

CS3642-02 Programming Assignment #3 (Fall 2024)

Due: November 22, 2024 (11:30PM)

To implement **two perceptrons** that can perform the classification tasks of 1) and 2) below, respectively.

Requirement:

- 1) You must have a biased neuron in the input layer. Remember that we have 16 samples available. You may divide them into some for training and some for testing.

Implement the perceptron to recognize 4 blocks image to make a decision if an image is BRIGHT or DARK. Remember that we have 16 samples for the input.

- If it contains 2, 3 or 4 white pixels, it is “bright”
- If it contains 0 or 1 white pixels, it is “dark”

- 2) Design a new perceptron (with a biased neuron) for real-world applications of your own choice, NOT toy examples such as AND Boolean function. Your design must be shown on your PDF file.

You must write your own codes for the algorithms. Make sure your submission meets all of the requirements and free of plagiarism.

You may write your code in a contemporary language of your choice; typical languages would include C/C++, Python, Java, Ada, Pascal, Smalltalk, Lisp, and Prolog. A GUI interface is preferred.

1. Submit a PDF file of your well-commented source program, your design and your printed outputs (screen shots). Please include your codes in your PDF file. **It is plagiarism to take any codes from the website or others.** Try to understand the algorithm and implement the algorithm by your own. **You must have all the information required in your PDF file.**
2. Provide a video presentation of your programming assignment in MP3/MP4, YouTube, or any media. This presentation should show that your program is running properly for the correct output.
3. Please upload items 1) and 2) above separately to **D2L**.
4. **Restriction: No zipped files.**

Make sure the following information is in your PDF file.

I. Your Information:

// Course: _____
// Student name: _____
// Student ID: _____
// Assignment #: _____
// Due Date: _____
// Signature: _____ (Your signature assures that everything is your own work. Required.)
// Score: _____ (Note: Score will be posted on D2L)

II. The table of statistics:

Problems to be solved	Accuracy (Training)	Accuracy (Testing)	Time complexity for training
4-block images			
Your real-world problem			

III. Your code:

IV. Examples of your output if any: