

Packet Switching on a network

The basic idea..

Using TCP/IP packets are sent randomly from computer to computer in any order until they happen to arrive at their destination. They can follow any route and arrive in any order. The TCP/IP application layer makes sense of the messages when they arrive.

Have everyone seated round the room (next to a computer).
Allocate each student an IP address in the range of...

192.168.1.3 to 192.168.1.20 (or beyond if needed)

One student could role-play the router **192.168.1.1**
(which routes out to the Internet if needed)

If they get given an Internet address they pass the packet out the door (out the gateway onto the Internet).

One student could role-play the BBC **212.58.246.91**

One student could role-play Google **74.125.132.94**

These two students should actually be outside the door (on the Internet)

Instructions: Hand out the random packets (Page 8) randomly to each student.

Give **message 23** packets to **Fred (192.168.1.4)**.

Give **message 33** packets to **192.168.1.5**

Give **message 76** packets to **192.168.1.6**

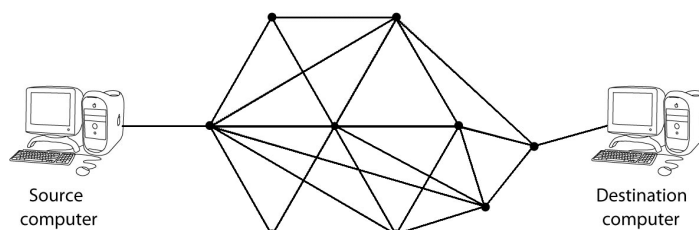
Give **message 84** packets to **192.168.1.3**

Each student gives any of their packets to any other student at random.

If a student gets given a message with their IP on it, they keep it.

Each student should try and make sense of any message they get.

Only when student **192.168.1.7** gets Fred's email (makes sense of it) do you hand out the **message 27** packets to student **192.168.1.7**



| Message ID | From | To | Content |
|------------|--------------------|-----------------------------------|--|
| Message 23 | 192.168.1.4 (Fred) | 192.168.1.7 | email |
| Message 27 | 192.168.1.7 | 192.168.1.4 | email reply to Fred |
| Message 33 | 192.168.1.5 | 74.125.132.94 www.google.co.uk | Typing into a search engine looking for a PowerPoint of the homework on IP |
| Message 76 | 192.168.1.6 | 212.58.246.91 www.bbc.co.uk | Message uploaded to a blog about TV programming |
| Message 84 | 192.168.1.3 | 192.168.1.6 | email |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 01 | 192.168.1.4 | 192.168.1.7 | Hell | 233 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 02 | 192.168.1.4 | 192.168.1.7 | o, how | 233 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 03 | 192.168.1.4 | 192.168.1.7 | are | 213 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 04 | 192.168.1.4 | 192.168.1.7 | you? | 222 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 05 | 192.168.1.4 | 192.168.1.7 | What | 208 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 06 | 192.168.1.4 | 192.168.1.7 | are | 193 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 07 | 192.168.1.4 | 192.168.1.7 | you | 183 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 08 | 192.168.1.4 | 192.168.1.7 | wate | 217 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|----------|---------------|---------|----------|
| | | | | | |

| | | | | | |
|----|----|-------------|-------------|------|-----|
| 23 | 09 | 192.168.1.4 | 192.168.1.7 | hing | 205 |
|----|----|-------------|-------------|------|-----|

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 10 | 192.168.1.4 | 192.168.1.7 | on | 186 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 11 | 192.168.1.4 | 192.168.1.7 | TV | 199 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 12 | 192.168.1.4 | 192.168.1.7 | toni | 211 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 13 | 192.168.1.4 | 192.168.1.7 | ght? | 206 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 14 | 192.168.1.4 | 192.168.1.7 | See you | 233 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 23 | 15 | 192.168.1.4 | 192.168.1.7 | , Fred | 200 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 01 | 192.168.1.7 | 192.168.1.4 | Hi F | 233 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 02 | 192.168.1.7 | 192.168.1.4 | red | 233 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|----------|---------------|---------|----------|
| | | | | | |

| | | | | | |
|----|----|-------------|-------------|------|-----|
| 27 | 03 | 192.168.1.7 | 192.168.1.4 | I wo | 233 |
|----|----|-------------|-------------|------|-----|

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 04 | 192.168.1.7 | 192.168.1.4 | n't | 207 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 05 | 192.168.1.7 | 192.168.1.4 | be | 213 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 06 | 192.168.1.7 | 192.168.1.4 | watc | 208 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 07 | 192.168.1.7 | 192.168.1.4 | hing | 178 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 08 | 192.168.1.7 | 192.168.1.4 | TV. | 199 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 09 | 192.168.1.7 | 192.168.1.4 | Too | 233 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 10 | 192.168.1.7 | 192.168.1.4 | much | 237 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 27 | 11 | 192.168.1.7 | 192.168.1.4 | home | 245 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|----------|---------------|---------|----------|
| | | | | | |

| | | | | | |
|----|----|-------------|-------------|------|-----|
| 27 | 12 | 192.168.1.7 | 192.168.1.4 | work | 231 |
|----|----|-------------|-------------|------|-----|

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 01 | 192.168.1.5 | 74.125.132.94 | A Pow | 144 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 02 | 192.168.1.5 | 74.125.132.94 | erPoi | 123 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 03 | 192.168.1.5 | 74.125.132.94 | nt on | 166 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 04 | 192.168.1.5 | 74.125.132.94 | TCPIP | 231 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 05 | 192.168.1.5 | 74.125.132.94 | and | 109 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 06 | 192.168.1.5 | 74.125.132.94 | Pack | 177 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 07 | 192.168.1.5 | 74.125.132.94 | et | 156 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 33 | 08 | 192.168.1.5 | 74.125.132.94 | swit | 146 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|----------|---------------|---------|----------|
| | | | | | |

| | | | | | |
|----|----|-------------|---------------|-------|-----|
| 33 | 09 | 192.168.1.5 | 74.125.132.94 | ching | 155 |
|----|----|-------------|---------------|-------|-----|

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 01 | 192.168.1.6 | 212.58.246.91 | I wis | 144 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 02 | 192.168.1.6 | 212.58.246.91 | h to | 123 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 03 | 192.168.1.6 | 212.58.246.91 | comp | 166 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 04 | 192.168.1.6 | 212.58.246.91 | lain | 231 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 05 | 192.168.1.6 | 212.58.246.91 | abou | 109 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 06 | 192.168.1.6 | 212.58.246.91 | t the | 177 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 07 | 192.168.1.6 | 212.58.246.91 | rubb | 156 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 76 | 08 | 192.168.1.6 | 212.58.246.91 | ish o | 146 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|----------|---------------|---------|----------|
| | | | | | |

| | | | | | |
|----|----|-------------|---------------|------|-----|
| 76 | 09 | 192.168.1.6 | 212.58.246.91 | n TV | 155 |
|----|----|-------------|---------------|------|-----|

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 01 | 192.168.1.3 | 192.168.1.6 | Isn' | 144 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 02 | 192.168.1.3 | 192.168.1.6 | t thi | 123 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 03 | 192.168.1.3 | 192.168.1.6 | s les | 166 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 04 | 192.168.1.3 | 192.168.1.6 | son | 231 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 05 | 192.168.1.3 | 192.168.1.6 | over | 109 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 06 | 192.168.1.3 | 192.168.1.6 | yet? | 177 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 07 | 192.168.1.3 | 192.168.1.6 | I wan | 156 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 84 | 08 | 192.168.1.3 | 192.168.1.6 | t my | 146 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|----------|---------------|---------|----------|
| | | | | | |

| | | | | | |
|----|----|-------------|-------------|-------|-----|
| 84 | 09 | 192.168.1.3 | 192.168.1.6 | lunch | 155 |
|----|----|-------------|-------------|-------|-----|

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|--------------|---------------|---------|----------|
| 44 | 01 | 192.168.1.44 | 192.168.1.44 | null | 144 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 46 | 02 | 174.168.2.2 | 192.168.1.28 | null | 123 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|-------------|---------------|---------|----------|
| 97 | 03 | 177.168.9.9 | 192.168.1.28 | null | 166 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|--------------|---------------|---------|----------|
| 57 | 04 | 188.125.5.87 | 192.168.1.44 | null | 231 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|---------------|---------------|---------|----------|
| 11 | 05 | 216.239.55.99 | 192.168.1.53 | null | 109 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|---------------|---------------|---------|----------|
| 14 | 06 | 216.239.55.99 | 192.168.1.67 | null | 177 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|---------------|---------------|---------|----------|
| 17 | 07 | 216.239.55.99 | 192.168.1.62 | null | 156 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|---------------|---------------|---------|----------|
| 88 | 08 | 216.239.55.99 | 192.168.1.44 | null | 146 |

| MessageID | MessageSeqNum | SourceIP | DestinationIP | Payload | Checksum |
|-----------|---------------|----------|---------------|---------|----------|
| | | | | | |

| | | | | | |
|----|----|---------------|--------------|------|-----|
| 19 | 09 | 216.239.55.99 | 192.168.1.33 | null | 155 |
|----|----|---------------|--------------|------|-----|