X

Unit 7 - Model Checking

Assignment-6

The due date for submitting this assignment has passed. **Due on 2018-09-12, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Which of the following equivalences is wrong for the temporal operators? ***1 point***

- AFφ = ¬EG¬φ
- ¬AFφ = EG¬φ
- EFφ = ¬AF¬φ
- ¬EFφ= AG¬φ

No, the answer is incorrect.
Score: 0

Accepted Answers:
EFφ = ¬AF¬φ

2) Which of the following sets is an adequate set of temporal operators? ***1 point***

- EX, AU
- EX, AU, and EU
- AG, EG, and AF
- AG and EG

No, the answer is incorrect.
Score: 0

Accepted Answers:
EX, AU, and EU

3) Which of the following is FALSE about a temporal operators φ and p? ***1 point***

- AGφ, EGφ, AFφ, and EFφ can be written in terms of AUφ and EUφ
- AXφ can be written with EGφ
- EXφ, EGφ (AFφ) and E(φ U p) is an adequate set of operators
- AXφ can be written with EXφ

No, the answer is incorrect.
Score: 0

Accepted Answers:
AXφ can be written with EGφ

4) If the future temporal operator (F) includes the present, then which of the following equivalences is true? ***1 point***

- EFp = EX EFp
- EFp = p ∧ EX EFp
- EFp = p ∨ EX EFp

5) Let p and q are atomic propositions. Which of the following pairs of CTL formulae is not equivalent? ***1 point***

- AFp ⋁ AFq and AF(p ⋁ q)
- AG(p ⋀ q) and AGp ⋀ AGq
- T and AGp -> EGp
- EFp ⋀ EFq and EF(p ⋁ q)

No, the answer is incorrect.
Score: 0

Accepted Answers:
EFp ⋀ EFq and EF(p ⋁ q)

6) Which of the following pairs of CTL formulae is equivalent? ***1 point***

- EFp ⋀ EFq and EF(p ⋀ q)
- EFp ⋁ EFq and EF(p ⋁ q)
- EFp and EGp
- T and EGp -> AGp

No, the answer is incorrect.
Score: 0

Accepted Answers:
EFp ⋁ EFq and EF(p ⋁ q)

7) What does the CTL model checking algorithm do? ***1 point***

- Iteratively determines states which satisfy a given CTL formula
- A CTL formula is derived from the states of the model
- Determines the equivalent states of the model
- A model is created using specifications

No, the answer is incorrect.
Score: 0

Accepted Answers:
Iteratively determines states which satisfy a given CTL formula

8) What are the inputs and outputs for the labelling algorithm for model checking? ***1 point***

- INPUTS = Set of states which satisfy φ and a CTL Formula φ. OUTPUT = A CTL Model M = (S, ->, L).
- INPUTS = A CTL Model M = (S, ->, L) and a Set of states which satisfy φ. OUTPUT = CTL Formula φ.
- INPUTS = A CTL Model M = (S, ->, L) and a CTL Formula φ. OUTPUT = Set of states which satisfy φ.
- INPUTS = A CTL Model M = (S, ->, L). OUTPUT = A CTL Formula φ.

No, the answer is incorrect.
Score: 0

Accepted Answers:
INPUTS = A CTL Model M = (S, ->, L) and a CTL Formula φ. OUTPUT = Set of states which satisfy φ.

9) Which of the following is not a subformula of the CTL Formula AGp ⋀ AGq ***1 point***

- p
- q
- AG p
- p ⋀ q

No, the answer is incorrect.
Score: 0

Accepted Answers:
p ⋀ q

10)Which of the following SAT function is FALSE? ***1 point***

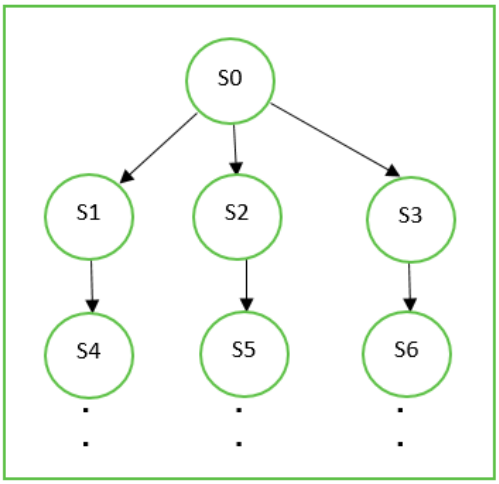
- SAT{φ1 V φ2} => SAT{φ1} U SAT{φ2}
- SAT{φ1 ⋀ φ2} => SAT{φ1} ⋂ SAT{φ2}
- SAT{AX φ1} = SAT {¬EX ¬φ1}

- SAT{EF φ1} = SAT{¬E{T U φ1}}

No, the answer is incorrect.
Score: 0

Accepted Answers:
SAT{EF φ1} = SAT{¬E{T U φ1}}

11)$SAT_{EX}(p)$ is a function that determines the set of states satisfying EXp. In the given figure, SAT(p) = {S4, S6}. ***1 point***
What is $SAT_{EX}(p)$?

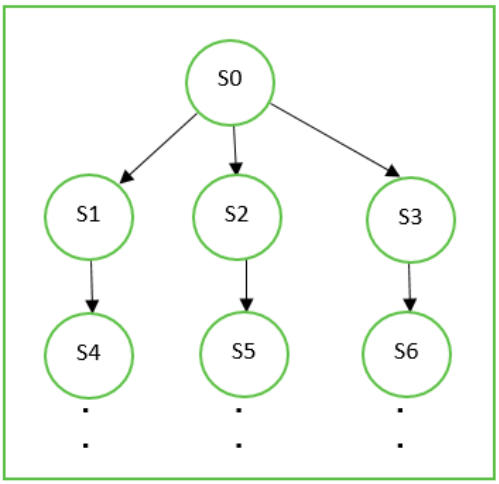


- {S1, S2, S3}
- {S1, S3}
- {S1}
- {S1, S3, S4, S6}

No, the answer is incorrect.
Score: 0

Accepted Answers:
{S1, S3}

12)$SAT_{AF}(p)$ is a function that determines the set of states satisfying AFp. In the given figure, SAT(p) = {S4, S6}. ***1 point***
What is $SAT_{AF}(p)$?

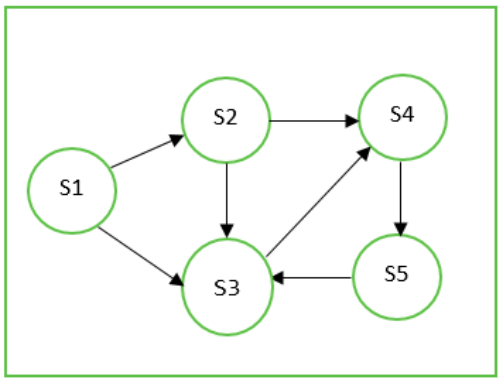


- {S0}
- {S1, S3}
- {S1, S3, S4, S6}
- {S0, S1, S3}

No, the answer is incorrect.
Score: 0

Accepted Answers:
{S1, S3, S4, S6}

13)Let $SAT_{EU}(p,q)$ be a function that determines the set of states satisfying E(p U q). In the given figure, SAT(p) = {S1, S2} and SAT(q) = {S3}. Now, What is $SAT_{EU}(p,q)$? ***1 point***



- {S3}
- {S3, S4, S5}
- {S1, S2, S3}
- {S1, S2}

No, the answer is incorrect.
Score: 0

Accepted Answers:
{S1, S2, S3}

14)Let p be an atomic proposition. Choose the correct one? ***1 point***

- AF (p) = E[T U p]
- AF (p) = p ∨ AXAF (p)
- EF (p) = p ∨ AXAF (p)
- AF (p) = p ∧ AXAF (p)

No, the answer is incorrect.
Score: 0

Accepted Answers:
AF (p) = p ∨ AXAF (p)

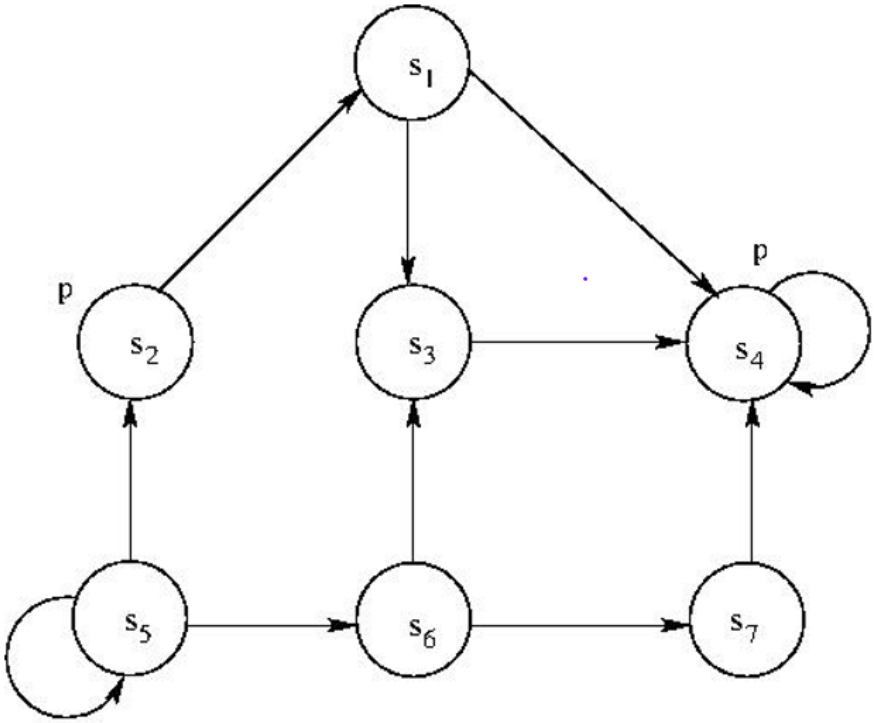
15)Consider the mutual exclusion example with 4 processes, P1, P2, P3, and P4. The atomic propositions for Pi are ni, ti and ci , where 1 = i = 4. What is the CTL formula to represent Safety property? ***1 point***

- AG ¬((c1 ∧ c2) ∨ c3 ∨ c4)
- AG ¬((c1 ∧ c3) ∨ c2 ∨ c4)
- AG ¬ ((c2 ∧ c3) ∨ c1 ∧ c3)
- AG ¬ (c1 ∧ c2 ∧ c3 ∧ c4)

No, the answer is incorrect.
Score: 0

Accepted Answers:
AG ¬ (c1 ∧ c2 ∧ c3 ∧ c4)

16)Consider the model M shown in the figure. p is an atomic proposition. Determine the set of states satisfying AXp using model checking algorithm, where ***1 point***

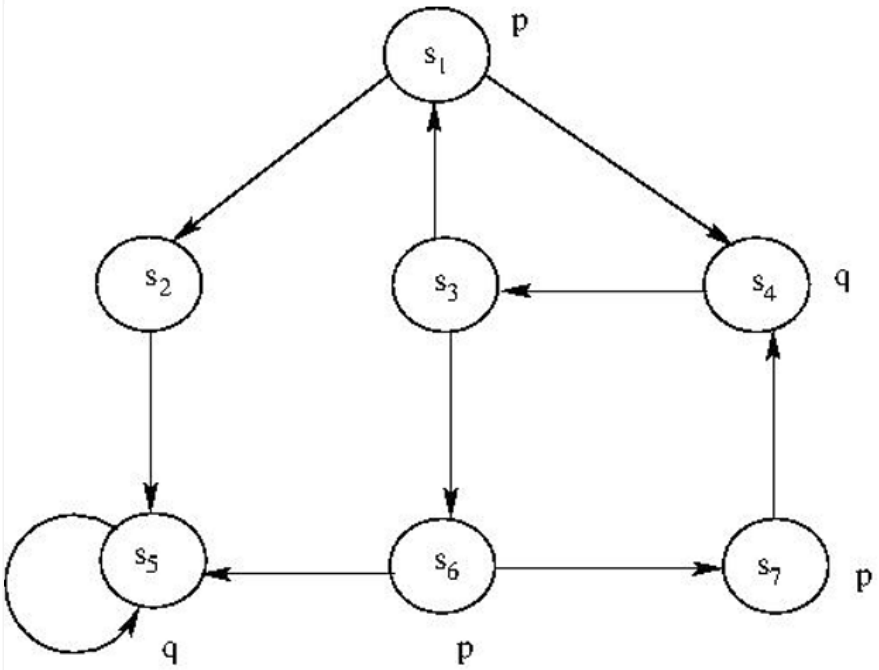


- S4, S7, S1
- S1, S3, S7
- S1, S3, S5
- S3, S4, S7

No, the answer is incorrect.
Score: 0

Accepted Answers:
S3, S4, S7

17)Consider the model M shown in the figure. p and q are atomic propositions. Determine the set of states satisfying E(pUq) using model checking algorithm. ***1 point***



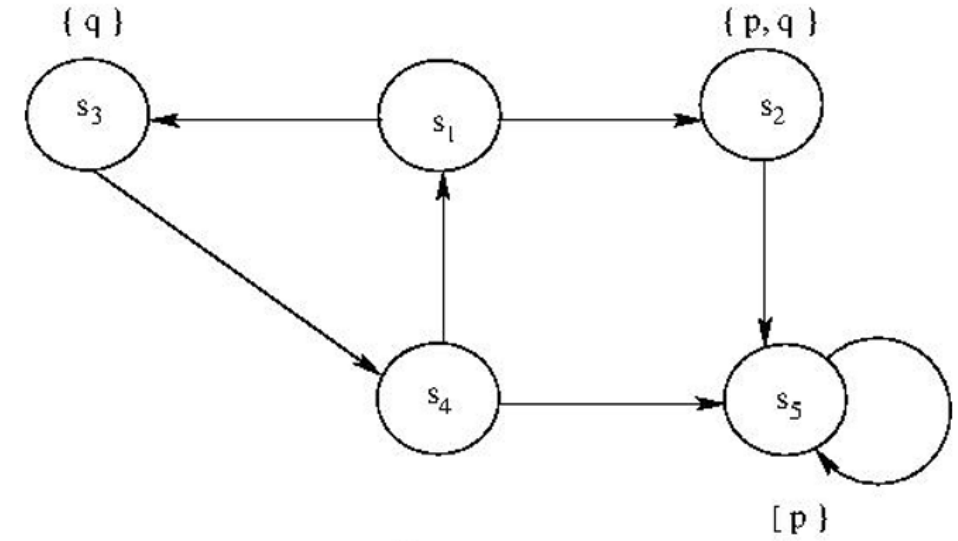
- S1, S4, S5, S2

- S3, S4, S5
- S1, S4
- S1, S4, S5, S6, S7

No, the answer is incorrect.
Score: 0

Accepted Answers:
S1, S4, S5, S6, S7

18)Consider the model M shown in the figure. p and q are atomic propositions. Determine the set of states satisfying AF(¬p ∧ q) using model checking algorithm. ***1 point***



- S3
- S3, S4, S1
- S3, S4
- S4

No, the answer is incorrect.
Score: 0

Accepted Answers:
S3

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