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CS433 Q 1: Let us suppose we have pushed literals $x > 1$ and $\neg y < 0$ in the theory solver. The other theory atoms in the formula are $x + y > 2$, $2x + y > 2$, $x + 2y > 0$, $x > -2$, and $y < -2$. Which of the following will be in included in the returned clauses from TheoryDeduction(QF_LRA)?

- [ ] $\neg x > 1 \vee y < 0 \vee x + 2y > 0$
- [ ] $\neg x > 1 \vee y < 0 \vee x + y > 2$
- [ ] $\neg x > 1 \vee y < 0 \vee \neg x + 2y > 0$
- [ ] $\neg x > 1 \vee y < 0 \vee 2x + y > 2$

Answer

Note: please be careful before submitting the answer. You will not be able to change the answers.

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You have answered the following:

✘ ¬x > 1 ∨ y < 0 ∨ x + 2y > 0 (You are incorrect)
✔ ¬x > 1 ∨ y < 0 ∨ x + y > 2 (You are incorrect)
✘ ¬x > 1 ∨ y < 0 ∨ ¬x + 2y > 0 (You are correct)
✔ ¬x > 1 ∨ y < 0 ∨ 2x + y > 2 (You are correct)

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CS433 Q 2: Consider the following Boolean encoder e = {x + y > 2 → p1 , 2x + y > 2 → p2 , x + 2y > 0 → p3 , x > −2 → p4 , y < −2 → p5 }. Which of the following is correct?

- [ ] e(2x + y > 2) = p2
- [ ] e(x > −2 ∧ y < −2) = p4 ∧ p5
- [ ] e(x + 2y > 2) = p2
- [ ] e(x + y > 2) = ¬p1

Answer

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You have answered the following:

✔ e(2x + y > 2) = p2 (You are correct)
✔ e(x > −2 ∧ y < −2) = p4 ∧ p5 (You are correct)
✘ e(x + 2y > 2) = p2 (You are correct)
✘ e(x + y > 2) = ¬p1 (You are correct)

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CS433 Q 3: Consider equivalence classes {t1 , t2 , t3 }, {t4 , t5 }, {t6 } with roots t3 , t4 , and t6 respectively. At this state, we add the following literals. Which of the statements are true?

- [ ] After pushing t1 = t2 , there is a class {t1 , t2 , t3 }, with root t2 .
- [ ] After pushing t1 = t2 , there will be no change in the equivalence classes.
- [ ] After pushing t1 = t4 , there is a class {t1 , t2 , t3 , t4 , t5 }, with root t3 .
- [ ] After pushing t3 = t5 , there is a class {t1 , t2 , t3 , t4 , t5 }, with root t3 .

Answer

Note: please be careful before submitting the answer. You will not be able to change the answers.

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You have answered the following:

✘ After pushing t1 = t2 , there is a class {t1 , t2 , t3 }, with root t2 . (You are correct)
✔ After pushing t1 = t2 , there will be no change in the equivalence classes. (You are correct)
✔ After pushing t1 = t4 , there is a class {t1 , t2 , t3 , t4 , t5 }, with root t3 . (You are correct)
✘ After pushing t3 = t5 , there is a class {t1 , t2 , t3 , t4 , t5 }, with root t3 . (You are incorrect)

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CS433 Q 4: Consider equivalence circular link lists consisting four objects x = {root:x, size:4, next:y }, y = {root:x, size:1, next:z}, z = {root:x, size:2, next:w }, and w = {root:x, size:1, next:x}. Which of the following are likely to be a past state of the circular linked lists?

- [ ] x = {root:x, size:1, next:x}, y = {root:y , size:1, next:y }, z = {root:z, size:1, next:z}, and w = {root:w , size:1, next:w }.
- [ ] x = {root:x, size:2, next:w }, y = {root:z, size:1, next:y }, z = {root:z, size:1, next:z}, and w = {root:x, size:1, next:x}.
- [ ] x = {root:x, size:2, next:w }, y = {root:x, size:1, next:z}, z = {root:z, size:2, next:y }, and w = {root:x, size:1, next:x}.
- [ ] x = {root:x, size:2, next:w }, y = {root:z, size:1, next:z}, z = {root:z, size:2, next:y }, and w = {root:x, size:1, next:x}.

Answer

Note: please be careful before submitting the answer. You will not be able to change the answers.

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CS433 Q 4: Consider equivalence circular link lists consisting four objects x = {root:x, size:4, next:y }, y = {root:x, size:1, next:z}, z = {root:x, size:2, next:w }, and w = {root:x, size:1, next:x}. Which of the following are likely to be a past state of the circular linked lists?

You have answered the following:

✘ x = {root:x, size:1, next:x}, y = {root:y , size:1, next:y }, z = {root:z, size:1, next:z}, and w = {root:w , size:1, next:w }. (You are incorrect)
✔ x = {root:x, size:2, next:w }, y = {root:z, size:1, next:y }, z = {root:z, size:1, next:z}, and w = {root:x, size:1, next:x}. (You are incorrect)
✔ x = {root:x, size:2, next:w }, y = {root:x, size:1, next:z}, z = {root:z, size:2, next:y }, and w = {root:x, size:1, next:x}. (You are incorrect)
✔ x = {root:x, size:2, next:w }, y = {root:z, size:1, next:z}, z = {root:z, size:2, next:y }, and w = {root:x, size:1, next:x}. (You are correct)

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