Informační systém Masarykovy univerzity

Zodpovězení odpovědníku (student)

Michal Lukáč (učo 430614)
Studium FI N-IN UMI [sem 1, roč 1]
podzim 2013 (jiné)

Odpovědník Exam-18-12

Odpovědi k průchodu Út 17. 12. 2013 13:54.52, operaci St 18. 12. 2013 12:42.31, osobě M. Lukáč, učo 430614 (číslo zadání: 46)

• Klikněte: Ukaž Přehled nastavení parametrů odpovědníku.

Přehled nastavení parametrů odpovědníku

Kdy lze s odpovědníkem pracovat:

- od 18. 12. 2013 08:00 do 18. 12. 2013 09:30

Zobrazují se pouze správné odpovědi: ne
Test můžu skládat opakovaně: test nelze skládat, je přístupná pouze prohlídka (typicky skenovací písemky)
Implicitní počet bodů za správně zodpovězenou otázku (ok): 1
Implicitní počet bodů za špatně zodpovězenou otázku (nok): -0.5
Implicitní počet bodů za nezodpovězenou otázku (null): -0.25
Při vyplňování záleží na velikosti písmen: ne
Při vyplňování záleží na diakritice: ne
Při vyplňování nedovoluji zaměnit různé typy apostrofů a uvozovek: ne
Při vyplňování záleží na interpunkci: ne

Zeleně jsou vyznačeny správné odpovědi.

1. **(2 points)**
How many steps are necessary to specialize the clause $p(X,W) : -q(X,Y), r(Z,W)$. to the clause $p(a,b) : -q(a,Y), r(Z,b), s(Y,Y)$.?
   - (•) ✔ *five
   - ( ) seven
   - ( ) six

body = 2 = 2

2. Which is a functionally complete set of connectives?
   - (•) ✔ *{ $\vee$, $\wedge$,NOR }
   - ( ) { $\vee$, $\wedge$, $\Leftrightarrow$ }
   - ( ) { $\vee$, $\wedge$ }

body = ok = 1

3. Let F, a formal system for propositional logic, be given. Let T be a set of all theorems that can be derived in F, V a set of all well-formed formulas of propositional logic and P a set of all tautologies. Which of the following statements is true?
   - (•) ✘ if F is complete then T = V
   - ( ) *if F si correct then T $\subseteq$ P
   - ( ) if F is contradictory then T = P

body = nok = -0.5

4. Suppose F is a given formal system for propositional logic. Let T be a set of all theorems that can be derived in F, V a set of all well-formed formulas of propositional logic and P a set of all tautologies. Which of the following statements is true?
   - (•) ✓ *if F is sound and complete then P = T
   - ( ) if F is contradictory then P = V
   - ( ) if F is not contradictory then T = V

body = ok = 1

5. Transformation of a predicate formula into prenex normal form preserves
   - ( ) satisfiability but not equivalence
   - (•) ✓ *both satisfiability and equivalence
   - ( ) equivalence but not satisfiability

body = ok = 1

6. There exists a tableau proof for a propositional formula A.
   Which statement is true?
   - ( ) A is a contradiction
   - ( ) *A is true in every interpretation
   - ( ) A is true only in one interpretation

body = null = -0.25

7. For the formulas $p \Leftarrow (a \wedge b \wedge c)$ and $p \Leftarrow (a \wedge c \wedge d)$, where p, a, b, c, d are propositional letters, it holds that
   - ( ) $p \Leftarrow (a \wedge b \wedge c)$ is a generalization of the formula $p \Leftarrow (a \wedge c \wedge d)$
   - ( ) $p \Leftarrow (a \wedge c \wedge d)$ is a generalization of the formula $p \Leftarrow (a \wedge b \wedge c)$
   - (•) ✓ *the formulas are not in generalization relation

body = ok = 1

8. By processing of a next example the algorithm for the version space computation
   - ( ) *can decrease the version space size
   - ( ) can increase the version space size
   - ( ) always decreases the version space size

body = null = -0.25

9. A tableau for a propositional formula containing an infinite path
   - ( ) can be finished
   - ( ) *does not exist
   - (•) ✗ is always finished

body = nok = -0.5

10. Let P be a predicate formula which is neither a contradiction nor a tautology. Then
    - ( ) there is exactly one formula in prenex conjunctive normal form equivalent to P
    - ( ) *there is at least one formula in prenex conjunctive normal form equivalent to P
    - ( ) it is possible that a formula in prenex conjunctive normal form equivalent to P does not exist

body = null = -0.25

11. For an SLD-tree, it is true that
    - ( ) it contains at least one finite branch
    - ( ) it contains finitely many nodes
    - (•) ✓ *it may contain an infinite branch

body = ok = 1

12. An LI-resolution tree of a derivation of $\square$ from $P \cup \{G\}$ where P is a set of Horn clauses and G is a goal, is always
   - ○ an LD-resolution derivation of G from P
   - ◉ ✗ an SLD-resolution derivation of $\square$ from $P \cup \{G\}$
   - ○ *a linear resolution refutation of $P \cup \{G\}$

body = nok = -0.5

13. Which of the sets contain all of its mutually nonequivalent logical consequences (with only proposition symbols from premises)?
   - ◉ ✓ *$\{p \vee \neg p, q \vee \neg q, q \Rightarrow q\}$
   - ○ $\{p \vee \neg q, q \vee p, (p \vee \neg q) \wedge (q \vee \neg p)\}$
   - ○ $\{p \vee \neg p, q \vee \neg q, q \vee q\}$

body = ok = 1

14. When B is a domain knowledge, H is a resulting theory and E^+, E^- are sets of positive and negative examples, *prior necessity* in inductive logic programming represents the condition
   - ○ $\forall e \in E^+ : B \cup H \vdash e$
   - ○ *$\exists e \in E^+ : B \nvdash e$
   - ○ $\forall e \in E^- : B \nvdash e$

body = null = -0.25

15. **(2 points)**
   Suppose we have the following Prolog code:
   ```
   prove(true).
   prove((A,B)):- prove(A), prove(B).
   prove(A):- clause(A,B), prove(B).
   ```
   To obtain a metainterpreter that can interpret *itself* it is necessary to
   - ○ add the clause `prove(A):- built_in(A), A.`
   - ○ *add the clauses `prove(A):- built_in(A), A. built_in(clause(_,_)).`
   - ○ add the clause `prove(A):- built_in(A), A.` and remove the clause `prove(A):- clause(A,B), prove(B).`

body = -0.25 = -0.25

16. One minimal generalization of $p(a, X, c)$ is
   - ○ *$p(a, X, Y)$
   - ◉ ✗ $p(Z, X, Y)$
   - ○ $p(a, b, c)$

body = nok = -0.5

17. **(2 points)**
   Build a DCG grammar for the recognition and evaluation of inverted binary codes of numbers (i.e. binary codes where all
   zeroes become ones and all ones become zeroes). The grammar returns a decimal value for every correct input, e.g.
   `?- i(X,[0,1,1],[]). X=4 Yes`
   Every nonempty list of ones and zeroes is supposed to be a correct representation of an inverted binary number.
   The beginning of the grammar is
   `c(0)--> [1]. c(1)--> [0]. i(X)--> i(0,X).`
   Select the correct choice for rest of the grammar:

○ `i(X,Y)--> i(X,Y1), c(Z), {Y is 2*Y1 + Z}.`

○ `i(X,X)--> [].`
`i(X,Y)--> c(Z), i(X1,Y), {X1 is 2*X + Z}.`

○ *`i(X,Y)--> c(Z), {Y is 2*X + Z}.`
`i(X,Y)--> c(Z), {X1 is 2*X + Z}, i(X1,Y).`

body = -0.25 = -0.25

18. For Horn clauses, SLD-resolution is
    - ○ not sound but complete
    - ◉ ✔ *sound and complete
    - ○ sound and not complete

body = ok = 1

19. Transformation of a predicate formula into Skolem normal form preserves
    - ○ equivalence
    - ◉ ✔ *satisfiability
    - ○ neither satisfiability nor equivalence

body = ok = 1

20. Which of the following clauses is not a specialization of the clause $p(X,Y) : -q(X,Z), r(Z, f(Y))$.?
    - ○ $p(X, f(c)) : -q(X, b), r(b, f(f(c))), p(c, Y)$.
    - ○ $p(f(X), Y) : -q(f(X), Z), r(Z, f(Y)), p(Z, f(Z))$.
    - ○ *$p(X, X) : -q(X, X), r(X, f(c)), s$.

body = null = -0.25

21. In 5-valued Lukasiewicz logic with truth values {0, 0.25, 0.5, 0.75, 1},given val(p)=1 and val(q)=0, then val(p $\wedge\neg$ q) is
    - ○ 0
    - ◉ ✔ *1
    - ○ 0.5

body = ok = 1

22. In fuzzy logic, given val(p)=1, val(q)=0.5, val(r)=0.2, then
    val($\neg$ (p $\Rightarrow$ q) $\vee$ r) is
    - ◉ ✔ *0.5
    - ○ 1
    - ○ 0

body = ok = 1

23. Let $P(Adam, Eve, apple)$ represent the statement, *Adam gives Eve an apple*. Which of the formulas represents the statement equivalent to *Eve gives something to Adam and someone gives an apple to everyone*?
    - ○ $\exists x P(Adam, Eve, x) \wedge \forall x \exists y P(x, y, apple)$
    - ○ $\exists x P(Eve, x, Adam) \wedge \forall y \exists x P(x, y, apple)$
    - ◉ ✔ *$\exists x P(Eve, Adam, x) \wedge \exists x \forall y P(x, y, apple)$

body = ok = 1

24. **(2 points)**
    How many steps are necessary to specialize the clause $p(X, W) : -q(X, Y), r(Z, W)$. to the clause $p(a, b) : -q(a, Y), r(Y, b), s(Y, Y)$.?
    - ○ *six
    - ◉ ✘ five

○ seven

body = -1 = -1

25. There is a tableau (not yet finished) with nodes $wSv, vSu, Tv \Vdash \varphi(c)$, among others. Without any further assumptions we can use the constant c in next reductions only in nodes that concern world(s)
   - ○ v, w but not u
   - ○ *u, v but not w
   - ○ all u, v and w

body = null = -0.25

26. Forward chaining is
   - ○ an inference method which starts with a hypothesis (list of goals)
   - ○ a model for debugging Prolog
   - ◉ ✓ *an inference method which starts with the available data (list of facts)

body = ok = 1

27. Suppose p is interpreted as true. Then the formula $p \Rightarrow q$ is
   - ○ false
   - ◉ ✓ *true or false depending on the interpretation of q
   - ○ true

body = ok = 1

28. For a Prolog program p(X) :- p(Y). p(a). p(b). p(c). and a goal ?- p(Z). it is true :
   - ○ The program is looping, the output is Z=a
   - ◉ ✗ The program is looping, the output is Z=a ; Z=b ; Z=c ; no
   - ○ *The program is looping, there is no output.

body = nok = -0.5

29. There exists an interpretation I such that a propositional formula A that contains $\wedge$, $\vee$, and $\neg$ is not true in I. Then
   - ○ *there exists a noncontradictory path in a finished tableau for $\mathrm{F}A$
   - ○ there exists a tableau proof of A
   - ◉ ✗ there exists a noncontradictory path in a finished tableau for $\mathrm{T}A$

body = nok = -0.5

30. Given F, a formal system for propositional logic, let `T` be a set of all theorems that can be derived in F, `V` a set of all well-formed formulas of propositional logic and `P` a set of all tautologies. Which of the following statements is true?
   - ○ if F is correct then $\mathtt{P} = \mathtt{T}$
   - ○ *if F is contradictory then $\mathtt{T} = \mathtt{V}$
   - ○ if F is complete then $\mathtt{P} \subset \mathtt{T}$

body = null = -0.25

31. We know that a finished contradictory tableau for $\mathrm{F}w \Vdash \varphi$ exists. Which of the following statements is true?
   - ○ φ is not true at least in one world of each Kripke frame.
   - ○ *φ is true in all worlds of all Kripke frames.
   - ○ φ is not true at least in one world of at least one Kripke frame

body = null = -0.25

32. In description logic $\mathcal{ALC}$ with concepts `Man`, `Person` and roles `hasChild`, `hasSibling` is a concept `Uncle` of the meaning "men, whose siblings have children" defined as follows
   - ○ $\mathtt{Uncle} \equiv \exists\mathtt{hasSibling}.(\mathtt{Man} \sqcap \exists\mathtt{hasChild}.\mathtt{Person})$

○ $\mathtt{Uncle} \equiv \mathtt{Man} \sqcap \exists\mathtt{hasSibling.Person} \sqcap \exists\mathtt{hasChild.Person}$

◉ ✓ *$\mathtt{Uncle} \equiv \mathtt{Man} \sqcap \exists\mathtt{hasSibling.}(\mathtt{Person} \sqcap \exists\mathtt{hasChild.Person})$

body = ok = 1

33. If the program P contains the clause $p :- a$, which of the following operators creates its generalization?
    - ○ addition of a literal b into a body of the clause
    - ○ addition of a literal p into a body of the clause
    - ◉ ✓ *addition of a clause $p :- b$ into the program P

ok

body = ok = 1

34. The inference strategy in Prolog is
    - ○ forward chaining
    - ◉ ✓ *backward chaining
    - ○ Bayesian inference

body = ok = 1

35. **(2 points)**
    A modal tableau proof of the formula $\Box\varphi \Rightarrow \Box\Box\varphi$ proves that the formula is not a tautology and gives the following Kripke frame $(W, S, C(w)_{w\in W})$ as a counterexample (except for variable naming) where:
    - ○ *$W = \{p, q, r\}, S = \{(p, q), (q, r)\}, \varphi$ is true in q, φ is not true in r
    - ○ $W = \{p, q, r\}, S = \{(p, q), (p, r)\}, \varphi$ is true in r, q, φ is not true in p
    - ○ $W = \{p, q\}, S = \{(p, q), (q, p)\}, \varphi$ is true in q, φ is not true in p

body = -0.25 = -0.25

Celkem bodů: 11.25 (z maximálních 40) (celkem otázek: 35, z toho špatně 7, nezodpovězených 11)

- Zpět na výběr operace

Bez uložení:

- Zpět na výběr odpovědníku
- Moje studium
- Osobní administrativa