5.11 Week 5 Homework Quiz

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Attempt 8

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Submission View

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Question 1   **10 / 10 points**

Consider this propositional logic statement. Assume that '~' is negation. Select all statements below that are true.

$$\sim y \lor \sim u \lor \sim s \lor q$$

☐ The statement is a Horn clause

☐ The statement is a definite clause

☐ The statement is logically equivalent to

$$\sim y \lor \sim u \lor \sim s \rightarrow q$$

☐ The statement is logically equivalent to

$$\sim y \land \sim u \land \sim s \rightarrow q$$

☐ The statement is logically equivalent to

$$y \land u \land s \rightarrow q$$

☐ The statement is logically equivalent to

$$\sim q \land u \land s \rightarrow \sim y$$

Question 2

Select all inferences that are valid logical inferences, where the clause below the line follows from the clause(s) above the line.

☐ $$\frac{p\lor\sim q\lor s,\ \sim p\lor q\ \lor\ \sim s}{\{\,\}}$$

☐ $$\frac{p,\ \sim p\lor q\lor r}{q\lor r}$$

☐ $$\frac{p\land\sim q\rightarrow s,\ p\land\sim q}{s\lor r}$$

☐ $$\frac{p\land\sim q\rightarrow s,\ p\land\sim q}{s}$$

☐ $$\frac{p\lor q\lor s,\ \sim p\lor q\lor r}{q\lor s\lor r}$$

☐ $$\frac{p\land\sim q\land r}{p\land r}$$

Question 3

Consider the propositional knowledge base, KB, from which you are to prove **(t ∧ p)** by contradiction using resolution (resolution refutation). KB is given immediately below. Select all statements that are true.

$p \lor \sim q \lor \sim r$

$\sim y \lor \sim u \lor \sim s \lor q$

$\sim x \lor r$

$\sim q \lor t \lor \sim x$

$u \lor \sim w$

$z \lor \sim m$

$\sim w \lor y \lor \sim x$

s

w

x

☐ A necessary step in a proof would be to resolve **(~t ∨ ~p)** with another clause.

☐ A necessary step in a proof would be to resolve **(t ∧ p)** with another clause.

☐ A necessary step in a proof would be to resolve **(~t ∧ ~p)** with another clause.

☐ The *very first resolution* of a proof, as dictated above, must be to resolve **(~q ∨ t ∨ ~x)** with another clause.

☐ A proof, as dictated above, will be greater than 5 steps (where the last step results in { }, a contradiction)

Question 4   13 / 14 points

Which of the following statements are true?

- [ ] Creating a machine that thinks like a human is definitional of the field of artificial intelligence
- [ ] Anytime search continues to search for solutions after finding the first solution
- [ ] The most challenging task environments for AI are fully observable, single agent, deterministic, episodic, and discrete.
- [ ] The runtime cost of a depth-bounded depth-first search is O(B*D), where B is the branching factor and D is the depth bound
- [ ] Macro operators are guaranteed of reducing search costs because their use reduces the effective depth of search
- [ ] Increased heuristic accuracy effects search costs by reducing the effective branching factor of search
- [ ] Logical state estimation is the process of updating the belief state as new percepts arrive
- [ ] WalkSAT conducts an iterative deepening depth first search in pursuit of a proof of satisfiability
- [ ] Modus Ponens is the sole basis of a complete inference algorithm when paired with iterative deepening
- [ ] The path between a start state and a descendant state M can be recovered through M's SearchNode parent link, and subsequent ancestor links -- this mitigates redundancy in path storage
- [ ] Nondeterministic algorithms can be slow due to search, but they can be elegant and simply stated too, and machine learning can speed them up
- [ ] Heuristic admissibility applies straightforwardly to utility-driven search
- [ ] The generalized arc consistency (GAC) procedure is guaranteed to find one or more solutions to any n-ary constraint satisfaction problems
- [ ] In contrast to offline search, online search interleaves computation and action

Attempt Score: 97.73 %

Overall Grade (last attempt): 89.14 %

Done