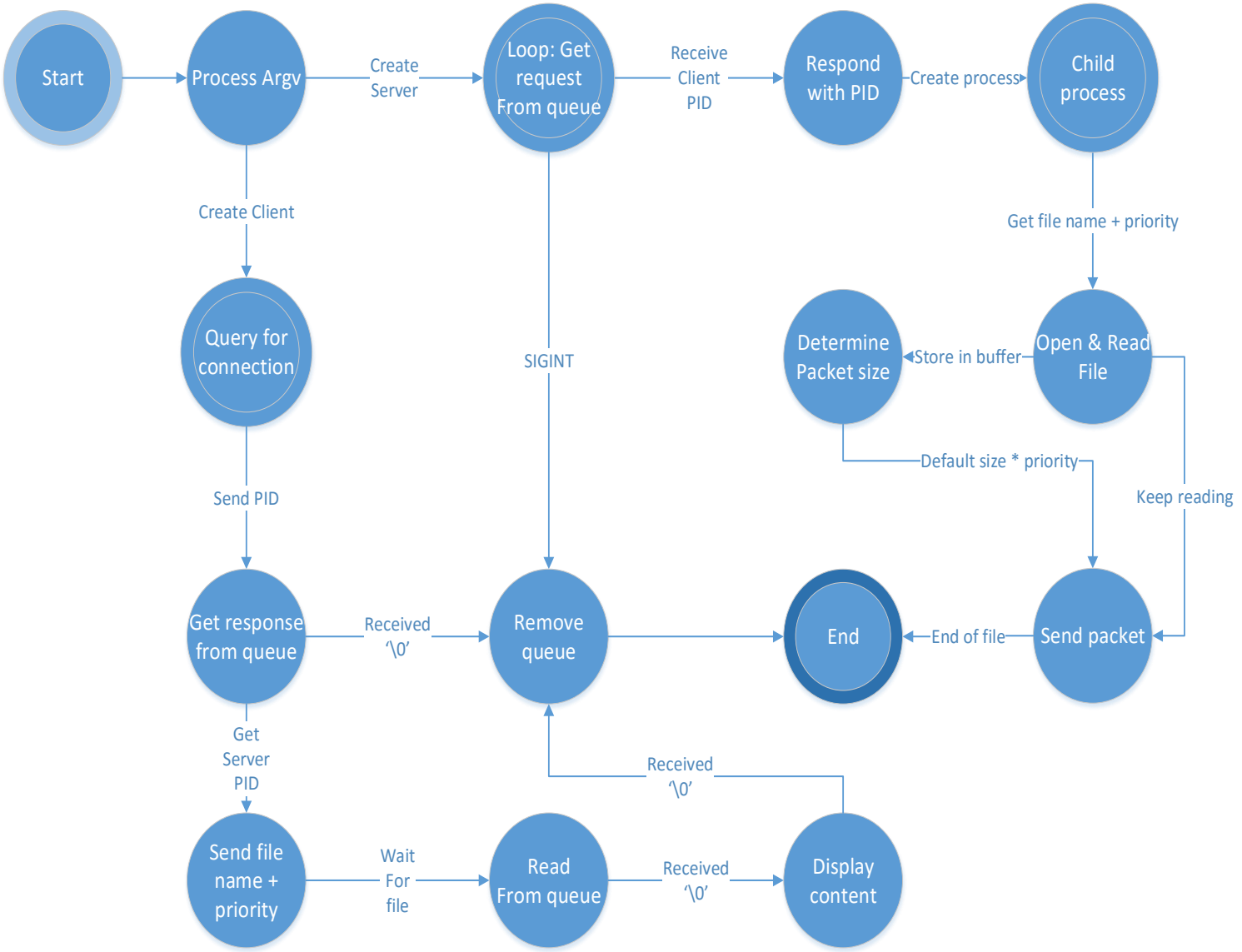
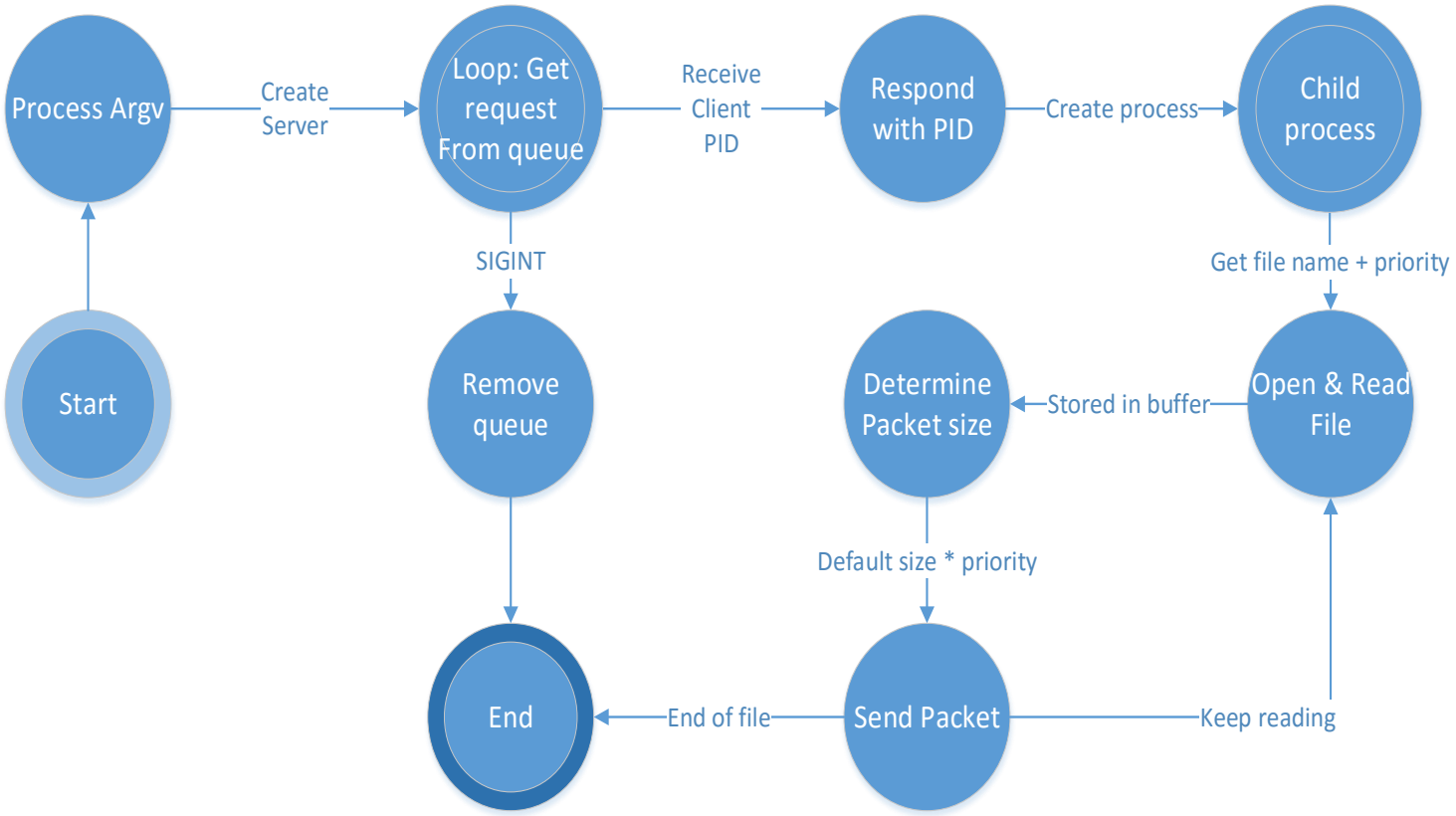
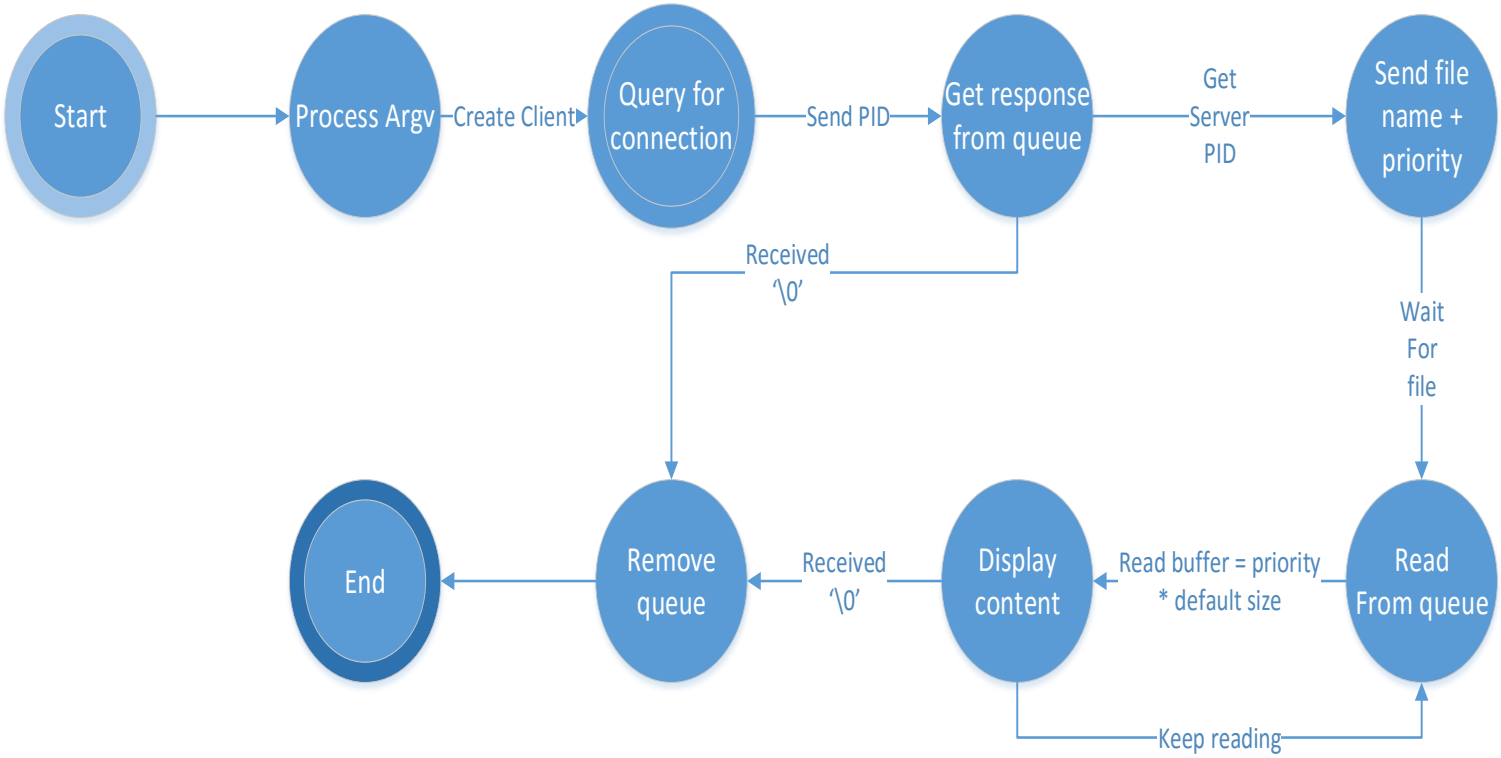
Overall State Diagram



Server State Diagram



Client State Diagram



Pseudocode

Process Argv

Catch the SIGINT signal when user enters ^C, which will terminate the process and close the message queue
Argv will contain the type of service, file name, and priority level
Validate the command line arguments
    If user entered "-s", valid
        Transition into **Get Request form queue (Server)** state
    If user entered "-c" and number of arguments is equal to 4, valid
        Transition into **Query for Connection (Client)** state

Server:

Get request from queue

Forever loop:
    Reads on blocking for a new client query from the message queue
        -mtype specified as a global defined variable
        -the query message will contain the client's process ID
    When the query is received
        Transition to **Respond with PID** state

Respond with PID

Initialize the message structure
    -mtype specified as a global defined variable
    -message content will contain the server's process ID
Open existing message queue
Write the message structure to the queue
Create a child process to handle the new client's communication
Transition to **Child Process** state
When child process ends, make sure to break and terminate it

Child Process

Initialize a message structure
Read from message queue
    -mtype specified as the client's process ID
    -message content will contain the file name and its priority level
When the message is read
    Transition to **Open & Read File** state

Open & Read File

Attempt to open the file name passed from the message structure

If the file does not exist
    Write a NULL message back onto the queue
        -mtype specified as the client's process ID
        -message content will contain NULL
        -exist child process
Start reading the file content
Have a dynamically sized string that will store the file's content
Transition to **Send File to Queue** state

Send file to Queue

Calculate the size of content that will be sent to the client
    -size is based off of the priority level, higher priority = bigger content
Loop through the buffer until there are no data to be sent
Initialize the message structure that will be written to the client
    -mtype specified as the client's process ID
    -message content will contain the sliced chunk of data based off of the size calculated
Send the message structure to the client
Transition to **END**, exists child process

Client:

Query for connection

Initialize message structure to communicate with the server
    -mtype specified as a global defined variable
    -message content will contain client's process ID
Send structure to message queue
Transition to **Get Response from queue** state

Get response from queue

Initialize message structure for reading from the queue
Reads from the message queue
    -mtype specified as a global defined variable
    -message content will contain server's process ID
If message content contains a null character
    Transition to **Remove Queue** state
Transition to **Send file name + priority** state

Send file name + priority

Sends message structure to message queue
    -mtype specified as the client's process ID
    -message content contains the file name to open and its priority level
Transition to **Read from queue** state

Read from queue

Read message structure from message queue
- -mtype contains the client's process ID
- -message content contains the the file content block

Transition to **Display content** state

Display content

Loop:
- Keep displaying content sent from the **Read from queue** state
- If the size of the content block is smaller than the size calculated based off of the priority level
  - Transition to **Remove queue** state
- Transition back to **Read from queue** state

Remove queue

Find the existing queue and close it
Exists the application