Android Development Manual (refer to functions in android)

1. Audio Encoding
    a. AudioSendThread - Thread reads samples from the android hardware and writes it into a byte[] to send it over the network via UDP to the target user
2. Video Encoding
    a. Set up a Camera object to display the preview frame of the Camera. Then asign the camera a PreviewCallback to handle new YUV images arriving on the preview.
    b. Take the new arriving images and convert it into jpeg, then write it to a custom output stream called BOutputStream which extends OutputStream. (This is done because the compress to jpeg function doesn't handle size)
    c. Compressed jpeg is then sent over via UDP to the target.
3. Audio Decoding
    a. AudioDecodeThread - Thread that handles decoding from UDP packets listening on a specific audio port
        i. Uses AudioTrack sampled at 11025Hz with a bufferSize of approximately 4160 bytes
        ii. Decodes packet data and writes it to the speaker
4. Video Decoding
    a. VideoDecodeThread - Thread that handles video decoding.
        i. Listens on specific UDP port for jpeg packets. Once a packet is received, the jpg data is passed to the UI thread via a Handler. The Handler then converts this jpeg data into usable bitmap and updates the ImageView on the screen.
5. Pan/Tilt
    a. Used the TOUCH_DOWN event to notice when a finger touched down, and used the TOUCH_UP event to notice when the finger was lifted. Found difference in x and y and calculated proportional rotation with min and max values of pan/tilt to create realistic experience.
        i. With values discovered, a pan/tilt packet was sent to the receiver with both an x and y to instruct the webcam to turn
6. Text Messaging
    a. Handled in the control thread. When a messaging packet is recevied, it sends the string over to the msgHandler in the UI thread and updates the contents of the drawer
7. Nameserver
    a. ListUsers - Android sends a list packet to the nameserver and retrieves a list of users
    b. Registration - When hosting, Android sends an add packet with the username, ip, and port of the new host
    c. Find - After selecting a user, Android sends a find packet which receives the ip information from a user
8. Statistics

    a. LatencyTimerTask fires off latency calculation packets on a timer for every 30s to help record and see latency statistics
    b. FPS is calculated in the Handler in which the ImageView sets the Bitmap and increments the amount of frames in a specific time frame and sets the textview
9. Mobile-Mobile
    a. Since our design was very flexible, we only had to set the mobile server to listen for a TCP connection and retrieve the IP address from the connecting client. Then the client would handle the packets the same way Mobile does from the Desktop
    b. Flexible!
10. Multi-Way
    a. Using UDP, we were actually able to send multiple images to multiple clients by maintaining an array of tcp sockets and sockaddr_in for udp connections. However, we saw lots of performance drop and complicated handling of additional peers.