

Your Bag of Tricks

- Constraint Propagation
- Logic
 - Mutual Exclusion
 - Trichotomy

Constraint Propagation is used in Machine Vision

- Interprets Line Drawings
 - Start with most Constrained First

- David Waltz's Constraint Demonstration

Constraint Propagation Can Work for You on Tests

- Symbolic instead of Graphic
 - Nodes == Questions
 - Lines Connect 'Related' Questions
 - Constraints == Structure of Questions + Base Knowledge

Where to Start?

- Start with most constrained first
 - The most constrained pieces are _____?

Where to Start?

- Start with most constrained first.
 - The most constrained pieces are:
Problem Text!
- Group Questions that are `similar' together

Text Example

Photoreceptors in the retina have special channels that are open to Na^+ in the dark. When light hits photoreceptors, these special channels close. What can you conclude from this?

- a) Photoreceptors depolarize to light.
- b) Photoreceptors hyperpolarize to light.
- c) Photoreceptor voltage does not change in the presence of light.
- d) None of the above

*from OCW 9.01 exam 1, Fall 2004

Question Structure – Multiple Choice!

- After essay prompts, Multiple Choice questions are the most constrained
- Logic – Trichotomy/Dichotomy
- Mutual Exclusion
- Short Circuit

Propagation Example

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Propagation Example

What happens in a photoreceptor cell (a rod, for example) in response to a light stimulus?

a) rod membrane depolarizes because Na^+ channels open as a result of a decrease in second messenger cGMP

b) rod membrane hyperpolarizes because K^+ channels open as a result of a decrease in second messenger cGMP

c) rod membrane hyperpolarizes because Na^+ channels close as a result of a decrease in second messenger cGMP

d) rod membrane depolarize because K^+ channels close as a result of a increase in second messenger cGMP

“Other” Multiple Choice

- I & II, III & II, II & I
- Weaker, more complicated Constraints
- Pay Attention to what's Missing – any less than 2^n choices, where n is the number of statements, gives a structural constraint.