MID EXAM UGD PROGRAM DEEP LEARNING(SPRING-2025)

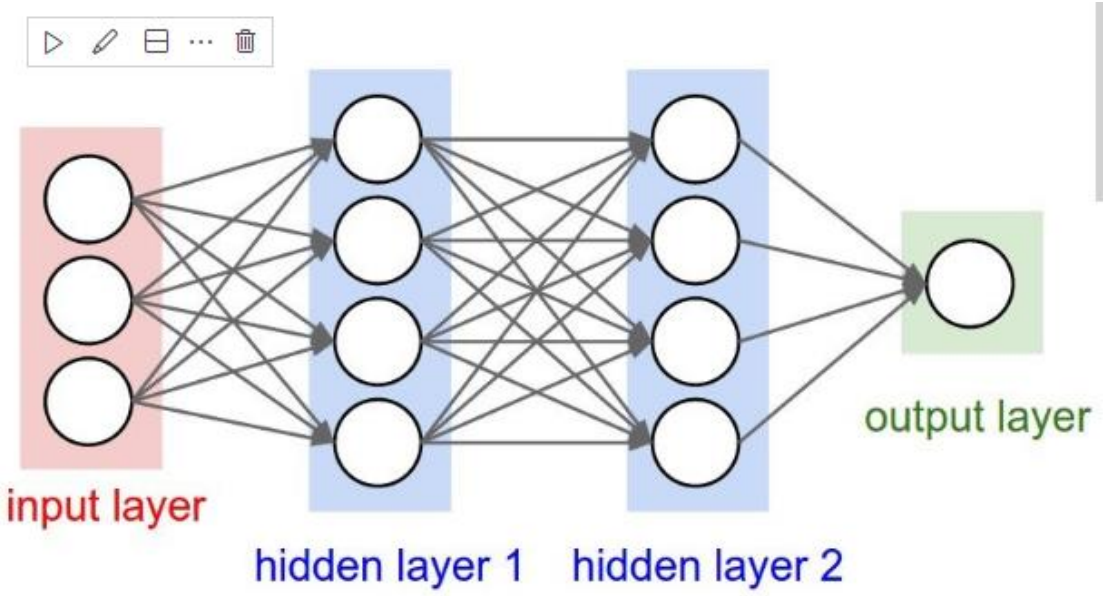
Question 1:

a. What do you understand by the term feed forward network and backward propagation.

b. What is activation function and why we use activation functions? Name any three Activation function.

Question 2:

In figure given below you have to label each and every part of the given MLP which we discussed in class and find out the Total Number of Trainable parameters.



Question 3:

1. **Dataset Loading:**
   - Load the CIFAR-100 dataset using a standard library such as tf.keras.datasets.
2. **Data Exploration and Visualization:**
   - Display a sample of the images along with their class labels.
   - Review and understand the 100 available classes.
3. **Data Preprocessing:**
   - Normalize the image pixel values to the [0, 1] range.
   - One-hot encode the categorical class labels.
4. **Model Construction:**
   - Build a deeper Convolutional Neural Network (CNN) architecture appropriate for classifying 100 categories.
   - Ensure the model includes regularization (e.g., dropout, batch normalization) as needed.
5. **Model Training:**
   - Train the CNN on the CIFAR-100 training set.
   - Monitor training and validation performance using learning curves (e.g., accuracy and loss vs. epochs).

6. **Model Evaluation:**
    - Evaluate your model on the test set and report overall accuracy.
    - Generate and display a confusion matrix.
    - Report class-wise accuracy if possible to understand model performance per category.
7. **Discussion:**
    - Discuss the key challenges faced when working with CIFAR-100 (e.g., fine-grained distinctions between classes, limited resolution).