

**Study of an Associative Memory**  
version 15 April 2022  
ECE 5730 Foundation of Neural Networks

Note that the project asks you to “investigate” an associative memory. Thus merely producing working code is not sufficient. Students are expected to reach specific conclusions based on the results of these experiments.

1. Consider the three bit maps on the attached page. Design an autoassociative neural network memory to store these patterns. Feel free to modify my bitmaps for the “4”, “6”, and “8” if that proves advantageous (but keep the same 10 x 12 size).
2. Demonstrate the operation of your network by including snapshots of the network output during recall of corrupted stored patterns (e.g. Figure 6.7 of [1]). Describe and explain any problems.
3. Investigate the recall ability of your network by adding various levels of noise to your stored patterns and then evaluating the network response.
4. Investigate the storage capacity of your network by adding new stored patterns (e.g. other digits, letters, etc.) and studying the network performance as in item 2.

Maximum report length is 6 pages.

**Reference**

[1] Jacek M. Zurada, *Artificial Neural Systems*, PWS Publishing, Boston, 1992.

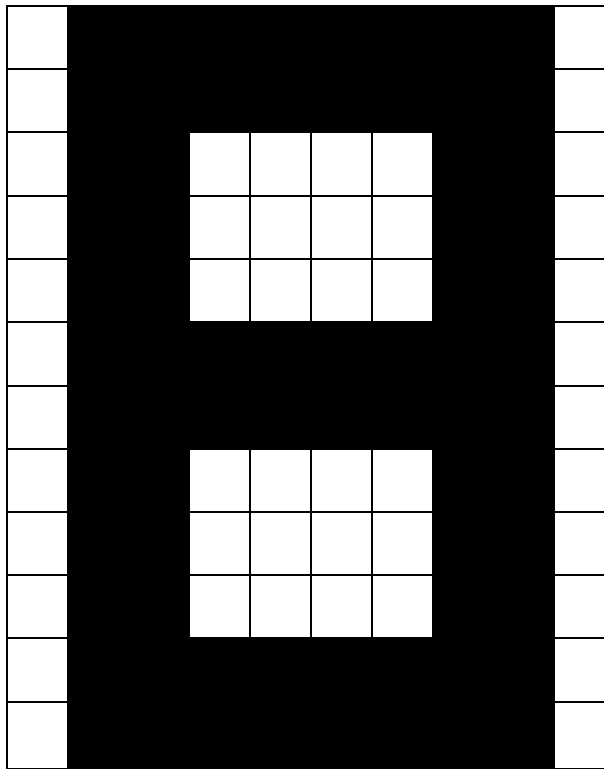
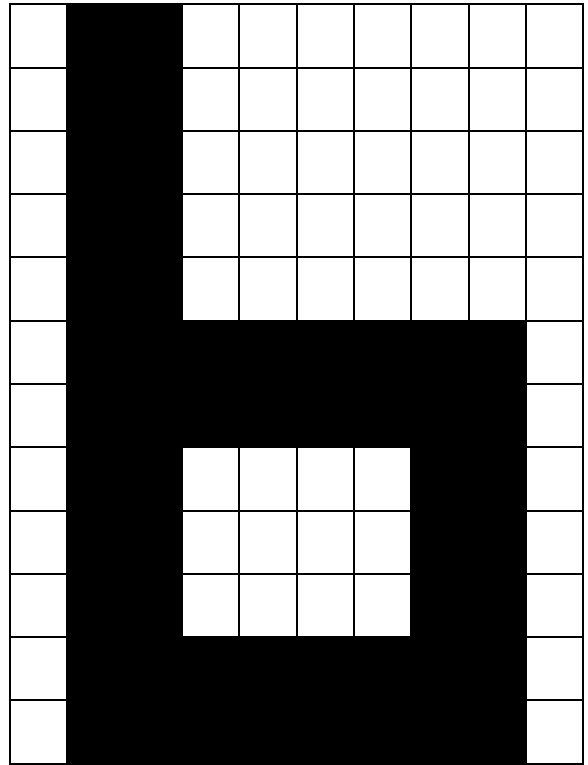
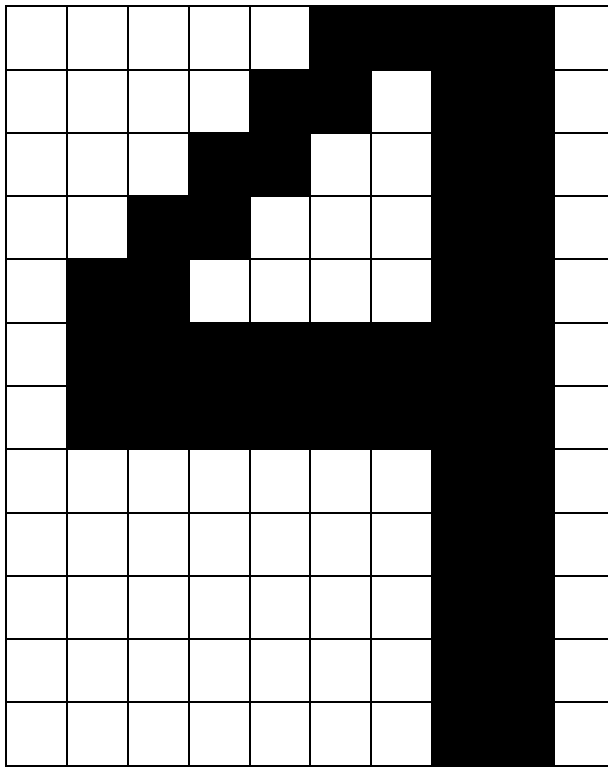


Figure 1. Bit maps for associative memory experiment