

PHYS352 – Final Project

Due: Sunday, March 20, noon

Submit a write-up and all C code/scripts/output for the problems below. Create a zip archive containing everything, name it “final_YourLastName.zip” (with the appropriate name replacement) and place in your `students/[netID]/homework` directory by noon on Sunday.

1. Decoder Ring (30 pt.)

Implement the routines listed in `neural.h`, as was discussed in class. These, together with the lattice functions provided in the `Ising` package, should enable you to create a functional Hopfield neural network. After checking that your network functions in a manner similar to what was demonstrated in class, use your network to decode the mystery characters in the `final` directory on the git repo. There are seven distorted patterns (001.dat – 007.dat) in the `mystery` subdirectory. For each of these patterns :

- Load your network with the four patterns in `character_group` that correspond to the numbered mystery pattern.
- Evolve the network.
- This will hopefully result in convergence to the correct, undistorted pattern. Your evolved pattern should match one of the four inputs exactly, giving a Hamming distance of zero. Store or record the character you converge to.

String the seven decoded patterns together, in order. What’s the mystery word?