1. (5 points) Describe the Turing Test.

2. (3 points) Here's some hype we read from the web, "Last week, an artificial intelligence computer named Cleverbot stunned the world with a stellar performance on the Turing Test...". What's wrong with that claim?

3. (4 points) In the Loebner Prize contest they conduct a 5-minute version of the Turing Test. Why do they restrict the test to 5 minutes?

4. (5 points) Why is it so difficult to write a program to pass the unrestricted Turing test?

5. (4 points) Describe the operation of a McCollough-Pitts neuron.

6. (5 points) What is the perceptron learning rule (full credit for the formula form)?

7. (2 points) Assuming you have a 50x50 perceptron and each weight is an int, how many different possible states does the weights matrix have?

8. (6 points) Prove that a perceptron cannot learn to correctly categorize XOR?
9. (3 points) Why is it useful to write accessors, equals, clone, and toString when you first write a class?

10. (4 points) What are two uses for a Java interface?
   
   i. 
   
   ii. 

   Here's an interface:
   ```java
   public interface Minimaxible {
       public MoveList makeListOfLegalMoves();
       public boolean gameOver();
       public int staticValue();
       public Move getMove();
       public void setMove(Move m);
       public int getValue();
   }
   ```

11. (8 points) ..and minimax with two deletions >>1<< && >>2<<. Fill in the correct parameters.

   ```java
   public Move minimax(Minimaxible theBoard, int depth) {
       Minimaxible bestBoard = maxPly(theBoard, depth);
       Move returnMe = bestBoard.getMove(); // the move that took us there
       return returnMe;
   }

   private Minimaxible maxPly(Minimaxible theBoard, int depth) {
       MoveList theMoveList = theBoard.makeListOfLegalMoves();
       if (depth==0 || theBoard.gameOver()) {
           theBoard.setValue(                                  );  // >> 1 <<
           return theBoard;
       }
       BoardList theBoardList = new BoardList(theBoard, theMoveList);
       for (Minimaxible nextBoard: theBoardList) {
           nextBoard.setValue(minPly(                    ).getValue()); // >> 2 <<
       }
       return boardWith_MAX_Value(theBoardList);
   }
   ```
12. (3 points) What is the law of uphill analysis and downhill synthesis?

13. (5 points) Two vehicles, one with crossed, the other uncrossed connections; the * is a source the detectors respond to. The detectors drive motors on the two wheels (not shown); the more input the detector gets the faster the motor turns. Draw their paths (until they are to the right of the *).

```
  uncrossed
  |   |   |
  C   |   |
  |   |   |
  C   |   |
```

```
  crossed
  |   |   |
  C   |   |
  |   |   |
  C   |   |
```

14. (4 points) Many people think consciousness resides in the cortex, but you have read a paper entitled, *Consciousness without a cerebral cortex*, by Merker. Summarize his argument for where consciousness resides.

15. (6 points) Write pseudo-code for the main loop of a GA.

16. (3 points) Describe one endogenous, dynamic GA fitness function.

17. (4 points) What does prediction/correction have to do with learning?

18. (4 points) Describe how a perceptron implements prediction/correction

20. (3 points) How do cell assemblies form?

21. (3 points) What does a cell assembly have to do with thought?

22. (8 points) Explain the concept of quasimorphism (in terms of the prediction/correction theory of model-building/learning). For full credit draw the diagram.

23. (5 points xtra) What question should have been on this exam that wasn’t? Provide an answer to it!