Computer and The Brain

Instructor: Dmitri A. Gusev

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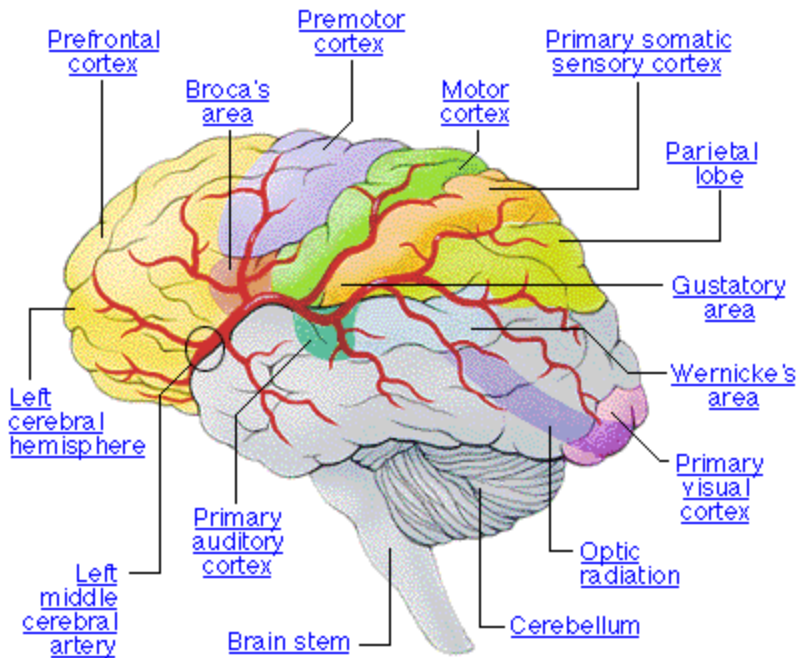
Selected Quotes

- "An automobile with a dead battery will not be able to move, but we don't therefore assume that the battery is responsible for propelling the car."
- "The ultimate stage in the brain's learning is a cultural process, in which knowledge acquired by other individuals over many generations is transferred into it."

Divide-and-Conquer

- The traditional engineering process relies heavily on the hierarchical structure (*modularity*).

- The function of a module has an explanation simpler than the description of its inner structure. Thus, *abstraction* is possible.

- *Redundancy* reduces the risk of a catastrophic failure

Modularity and The Brain Structure

Region of the Cerebrum Damaged by Stroke	Signs and Symptoms
Wernicke's area (central language area)	Difficulty speaking understandably and comprehending speech; confusion between left and right; difficulty reading, writing, naming objects, and calculating
Broca's area (speech)	Difficulty speaking and, sometimes, writing
Parietal lobe on the left side of the brain	Loss of coordination of the right arm and leg
Facial and limb areas of the motor cortex on the left side of the brain	Paralysis of the right arm and leg and the right side of the face
Facial and arm areas of the sensory cortex	Absence of sensation in the right arm and the right side of the face Optic radiation Loss of the right half of the visual field of both eyes

Simulated Evolution

- Introduce "mutations" – random alterations of the original text of the program

- Combine instruction sequences of two or more programs

- Select the next generation of the programs via "survival of the fittest"

Two Heuristics of Simulated Evolution

- Try a design similar, but not identical to the best designs found so far
- Combine elements of two successful designs

The Baldwin Effect

- When you combine evolution and development (*creation??*), the progress toward better versions is faster