HT Correction Script

Type	Notes
Date	@March 29, 2022
Note	

TERMS

- 3D vs 1D frames
  - 3D means that all 3 points (head, tail, centroid) are visible on that frame
  - 1D means only 1 point is visible (all converge into centroid position) aka a **blink** on that frame

BEHAVIOR

- PiVR will usually switch back to correct position on its own so we need to find when the beginning of an error occurs until the frame right before it switches back to the correction position and SWAP the coordinates in between
- Looking specifically at when the larva crosses through the contrasted area in the center
- Detect errors using unprocessed data then swap those coordinates in the processed data

FUNCTIONS

find_start_blink

- INPUT: any correctly positioned 3D frame (head and tail in right place and visible)
- PROCESS: from that starting 3D frame find the closest occurrence of a blink
- OUTPUT: first frame of the blink (1D frame)

find_end_blink

- INPUT: first frame of the blink (1D frame) = output of find_start_blink

- PROCESS: iterate through each frame until we find a 3D frame
- OUTPUT: last frame of blink (1D frame)

compare_angle

- INPUT: first and last frames of blink (both 1D frames)
- PROCESS: compare the frame right before the blink and frame right after end of the blink (comparing two 3D frames to find angle)
- OUTPUT: angle in radians of HT vector before and after blink

find_end_of_error

- INPUT: first and last frames of blink (both 1D frames)
- PROCESS: iterate through frames until the end of the error is found
  - must move past blanks blinks (blinks that don't result in an error)
- OUTPUT: last frame of blink before it switches to correct position (1D frame)

ht_correction (main function)

- INPUT: unprocessed and processed coordinates
- PROCESS: identify errors using helper functions and swap them through the specified frame
- OUTPUT: plot of trajectory before and after correction