SWEN 342 Concurrent and Distributed Systems

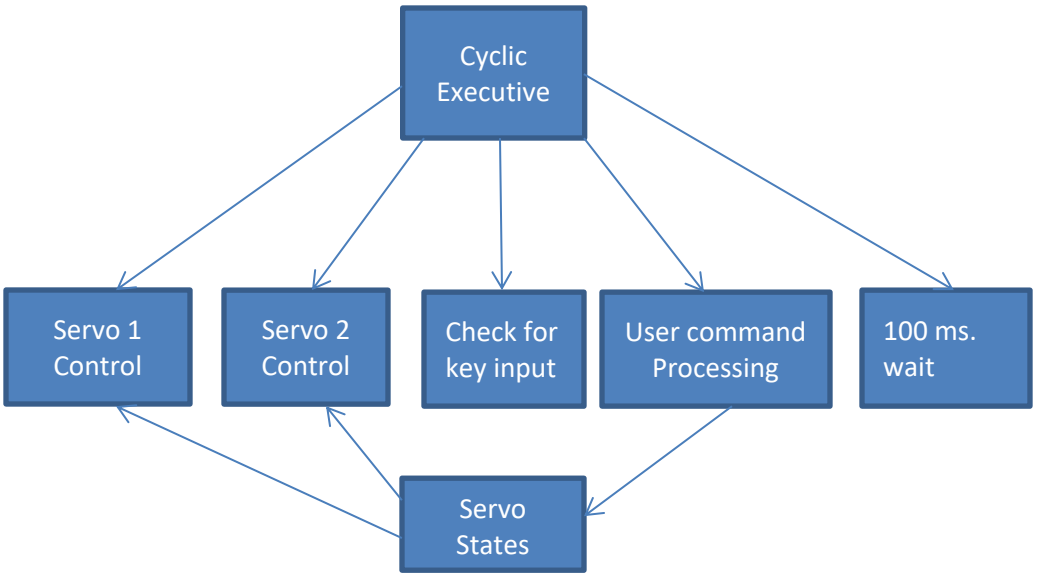
Design doc example

The following is an example of a design document for a SWEN 563 Project – Servo Control.

Overview:

This document describes one possible overall design for Project 2a. The major components and their high level functionality are described.

System Block Diagram:



Cyclic Executive:

The cyclic executive is a loop that executes once every 100 milliseconds. At the top of the loop it notes the current time. It then checks for key input. If there is a key input it then passes the accumulated keys to the command processing function. Then it calls each of the two servo controls. Lastly, it waits the remainder of the 100 milliseconds.

Note that, with the exception of the 100 ms wait function all calls are non-blocking.

Check for Key Input:

This is a non-blocking call that simply returns the next key that was pressed or 0 if nothing was pressed since the last time this function was called.

User Command Processing:

This function determines whether or not a complete command has been entered. If so, it then starts that command. When entering a command that will start or stop recipe operation the corresponding servo state will be modified.

Servo Control:

This function controls servo operations and delays between servo operations. When in manual (non-recipe) mode as defined by the Servo State, this function will clear the countdown counter and return.

During recipe operation the servo control either executes the next recipe command or waits the required amount of time for servo to complete a move or for a wait command to complete.

Countdown counters are maintained internally for each servo. When the counter is zero the next recipe command will be executed. If the counter is non-zero it will be decremented once each time this function is called.

Servo States:

A separate state is maintained for each of the two servos. These states are controlled by the User Command Processing function. The states include running a recipe and responding to user commands.

100 millisecond wait:

At the top of the loop this function is called to just record the current time using a free running counter with a known count rate. At the bottom of the loop this function is called again. In this case the function does not return until 100 ms. have elapsed since the previous call. This is done by simply polling on the count value in the free running counter until the difference in counter values indicates that 100 ms. have elapsed.