**Exercise for Unit 4**

Name: Date:

Name:

Year and Section:

*Note: Save your Python source codes into a single .ipynb file with the proper naming convention (see Readme on the repository), upload it to your assigned folder in the GitHub organization* ***CCS-248-Artificial-Neural-Networks****, repository* ***“25-26****”.*

*Use this file as your answer.*

Study the Backpropagation implementation uploaded [here](https://github.com/CCS-248-Artificial-Neural-Networks/25-26/blob/main/Sample%20Codes/backpropagation.ipynb), and perform the following:

1. Set up the code so that it will perform the **Forward Pass (FP), Backpropagation (BP)** and weight updatein*1000 epochs.*
2. Modify the Optimizer class so that it will accept 3 optimizers we've discussed
   1. *Learning rate decay*
   2. *Momentum*
   3. *Adaptive Gradient*

Hint: Updating the learning decay rate happens before running both FP and BP, implementing momentum, and vanilla SGD happens after the learning rate decay

1. Display the **accuracy** once every 100 epochs have elapsed, to see if the accuracy is increasing. Paste a screenshot here of your console that shows the accuracy.
2. Compare the difference of two optimizers you’ve implemented in terms of: a) how many epoch did it take to *stabilize the loss*, and b) the *accuracy* of the model.