# Notes:

* The MAD function must be contained in a class to conform with out implementation.
* There are 3 main instance variables that need to exist in order for this function to work with the history system:
  + Values == A list of values to perform the operation operation
  + Mean == A mean (AVG) value of the values. This will be used in the MAD calculation.
  + Mad == The mean absolute deviation value of the list. Publicly available once the object is instantiated.
* In order for the object to behave as intended, there are 3 main methods that need to be implemented:
  + \_\_init\_\_ == This will be used to instantiate the variables (its a constructor)
  + calculate\_mean == This will perform the necessary operations to calculate the mean. The rough implementation scheme can be found in the pseudocode. As of now, the method will be made private, as it is only planned to be used as a helper function for the MAD calculation. In the event that we want to implement a mean function on the front-end, this can be opened up.
  + calculate\_mad == Calculate the mean average deviation. It uses calculate\_mean method to not have the same function in two different methods.
* Since using math.abs() isn't allowed (as per the requirements), I have opted to manually check each calculated difference to ensure that there are no negatives. If a negative number is detected, the program multiples it by -1 to convert it to a number. The implementation was intuitive.
* Some extra support setters/getters functions were added to try to make the data more accessible and to conform to our implementation choices.
* The class (and methods) were tested with various sample data. With both positive and negative numbers and with large and small sets. The results were compared with various online MAD calculators and the number produced by this class matches those found online. Therefore, I can conclude that the algorithm is accurate.

# Pseudocode:

function calculate\_mad(values)

number\_of\_values = length(values)

total = 0

for value in values

total += value

avg = total / number\_of\_values

total = 0

difference = 0

for value in values

difference = value - mean

if difference is less than 0

difference \*= -1

total += difference

mad = total / number\_of\_values