

ComS 610as: Developmental Robotics
Homework 2

Out: Thursday, September 29

Due: Tuesday, October 11

Choose five of the following eight questions and answer them.

1. What is the difference between learning and development? If you think that they are different then give an example that makes the distinction obvious. If you think that they are the same then explain why.
2. Describe how population coding works. What are its advantages? Disadvantages? Also, pick your favorite motor task (e.g., hand movement, eye movement, etc.) and explain how it can be encoded and executed using population coding. Draw graphs if necessary.
3. What is a circular reaction? Give two examples. Why do you think Piaget put so much emphasis on circular reactions during the early stages of child development?
4. Watson describes four methods for detection of contingency that might be useful for detection of self. Pick your favorite method and sketch how it can be implemented on a robot. If you don't like any of the four methods then suggest a new one.
5. Summarize the main points of Piaget's theory (sensorimotor stage only). Provide at least a couple of sentences for each of the six stages.
6. Our body is the most persistent and predictable part of the environment (we can't run away from it) and yet our brain is capable of modifying our body schema in seconds. Why is our body schema so pliable? Give an example of a task and explain how having a malleable body schema helps us to solve the task.
7. Many primitive animals (and even humans) exhibit a wide range of innate behaviors and reflexes. Some of these can be quite elaborate (e.g., fixed action patterns, courting rituals, etc.). How do you think these behaviors are encoded? Try to be as specific as possible, i.e., don't just say that they may be encoded in the genome.
8. The midterm exam is coming soon. Based on the material covered in class so far, write one question (and its complete answer) that you would like to see on the exam. If your question is good then your wish may come true.