

# Computational Intelligence

## Final Quiz

Answer the questions in the spaces provided. If you run out of room for an answer, continue on the back of the page.

1. What is the first thing you should do when faced with a problem potentially solvable with CI<sup>1</sup>.
  - Gather test data
  - Determine size of search space
  - Pick method, i.e. PSO, NN's, etc.
  - Change careers
  - Determine fitness function
  - Set the goal and accuracy required
  - None of the above
  
2. What is the second thing you should do when faced with a problem potentially solvable with CI.
  - Gather test data
  - Determine size of search space
  - Pick method, i.e. PSO, NN's, etc.
  - Ask your mother
  - Determine fitness function
  - Set the goal and accuracy required
  - None of the above

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3. Sketch a benign one dimensional search space. The x-axis is the independent variable and the y value is the fitness.

4. Sketch an evil one dimensional search space. The x-axis is the independent variable and the y value is the fitness.

5. Describe the representation used by each of the following,

(a) NN

(b) GP

(c) GA

(d) EC

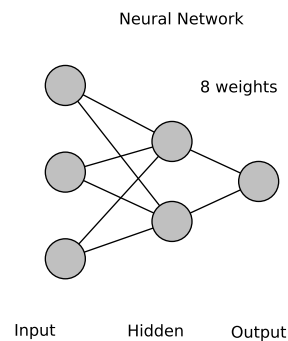
(e) PSO

(f) FSM

6. The non-straw end of a broom is placed on an x-y carriage with the straw end of the broom above it. The x-y carriage should move appropriately to keep the broom approximately vertical.
- (a) What would the fitness function be for this CI broom balancer?

(b) How would you compute the chosen fitness function?

7. Given the neural network below. If you were using PSO to train this network what would the representation be?



8. You want to predict tomorrow's stock market DOW with a neural network (simply whether it goes up or down) using the previous 3 days DOW closing price. Please sketch an appropriate potential neural network topology.

### Extra Credit

9. You want to design a CI system for recognizing Bach music (I find it generally has a unique character to it)

- (a) What CI approach would you use?
  
- (b) What would your fitness function be?
  
- (c) If successful, could you use it to help write 'Bach-Like' music? If so, how would you do it?