Cairo University **Faculty of Computers and Artificial Intelligence**

Third year (2022-2023) **Supervised learning (Spring 2023)**

Assignment 2

- ## Delivery Notes:

  • This is a group task of 3 members (at most)

  • All students should work and fully understand everything in the code.

  • **All students should have the same TA section**

  • The deadline is on Thursday 11/5 at 11:59pm

  • No Built-in Functions is allowed

  • No late submission is allowed.

  • No submission through e-mails.

  • The submitted files should be named Assignment1_firstStudentID_SecondStudentID_ ThirsStudentID.ipynb

  • **Do not send your code** to anyone**,** so that no other student would take your files and submit it under their names.

  • **In case of Cheating, you will get a zero grade whether you give the code to someone or take the code from someone or from the Internet**

  • Make sure that your notebook **has a clear and visible output** and that your code **is clean and understandable**.

Task:

1. Load MNIST dataset
2. Subset your data to use only class 0 and class 1 for the next steps.
3. Standardize your dataset
4. Divide data into training and validation set
5. Implement Logistic Regression
6. Use L1 regularization with gradient descent optimizer. Try 2 values for lambda
7. Use mini-batch gradient descent optimizer. Try multiple batches (at least 2)
8. Use RMS Prob optimizer and Adam optimizer

9. Report the accuracies for all of the above cases and write a **conclusion** for each case explaining the behind reasons