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The process of our program is outlined below. The structure of our design will also be highlighted throughout the process as well.

First, we create a TCP socket on the client. The socket will use the predefined server address, port number, and message size. After the socket is initialized, we establish a connection between client and server. Then, we use the Raspberry Pi camera to read a qr code containing a question. We use OpenCV to control and capture the image from the camera as soon as a QR code is recognized. Once we have the image, we use pyzbar to decode the image in order to access the message in plain text.

Once we have the plain text message, we generate a unique symmetric key. Using the symmetric key, we encrypt the message. Then, we use the MD5 algorithm to generate a checksum. We create a python tuple that contains the symmetric key, encrypted message and md5 hash of the message. We then pickle the tuple to serialize it and send the data through the socket to the server. Once the server has received the data, it is unpickled. The server code will hash the encrypted msg, and compare it to the hash passed inside the tuple in order to determine if the message has been corrupted. If the message is complete, it will use the symmetric key to decrypt the message. When the message is decrypted, it will be printed on the server side and will be sent to the Watson API to be read aloud, as well as passed to the Wolfram Alpha API.

The Wolfram Alpha API will return the answer, or an error message asking for clarification. The answer will be encrypted with a new symmetric key and hashed in the way described above. We create a tuple on the server again and insert the key, answer and hash. The server detects the clients' IP address and creates a socket to send a pickled tuple back over.

Once the client has received the pickled passage, it will do message checking and decrypt the message. It will lastly send the answer to the IBM Watson API to be read aloud and print it to the terminal.