**References**

**RSA encryption algorithm references:**

* <https://en.wikipedia.org/wiki/RSA_(cryptosystem)>
* <https://gist.github.com/Ayrx/5884790> (Miller-Rabin method in python)

**Huffman compression algorithm references:**

* <https://towardsdatascience.com/huffman-encoding-python-implementation-8448c3654328> (this paper was used to understand the concept behind Huffman compression.)
* <https://en.wikipedia.org/wiki/Huffman_coding> (the theory behind Huffman compression)

**Merge sort algorithm:**

* <https://en.wikipedia.org/wiki/Merge_sort>

**Client server model research:**

* <https://flask-socketio.readthedocs.io/en/latest/> (documentation for flask-socketio)
* <https://en.wikipedia.org/wiki/Client–server_model> (documentation for client server model)
* <https://www.w3schools.com/js/js_events.asp> (JavaScript events)

**SQL database documentation:**

* <https://www.tutorialspoint.com/sqlite/sqlite_python.htm>

**Hash table research:**

* <https://en.wikipedia.org/wiki/Hash_function> (Wikipedia article for how the hash table works and dealing with collisions)

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**File sharing and chatting application**

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