CS4730 Project 1 - Lucca Wu

The purpose of this project is to implement a UDP-based messaging system for a distributed network of peers. Each peer communicates with others to exchange readiness messages, ensuring that all peers in the network are prepared to proceed with a task. This project focuses on efficient and reliable communication using the UDP, which is lightweight but does not guarantee message delivery or ordering.

The system consists of two main components:
- Message Sending: Each peer sends a "READY" message to all other peers.
- Message Receiving: Each peer listens for incoming "READY" messages and tracks the peers that have responded.

The send_ready_messages function is responsible for broadcasting readiness messages to all peers in the network. It does so by:
- Initializing a UDP socket for sending messages to peers.
- Each peer's hostname is resolved to an IP address using DNS.
- The peer sends a "READY" message with its hostname attached. If a message fails, the function retries sending up to 5 times.
- The socket is closed after all messages are sent.

The receive_messages function is responsible for listening and receiving the "READY" messages from each peer in the network. It does so by:
- Initializing a UDP socket for receiving messages.
- The socket listens for incoming messages from other peers.
- When a message is received, it is parsed to separate the peer's hostname.
- The sender's hostname is added to the set of ready peers.
- Progress is logged as peers send "READY."
- Function terminates when all peers have confirmed readiness.
- Socket is then closed.