**Data Processing in Python**

**Background**

This data processing is for an experiment in kids fitness. This experiment is trying to achieve the following with videos of kids doing a particular exercise:

* Identify the kids position in every frame
* Identify the kids body points in every frame (human pose)

The frame by frame outcome of these 2 is saved in CSV files.

This task begins from this point to create a custom HTML assessment report for every video.

**Input**

* A CSV file with frame by frame position (In\_File\_1)
* A CSV file with frame by frame human pose points (In\_File\_2)
* A CSV file of assessment rules (In\_File\_3)

Samples of these files are attached.

**Desired Output**

The desired outputs are the below:

* A dataframe with the frame by frame assessment (pass / fail) (Out\_1)

**Program Execution**

The program will be executed via command line like this:

‘python3 program.py --file <<video\_file\_name>> --cconf 0.7 -hpconf 0.5’

This is required as this program will integrate into a larger pipeline this way.

**Data Processing Steps**

#1: Parse the arguments to get the values of video file, cconf and hpconf

#2: Read In\_File\_1 (this will be provided)

#3: Extract the frames where it is identified as a squat, jump\_peak & landing frame in In\_File\_1 and the confidence is >= *cconf* *(this becomes frame\_list\_1)*

#4: Read In\_File\_2 (this will be provided)

#5: Read In\_File\_3 (this will be provided)

#5: For all the frames in *frame\_list\_1*; assess each frame according to the assessment rules. Assessment rules will need the data in In\_File\_2.

Possible assessment outcomes are:

* Pass
* Fail
* Cannot be evaluated (pose point data not complete)

#6. Create the Out\_1 dataframe (1 line will be 1 frame). For each frame:

* Critical\_frame (yes or no)
* Assess\_Outcome:
  + Pass (P)
  + Fail (F)
  + Cannot be evaluated :
    - Pose point has missing data (value of ‘-1’ denotes missing data) CE\_MD
    - Pose point has data but confidence is lower than *hpconf* CE\_LC
  + Not a critical frame (‘transition’ frames do not need to be evaluated) NC
* Eval\_JSON:
  + Criteria\_1: Value
  + Criteria\_2: Value
  + Criteria\_3: Value

#7. Create the HTML report for the video

**Must Dos:**

* Modular programming. Code must be organized into neat functions that can be easily understood and re-used