

## The Network Game – Application Layer

Four people per team:

1. Application Layer (e.g. an application program like your email program or web browser)
2. Transport Layer (divides/reassembles messages into packets)
3. Network Layer (routing)
4. Data Link Layer (delivery)

### Application Layer

Application Layer Form:

From (name, e.g. www.uaa.alaska.edu)	
To (name, e.g. www.google.com)	
Message (e.g. how are you?)	

Sending a message:

1. Get a blank form Application Layer form
2. Fill in From, To, and a short Message
3. Hand to Transport Layer

Receiving a message:

1. Periodically, you will receive a message from another computer asking you a question or sending you a reply. Respond by following the same steps as above on a new form. Destroy the incoming message.

## The Network Game – Transport Layer

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2. Transport Layer (divides/reassembles messages into packets)
3. Network Layer (routing)
4. Data Link Layer (delivery)

### Transport Layer

Network Form:

From (name, e.g. www.uaa.alaska.edu)	
To (name, e.g. www.google.com)	
Data (10 characters max)	
Data Packet Number (e.g. packet 1)	
Total Number of Packets (e.g. of 2)	

Accepting messages from the Application Layer: Periodically the application layer will hand you an application layer form with a message.

1. Get a blank Network Form. Each form is a “Packet”.
2. Copy the From and To from the Application Layer Form to the same sections of the Network form.
3. Put “1” as the data packet number.
4. Copy the first 10 characters of the message (spaces count) into the Data box.
5. If there are more than 10 characters in the message:
  - a. Get a second blank Network Form.
  - b. Copy the From and To from the Application Layer Form to the same sections of the Network Form.
  - c. Copy the next 10 characters of the message to the Data field.
  - d. Label the packet number box with “2”
  - e. Repeat step 5 if there are still characters left in the message, adding 1 to the packet #
6. For all Network Forms, label the Total Number of Packets with the number of Network Forms you used to store the message.
7. Destroy the Application Layer Form. Hand all the Network forms to the Network Layer.

Receiving a message from the Network Layer:

1. When you receive a form from the Network Layer, check the “From” box until you receive all the forms (indicated by Total Number of Packets) from the same “From” sender. For example, if Total Number of Packets is 3, wait until you receive forms labeled Packet 1,2, and 3.
2. Get a blank Application Layer Form, copy the From and To from the Network Form, and reassemble the complete message from all Network forms in the Message box.
3. Hand the Application Layer Form to the Application layer and destroy the Network form.

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### Network Layer

Network Form:

From (name, e.g. www.uaa.alaska.edu)	
To (name, e.g. www.google.com)	
Data (10 characters max)	
Data Packet Number (e.g. packet 1)	
Total Number of Packets (e.g. of 2)	
<b>Final Destination IP Address</b>	
<b>Next Node IP Address</b>	

Accepting messages from the Transport Layer:

1. Address the message by translating the application layer address of the destination computer into its network layer (IP) address. Put this IP address in the Final Destination box.
2. Route the message by finding the next computer to which the message should be sent. Put its IP address in the Next Node box.
3. Pass the message to the data-link layer.

Receiving messages from the Data Link Layer:

1. If the message is addressed to you (i.e. the Final Destination box contains your IP address), pass the message to the Transport layer.
2. If the message is not addressed to you (i.e. the Final Destination box contains someone else's IP address), perform the following steps.
  - a. Route the message by finding the next computer to which the message should be sent. Cross out the IP address in the Next Node box and put the new next computer's IP address in the Next Node box.
  - b. Pass the message to the data-link layer.

## The Network Game – Data Link Layer

Four people per team:

1. Application Layer (e.g. an application program like your email program or web browser)
2. Transport Layer (divides/reassembles messages into packets)
3. Network Layer (routing)
4. Data Link Layer (delivery)

### Data Link Layer

Network Form:

From (name, e.g. www.uaa.alaska.edu)	
To (name, e.g. www.google.com)	
Data (10 characters max)	
Data Packet Number (e.g. packet 1)	
Total Number of Packets (e.g. of 2)	
Final Destination IP Address	
Next Node IP Address	
<b>Source Data Link Address</b>	
<b>Destination Data Link Address</b>	

Accepting messages from the Network Layer:

1. Cross out any existing addresses in the Source and Destination Data Link Address boxes.
2. Write your data-link layer address in the Source Data Link box. Put the data-link layer address of the computer given in the Next Node IP box into the Destination Data Link Address box.
3. Pass the message to the person handling the Data Link Layer for the Destination computer.

Accepting messages from another computer's Data Link Layer:

1. Pass the message to the Network layer.

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To (name, e.g. www.google.com)	
Data (10 characters max)	
Data Packet Number (e.g. packet 1)	
Total Number of Packets (e.g. of 2)	
Final Destination IP Address	
Next Node IP Address	
<b>Source Data Link Address</b>	
<b>Destination Data Link Address</b>	

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To (name, e.g. www.google.com)	
Data (10 characters max)	
Data Packet Number (e.g. packet 1)	
Total Number of Packets (e.g. of 2)	
Final Destination IP Address	
Next Node IP Address	
<b>Source Data Link Address</b>	
<b>Destination Data Link Address</b>	

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To (name, e.g. www.google.com)	
Data (10 characters max)	
Data Packet Number (e.g. packet 1)	
Total Number of Packets (e.g. of 2)	
Final Destination IP Address	
Next Node IP Address	
<b>Source Data Link Address</b>	
<b>Destination Data Link Address</b>	

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To (name, e.g. www.google.com)	
Data (10 characters max)	
Data Packet Number (e.g. packet 1)	
Total Number of Packets (e.g. of 2)	
Final Destination IP Address	
Next Node IP Address	
<b>Source Data Link Address</b>	
<b>Destination Data Link Address</b>	

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