AR2B Particulate Matter Experiment:

Monitor.sh

Monitor.sh waits 20 minutes to start, this allows a buffer time for programs to launch and will allow usable data to be collected if this program malfunctions (false positives).

**Loop:**

* The while loop encasing the program and the 10 minute buffer time should allow the program to continuously check for errors during operation time.

**Variables:**

* Logs: (identified and read via cat command)
  + Startup
  + Transfer
  + UAH
  + Sensor
* Time:
  + Initialized as a variable to compare with log times.
* Other Variables:
  + Results of string splitting from the log data, largely self explanatory.
    - Ex: startup\_hour is the hour that the startup program was launched in.
    - Ex: transfer\_minute is the minute that the transfer program was launched in.

**Startup Checker:**

Note: pseudocode does not follow any convention, simply is intended allow readers without an understanding of bash to read the code logic.

First if statement pseudocode:

* if started TODAY or YESTERDAY or TOMORROW return DATE\_GOOD else DATE\_BAD
* Pass example: (startup date = 1/1/22, current date = 1/2/22)
  + 1/1/22 == TODAY returns false
  + 1/1/22 == YESTERDAY returns true
  + 1/1/22 == TOMORROW returns false
    - Because these are all “or” statements, result is true
* Fail Example: (startup date = 1/1/22, current date = 1/3/22)
  + 1/1/22 == TODAY returns false
  + 1/1/22 == YESTERDAY returns false
  + 1/1/22 == TOMORROW returns false
    - This check theoretically should never trigger due to startup.sh’s inbuilt 12hr restart clock, but this check is here for redundancy.

Second If Statement:

* Checks the hour in which the program was launched
* Pseudocode:
  + if LAUNCH\_HOUR == CURRENT\_HOUR return TRUE else FALSE
    - True occurs when hours are the same (ex: 8 and 8) continues to the third if statement.
    - False occurs when hours are different and can only occur when the restart happened less than 12 hours ago. This should be the most common return.

Third If Statement:

* Checks to see if the hour is am or pm:
* Pseudocode:
  + if LAUNCH\_AM\_PM == CURRENT\_AM\_PM return TRUE else FALSE
  + Ex: (launch=pm, current = am)
    - if PM == AM return TRUE else FALSE
      * True only occurs when check is executed in the same hour as the launch (ex: launch = 8:00 am and check = 8:10)
      * False should be the check that fails at the 12 hour marker, and restarts the system. This should be restarting around the same time as startup.sh, so there is redundancy to this measure.

**Transfer Check:**

The transfer program is intended to execute in a loop every second to move programs from the /home/pi/ or /home/pi/Programs/ directories to /tmp/experiment/ for use by UAH’s program. After moving the files, transfer.sh writes the current time to its log file.

Transfer Pseudocode:

* if LOGGED\_MINUTE (is within two minutes of) CURRENT\_MINUTE return TRUE else FALSE
  + True means the program is looping properly, as the log file is within an acceptable deviation from the current time.
    - 2 minutes was chosen as it is the approximate time taken to launch the system and is not enough time to produce a harmful amount of data files.
  + False should/has never occur/ed, but in the event that it does this false will restart the system to handle this problem preventing massive amounts of packets from taking up storage space.

**UAH and Sensor Check:**

* Uses the exact same mechanics as the startup check, see above.

**Notes and Warnings:**

* DO NOT CHANGE SYSTEM TO A 24 HR CLOCK!!!!
  + This should be largely self-explanatory, but it will break many of the checks in this program. This program must be edited to work on a 24hr clock.