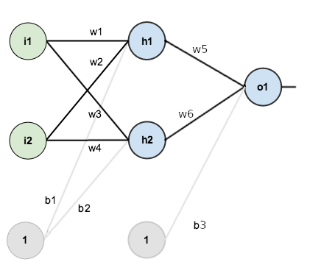
**Given the following Neural Network and input values, compute the output value. Use the sigmoid activation function. Show your work for partial credit.**



|  |  |  |  |
| --- | --- | --- | --- |
| Input | Level 1 Weights | Level 1 Weights | Bias |
| i1 = .8 | W1 = .2 | W5 = .48 | B1 = .23 |
| i2 = .3 | W2 = .35 | W6 = .34 | B2 = .41 |
|  | W3 = .15 |  | B3 = .5 |
|  | W4 = .6 |  |  |

The work for partial credit is shown in the attached Excel file, but here are screenshots for simplicity.

**Answer**:

A black rectangle with a white background

Description automatically generated

Work for partial credit (actual calculations were done in the Excel file that was included in the submission

A screenshot of a spreadsheet

Description automatically generated

Using the output from the previous question, apply backpropagation assuming the target value is 0 and the learning rate is .1. What are the new weights. Show your work for partial credit.

**Answer:**

A screenshot of a table

Description automatically generated

Work for partial credit (actual calculations were done in the Excel file that was included in the submission

A screenshot of a spreadsheet

Description automatically generated

A screenshot of a spreadsheet

Description automatically generated

A screenshot of a computer

Description automatically generated

Apply PCA to the Diabetes dataset. What are the resulting projections for the top 2 dimensions?

**The projections themselves are stored in the attached diabetes\_pca\_top\_2\_projections.csv**

Nevertheless, here is a plot of the values with component-1 on the X axis and component 2 on the Y axis.

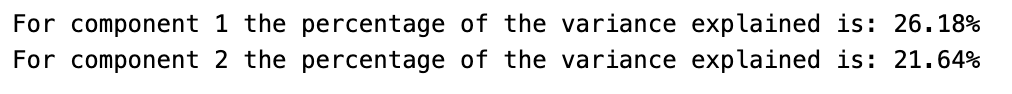
A chart of yellow and purple dots

Description automatically generated

Also of note:

A screenshot of a data

Description automatically generated



Apply LDA and PCA to the iris dataset. Using the top 2 dimensions, graph the resulting subspace and include the graphs here. Which one produces a better separation between classes.

**LDA provides a better separation between the classes. This is illustrated by noting how many of the dots shown in green “bleed” into the yellow class with PDA whereas there is almost no intermixing with LDA**

A chart of different colored dots

Description automatically generated

A chart of different colored dots

Description automatically generated