Review Test Submission: Quiz 5

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Unit	Discrete Structures
Test	Quiz 5
Started	6/06/17 9:17 AM
Submitted	6/06/17 9:17 AM
Status	Completed
Attempt Score	0 out of 100 points
Time Elapsed	0 minute
Instructions	For each question, choose the most correct answer.
Results Displayed	All Answers, Correct Answers

Question 1

0 out of 5 points

In the proposition $\forall x \in S \ (p(x) \to q(x))$

Answers:

The sufficient condition is $p(x)$ and the necessary condition is $\neg q(x)$

The sufficient condition is $\forall x \ p(x)$

✓ The sufficient condition is $p(x)$ and the necessary condition is $q(x)$

The necessary condition is $\forall x \ p(x)$

Question 2

0 out of 5 points

The proposition $\forall x \in S \ (p(x) \to q(x))$ is logically equivalent to:

Answers:

$\neg(\exists x \in S \ (\neg p(x) \to \neg q(x)))$

✓ $\neg(\exists x \in S \ (\neg(p(x) \to q(x))))$

$\exists x \in S \ (\neg(p(x) \to q(x)))$

$\exists x \in S \ (\neg(p(x) \to q(x)))$

Question 3

0 out of 5 points

The proposition $\exists x \in S \ (p(x) \wedge q(x))$ is logically equivalent to:

Answers:
- $\exists x \in S \ \neg(\neg p(x) \vee \neg q(x))$
- $\forall x \in S \ \neg(p(x) \wedge q(x))$
- $\forall x \in S \ (p(x) \rightarrow q(x))$
- $\exists x \in S \ (p(x) \rightarrow q(x))$

Question 4

0 out of 5 points

The proposition $(\forall x \in S \ (p(x) \wedge q(x))) \wedge y \in S$ logically implies:

Answers:
- $p(x) \wedge q(x)$
- $\exists y \notin S \ p(y)$
- $\neg(\exists y \in S \ p(y))$
- $p(y)$

Question 5

0 out of 5 points

The predicate $x \equiv 0 \pmod{n}$ is the same as:

Answers:
- $\exists q \in \mathbb{Z} \ (x = n + q)$
- $\exists q \in \mathbb{Z} \ (xq = n)$
- $\forall q \in \mathbb{Z} \ (x = qn)$
- $\exists q \in \mathbb{Z} \ (x = qn)$

Question 6

0 out of 5 points

If we have $p(x)$ as a pre-condition for a block of code, then we can take always take $p(x)$ as a post-condition if:

Answers:
- x is on the left-hand side of an assignment.
- $p(x)$ is satisfiable.

$p(x)$ is implied by other pre-conditions.

The variable x is not changed by the block of code.

Question 7

0 out of 5 points

Which of the following does the choice rule *not* allow you to do?

Answers:

Take the condition of the if statement a a pre-condition of the if: block

Take the condition of the if statement as a pre-condition of the else: block

Take {P} as a post-condition of the whole if: construction if {P} is a post-condition of both the if: and else: blocks

Take any pre-condition of the if: construction as a pre-condition of the if: and else: blocks

Question 8

0 out of 5 points

In order to use a the loop rule, we must idendify some assertion {P} which:

Answers:

is an invariant of the body of the loop.

is independent of the truth of the condition in the while: statement

is a pre-condition of the loop and an invariant of the body of the loop

is a pre-condition of the loop.

Question 9

0 out of 5 points

The assignment rule states:

Answers:

If $\{p(E)\}$ is a pre-condition and the block of code is y = E, then we can take $\{p(y)\}$ as a post-condition.

If $\{p(E)\}$ is a post-condition and the block of code is y = E, then we can take $\{p(y)\}$ as a pre-condition.

If $\{p(E)\}$ is an invariant of the block of code y = E, then we can take $\{p(y)\}$ as a post-condition.

If $\{p(y)\}$ is a pre-condition and the block of code is y = E, then we can take $\{p(E)\}$ as a post-condition.

Question 10

0 out of 5 points

The following proof of correctness applies for the next 6 questions:

1 $\{\exists k \in \mathbb{N}\ x = 2k\}$

2 if y % 2 == 0 :

3 $\{\exists k \in \mathbb{N}\ y = 2k\}$

4 $\{\exists k \in \mathbb{N}\ x + y = 2k\}$

5 z = x + y

6 $\{\exists k \in \mathbb{N}\ z = 2k\}$

7 else:

8 $\{\exists k \in \mathbb{N}\ y = 2k - 1\}$

9 $\{\exists k \in \mathbb{N}\ x + y + 1 = 2k\}$

10 z = x + y + 1

11 $\{\exists k \in \mathbb{N}\ z = 2k\}$

12 $\{\exists k \in \mathbb{N}\ z = 2k\}$

Line 1 is a:

Answers:
- pre-condition ✓
- post-condition
- invariant assertion
- block of code

Question 11

0 out of 5 points

Line 3 holds by:

Answers:
- rule 1
- the choice rule, since it is negation of the condition in the if statement
- the implication rule
- the choice rule, since it is the same as the condition in the if statement ✓

Question 12 0 out of 5 points

Line 4 holds by:

Answers:
- rule 1
- ✓ the implication rule
- the choice rule, since it is the same as the condition in the if statement
- the choice rule, since it is negation of the condition in the if statement

Question 13 0 out of 5 points

Line 6 holds by:

Answers:
- rule 1
- the choice rule, since it is negation of the condition in the if statement
- ✓ the assignment rule
- the choice rule, since it is a post-condition of both the if and else blocks

Question 14 0 out of 5 points

Line 8 holds by:

Answers:
- the implication rule
- the assignment rule
- the choice rule, since it is a post-condition of both the if and else blocks
- ✓ the choice rule, since it is negation of the condition in the if statement

Question 15 0 out of 5 points

Line 12 holds by:

Answers:
- the implication rule
- ✓ the choice rule, since it is a post-condition of both the if and else blocks
- the assignment rule
- the choice rule, since it is negation of the condition in the if statement

Question 16

0 out of 5 points

Consider the following proof of correctness and answer the next 4 questions.

1 $x \geq 0$

2 $y \geq 0$

3 $y + x \geq 0$

4 y = y + x

5 $y \geq 0$

6 $x \geq 0$

Line 3 holds by:

Answers:
- the loop invariant rule
- ✓ the implication rule
- rule 1
- the assignment rule

Question 17

0 out of 5 points

Line 5 holds by:

Answers:
- ✓ the assignment rule
- the loop invariant rule
- rule 1
- the implication rule

Question 18

0 out of 5 points

The predicate $y \geq 0$ is:

Answers:
- ✓ an invariant of the block of code, given $x \geq 0$
- not an invariant of the block of code
- logically equivalent to $x \geq 0$
- an invariant of the block of code

Question 19

0 out of 5 points

The predicate $x \geq 0$ is:

Answers:

- an invariant of the block of code
- not an invariant of the block of code
- an invariant of the block of code, given $y \geq 0$
- not suitable for use as a loop invariant

Question 20

0 out of 5 points

One way we could use this proof of correctness is:

Answers:

- If $\{y \geq 0\}$ is a pre-condition, y = y + x is the body of a while loop, and $x < 0$ is the condition of the while loop, then we could take $\{y \geq 0\}$ as a post-condition.
- If $\{x \geq 0\}$ is a pre-condition, y = y + x is the body of a while loop, and $y \geq 0$ is the condition of the while loop, then we could take $\{y \geq 0\}$ as a post-condition.
- If $\{y \geq 0\}$ is a pre-condition, y = y + x is the body of a while loop, and $y \geq 0$ is the condition of the while loop, then we could take $\{y \geq 0\}$ as a post-condition.
- If $\{y \geq 0\}$ is a pre-condition, y = y + x is the body of a while loop, and $x \geq 0$ is the condition of the while loop, then we could take $\{y \geq 0\}$ as a post-condition.

Tuesday, 6 June 2017 9:17:13 AM AEST

← OK