Module 4 Graded Quiz

Started: Mar 6 at 9:22am

Quiz Instructions

Question 1

1 pts

Find the reduct of (the propositional image of) the following clingo program relative to the interpretation {q(a)}.

{p(a)}.

q(X) :- p(X).

- (●) $p(a) \vee \top$
  $q(a) \leftarrow p(a)$
- ( ) $\bot \vee \top$
  $q(a) \leftarrow \bot$
- ( ) $p(a) \vee \neg p(a)$
  $q(a) \leftarrow p(a)$
- ( ) $p(a) \vee \top$
  $q(a) \leftarrow \bot$

Question 2

1 pts

Find the stable model(s) of the following clingo program.

0{p(a)}1.

q(X) :- p(X).

- (●) ∅ and {p(a), q(a)}
- ( ) {q(a)}

- ∅
- ∅, {p(a)}, {q(a)}, and {p(a), q(a)}

Question 3

1 pts

How many stable models are there for the following clingo program?

q(1..-1).

{r(X,Y): q(X)} :- q(Y).

- (●) 1
- ( ) 0
- ( ) 2
- ( ) 4

Question 4

1 pts

The following clingo program represents what will happen when we roll a dice. However, not all stable models (e.g., {roll_dice, get(1), get(2)}) of this program represent solutions of rolling a dice. Choose the option such that: adding the option to the clingo program can weed out the elements of the search space that do not represent solutions.

roll_dice.

{get(N): N=1..6} :- roll_dice.

- (●) :- get(N1), get(N2), N1 != N2.

  :- not get(1), not get(2), not get(3), not get(4), not get(5), not get(6).
- ( ) :- get(N1), get(N2), N1 != N2.
- ( ) :- roll_dice, get(1), get(2).

- :- 1{get(N): N=1..6}1.

Question 5

1 pts

The following clingo program represents a function from set A={1,2} to set B={a,b,c}. Which kind of function does it represent?

a(1;2).

b(a;b;c).

{f(X,Y) : b(Y)}=1 :- a(X).

:- f(X, Y), f(X', Y), X!=X'.

- (●) 1-1 function
- ( ) Onto function
- ( ) 1-1 correspondence function
- ( ) Bijective function

Question 6

1 pts

Generate-Test method is widely used in clingo programming. Generate is to generate a "search space" – a set of potential solutions while Test is to weed out the elements of the search space that do not represent solutions. Which option is for Test in Seating Arrangement problem?

- (●) :- like(G1,G2), at(G1,C1), at(G2,C2), not adj(C1,C2).
- ( ) #const n=6.
- ( ) like(1,2; 3,4).

  dislike(2,3; 1,3).
- ( ) {at(G,1..n)} = 1 :- G = 1..n.

Question 7

1 pts

In Hamiltonian Cycle problem, we use “edge(X,Y)” to represent that “there is a directed edge from X to Y”, and use “in(X,Y)” to represent that “edge from X to Y is in the Hamiltonian cycle”. Then which option is represented by the following clingo rule?

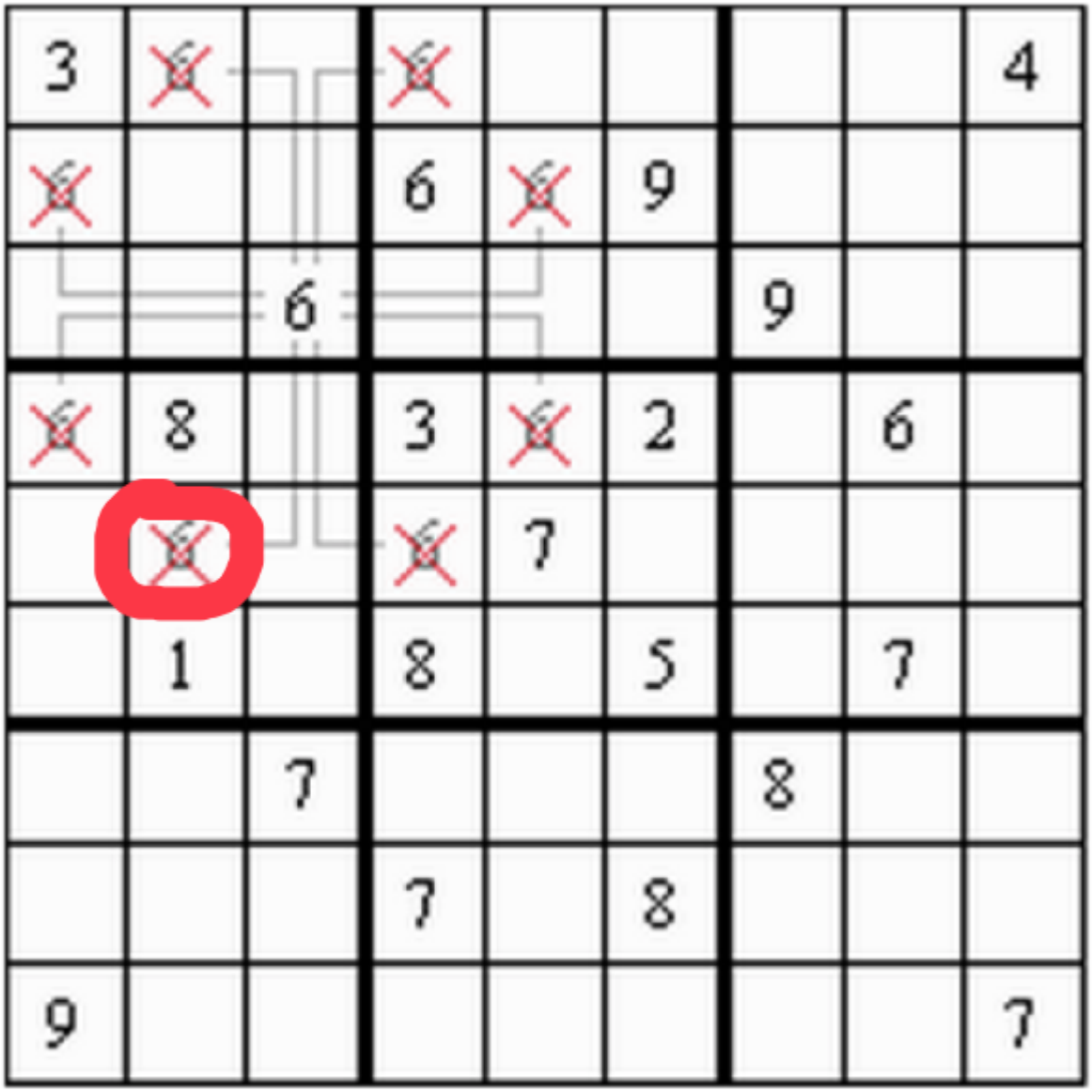
1{in(X,Y): edge(X,Y)}1 :- node(Y).

- (●) Every node in the graph has exactly 1 incoming edge.
- ( ) Every node in the graph has exactly 1 outgoing edge.
- ( ) Every node is reachable.
- ( ) For each node Y, we choose exactly 1 edge of it to be in the Hamiltonian cycle.

Question 8

1 pts

In Anti-Knight Sudoku, cells that are a chess knight’s move away from each other cannot hold equal values. Given that position (3,3) is 6, which option weeds out the possibility of 6 being at position (5,2) highlighted by the red circle?



- (●) :- a(R,C,N), a(R+2,C-1,N).
- ( ) :- a(R,C,N), a(R-1,C-2,N).
- ( ) :- a(R,C,N), a(R+1,C-2,N).
- ( ) :- a(R,C,N), a(R-2,C-1,N).

Question 9

1 pts

Which option is the stable model of the following program?

p(a,1). p(b,1). p(c,2). p(a,2).

s(N) :- N = #count{X : p(A,X)}.

- (●) {p(a,1), p(b,1), p(c,2), p(a,2), s(2)}
- ( ) {p(a,1), p(b,1), p(c,2), p(a,2), s(4)}
- ( ) {p(a,1), p(b,1), p(c,2), p(a,2), s(6)}
- ( ) {p(a,1), p(b,1), p(c,2), p(a,2), s(0)}

Question 10

1 pts

Consider the following clingo program. Which option is the stable model of this program?

a(1,2; 2,2; 1,2; 5; -1,7).

b(N) :- N = #sum{X,Y : a(X,Y)}.

- (●) {a(1,2), a(2,2), a(5), a(-1,7), b(2)}
- ( ) {a(1,2), a(2,2), a(1,2), a(5), a(-1,7), b(3)}
- ( ) {a(1,2), a(2,2), a(5), a(-1,7), b(3)}
- ( ) {a(1,2), a(2,2), a(5), a(-1,7), b(4)}

Question 11

1 pts

Which option is the stable model(s) of the following program?

{p(X): X=1..3}.

:- 1{p(1); p(3)}.

:- not p(1), not p(2).

- (●) {p(2)}
- ( ) {p(1), p(3)} and {p(1), p(2), p(3)}
- ( ) ∅ and {p(2)}
- ( ) {p(1)}, {p(1), p(2)}, {p(1), p(3)}, {p(1), p(2), p(3)}, and {p(2), p(3)}

Question 12

1 pts

Which option is the number of the stable models of the following clingo program?

{q(I,J): J=1..2} :- I = 1..3.

- (●) 64
- ( ) 1
- ( ) 8
- ( ) 6

Question 13

1 pts

Which option is the value of the following aggregate?

#count{X*Y : X = 2..6, Y = 2..6, X*Y <= 6}

- (●) 2
- ( ) 10
- ( ) 14
- ( ) 5

Question 14

1 pts

Which option is the value of the following aggregate?

#sum{M*N,M,N : M=1..3, N=1..3}

- (●) 36
- ( ) 25
- ( ) 9
- ( ) 6

Question 15

1 pts

Which option is the "best" stable model of the following clingo program with #maximize optimization?

{p(X): X=-3..3}=2.

#maximize{X: p(X)}.

- (●) {p(2), p(3)}
- ( ) {p(3)}
- ( ) {p(1), p(2), p(3)}
- ( ) ∅

Quiz saved at 9:49am Submit Quiz