities of that particular layer
   * Significant protocols at that layer (only for 4 and 3)
   * The protocol data unit name and pertinent fields of that layer
   * Addressing and delivery methods of that layer
   * The standards body most relevant to the layer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Layer 7 | Layer 4 | Layer 3 | Layer2 |
| Responsibilities | Session management, encryption, encoding, application specific protocols | End-to-end message transfer, error control, fragmentation, and flow control | Packet transfer, message delivery, node to node data transfer | IP packet encapsulation,  Physical network connection |
| Protocols | HTTP, FTP, SMTP | TCP, UDP | IP, ICMP, IPsec, IPv6 | MAC, PPP, OSPF |
| PDU & fields | Data,  Application Specific such as Get request in HTTP | Segment,  Data transport from source to destination system | Packet,  Node to node transport, transport across the network | Frame, Bytes,  Physical/ data link to the network |
| Addressing & delivery | Application specific. URL, command etc. for application layer routing | Application communication, data transport, TCP | Host addressing and identification, packet routing across internet | Internet addressing, network identification, and connection |
| Standards | IETF RFCs | TCP, UDP | TCP, IP, ARP, ICMP | IEEE 802.3, TIA 568, DLL |

1. [3 points] Each layer of the TCP/IP model has a different addressing schema. For each layer of the TCP/IP model (layers 7, 4, 3, and 2 in the OSI model), how are addresses resolved and PDUs delivered? Frame your answer in the context of an HTTP GET request on an Ethernet network for <http://cs.franklin.edu/isec/chart.php>.

For the HTTP GET request the application layer will get a request type from the URL and the address of the interpreted resource. This will then be sent back to the transport layer has a port number that is used to send back to the browser client. The internet layer contains the destination host address for the machine and the source address to reply back to the requesting host. The network access layer contains the MAC address for the local center which it will then relay the information.

1. [2 points] What is the binary subnet mask for the IP address of 172.16.55.131/25? What is the decimal subnet mask?

Binary subnet mask: 11111111.11111111.11111111.10000000

Decimal subnet mask: 255.255.255.128

1. [10 points] Consider the following diagram of a small network



* + Describe the mechanism and path (e.g. any lookups, switching, routing, resolutions, etc.) for PC1 to communicate with PC2.

For PC1 and PC2 to communicate, they will travel from the pc to switch 1 to the other.

PC1--->Switch1--->PC2

* + Describe the mechanism and path (e.g. any lookups, switching, routing, resolutions, etc.) for PC1 to communicate with PC3.

For PC1 to communicate with PC3 it will need to travel through switch 1, then both routers, switch 2 and finally reach PC3.

PC1--->Switch1--->Router1--->Router2--->Switch2--->PC3

* + Show the routing table for Router 2 with columns for port, network, and gateway

|  |  |  |
| --- | --- | --- |
| Port | Network | Gateway |
| Internet | 0.0.0.0/0 | Direct delivery |
| PC1 | 192.168.1.100/24 | Switch1  172.16.0.0/31 |
| PC2 | 192.168.1.101/24 | Switch1  172.16.0.0/31 |
| PC3 | 192.168.2.100/24 | Switch2 |
| PC4 | 192.168.2.101/24 | Switch2 |

* + Show the switching table for Switch 1 with columns for destination address and destination port.

|  |  |
| --- | --- |
| Destination Address | Destination Port |
| 0.0.0.0./0 | Fa0/0 |
| 00:09:27:00:D0:00 | Fa0/1 |
| 00:09:27:00:D0:01 | Fa0/2 |
| 00:09:27:00:D0:02 | Fa0/2  Fa0/0  Gi0/0  Fa0/0 |
| 00:09:27:00:D0:03 | Fa0/1  Fa0/0  Gi0/0  Fa0/0 |

* + What might the ARP cache of PC3 look like?

|  |  |
| --- | --- |
| Internet Address | Physical Address |
| 192.168.2.000/24 | 00:09:27:00:D0:02 |

1. [5 points] In two to three paragraphs of prose (i.e. sentences, not bullet lists) using APA style citations if needed, summarize and interact with the content that was covered in the class session this week. In your summary, you should highlight the major topics, theories, practices, and knowledge that were covered. Your summary should also interact with the material through personal observations, reflections, and applications to the field of study. In particular, highlight what surprised, enlightened, or otherwise engaged you. Make sure to include at least one thing that you’re still confused about.  In other words, you should think and write critically not just about what was presented but also what you have learned through the session. Feel free to ask questions in this as well since it will be returned to you with answers.

This week we looked into the layers of the TCP/IP model, protocols, routes of a network, and the different tables. The layers of the TCP/IP model is not new to me but it is a nice refresher and goes more into the layers compared to other classes I have had that focus more on the OSI model. I knew some of the protocols but there were more that I did not know but made sense like the PPP. The network connections is one that I have a hazy memory on but going through the lecture and book helped me remember a lot of the information. The tables I had more trouble with as I had to take a bit to determine which numbers are which and what would be added to the table. For the gateways it looked like while both the from and to points have different numbers, the from number gets written. My question is are there other tables which would want both numbers?