

**STS 350**

**Exam #3**

**Name** \_\_\_\_\_

Friday, April 27  
100 pts.



(continuation of problem I)

- c. (10 pts) Write a rule that says that if a customer status is DEFAULT for some customer, we should assert (or print - your choice) a statement to the effect that this customer (be sure to include the customer's name) should be sent a letter.

## II. Connectionism

- a. (10 pts) What do we mean by the connectionist approach? As a part of your answer to this question, contrast the connectionist approach with the symbolic approach.

- b. (10 pts.) It is desired to construct a perceptron satisfying the following truth table:

X	Y	Out
1	1	1
1	0	0
0	1	1
0	0	1

Find appropriate weights to make this work, and sketch a picture of the perceptron. One way to approach might be to draw the appropriate line first - see part (c) below.

- c. (5 pts.) Associated with each two-input perceptron is a straight line. Write the equation of the line associated with the perceptron in part (b) and give a quick sketch of the graph of the line.

- d. (10 pts.) What is a feed-forward network? How does training with backpropagation work? A brief diagram might be useful in explaining this.

III. Computation

- a. (5 pts.) What is a finite state automaton (machine)?
- b. (5 pts.) What is a push-down automaton (machine)?

c. (10 pts.) What is a Turing machine?

d. (10 pts.) Consider the Finite State Machine whose state-transition table is given below:

State\input	a	b	c
State 1	goto 2	error	error
State 2	error	goto 2	goto 3
State 3	error	error	goto 3

State 1 is the start state, and state 3 is the only final state. This problem will be continued on the next page.

1. Sketch the finite state machine from the state-transition table. Be sure to sketch the complete machine, and use appropriate notation for the initial and final states.

(continuation of problem III.d)

2. give an example of a string of a's, b's and c's **accepted** by the machine and a non-trivial example of a string of a's, b's and c's **rejected** by the machine.

- e. (10 pts.) What is the Turing-Church hypothesis and what is its relation to cognitive science?