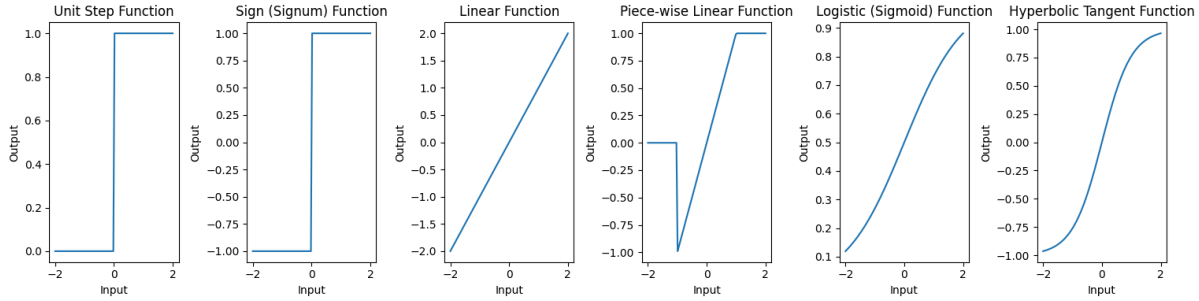
Department of Computer Science

MCA575 / Neural Networks and Deep Learning

Program 2: Activation Functions

1. Create a perceptron to demonstrate the following
   - AND operation
   - OR operation
   - XOR operation
2. Build Activation Function from scratch to display the range values as shown in the figure (Refer Unit-1 Slides)



For example,

- Complete the `sigmoid(x)` function to compute the sigmoid activation.
- Complete the `tanh(x)` function to compute the hyperbolic tangent
  - For example: x_values = np.linspace(-1, 1, 50)
- Plot both functions.
- Answer the analysis question below.
  - What are the output ranges for Sigmoid and Tanh? How are they similar and different?

3. Use the dataset from the link below

   archive.ics.uci.edu/dataset/267/banknote+authentication

4. Train the network on the banknote data and compare the performance of `sigmoid`
   vs. `relu` activation functions