

UMUC

**CMSC150 Self-Grading Quiz:
Sections 1.1, 1.2 Chapter 1**

R. T. Harris

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Instructions: YOU MUST INITIALIZE THE QUIZ BY CLICKING ON THE START BUTTON. YOU MAY CHANGE YOUR ANSWERS AT ANY TIME UNTIL YOU CLICK ON END. THIS WILL GIVE YOU YOUR SCORE. THE QUIZ WILL NOT ALLOW TO LOOK AT ANSWERS UNTIL YOU ARE DONE WITH THE QUIZ. WHEN YOU ARE DONE, PRESS THE END QUIZ BUTTON. YOUR SCORE WILL BE SHOWN. THEN PRESS THE CORRECT BUTTON. CORRECT SOLUTIONS WILL BE CHECKED. MOST OF THE PROBLEMS HAVE EXPLANATIONS FOR THE SOLUTIONS, AND YOU CAN CLICK ON THE BOX WITH THE CORRECT ANSWER TO SEE A SOLUTION. TO RETURN TO THE QUIZ TO LOOK AT THE NEXT PROBLEM IN THE QUIZ ITSELF, CLICK ON **END QUIZ** AT THE BOTTOM OF THE SOLUTION. THIS WILL RETURN YOU TO WHERE YOU WERE.

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Answer each of the following. Passing is 60%.

1. (2^{pts}) A *wff* which has the property that for any combination of True or False as values for all the variables the wff is true is called a

2. (2^{pts}) Is $p \vee \neg p$ an example of the type of wff mentioned in the previous problem?

Yes

No

3. (6^{pts}) The negation of $(p \wedge q) \Rightarrow q$ is

p

p'

c

$(p \Rightarrow q)'$

4. (6^{pts}) We call a proposition *contingent* if the proposition is neither a tautology nor a contradiction.



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p	q	$\neg p$	$p \vee q$	$\neg p \wedge (p \vee q)$	$[\neg p \wedge (p \vee q)] \rightarrow q$
T	T	_____	_____	_____	_____
T	F	_____	_____	_____	_____
F	T	_____	_____	_____	_____
F	F	_____	_____	_____	_____

The proposition in the final column is

a contradiction

a contingency

a tautology

5. (6^{pts}) Sharky was rubbed out by one of his four henchman. Detective Hammer interviewed the men and determined from other sources that they were all lying except one. But he did not know which one. But a little logic helped, and he deduced who killed Sharky. The interview is as follows:

- Socko: Lefty killed Sharky.
- Fats: Muscles didn't kill Sharky.
- Lefty: Muscles was shooting craps with Socko when Sharky was bumped off.
- Muscles: Lefty did not kill Sharky.

So, who did kill Sharky?



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Lefty

Fats

Muscles

Socko

Answers:

Points:

Percent:

Letter Grade:



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Solutions to Quizzes

Solution to Quiz: 1.

A tautology written in silicon is just the kind of digital circuit that is always on regardless of the inputs. ■



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Solution to Quiz: 2.

Sometimes this law, a tautology, is called *the law of the excluded middle* since it says that a proposition p is either true or its negation $\neg p$ is true, and there is no other alternative. The opposite of a tautology is called a *contradiction*, a formula which is always false. An example of such a formula is $p \wedge \neg p$ which is sometimes called the *law of contradiction*, that is a proposition cannot be both true and false at the same time. The negation of the law of contradiction is the law of the excluded middle, that is, either p or not p is true. ■



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Solution to Quiz: 3.

Look at $\neg((p \wedge q) \Rightarrow q)$. So, $\neg((p \wedge q) \Rightarrow q) \equiv (p \wedge q) \wedge \neg q \equiv p \wedge (\neg q \wedge q) \equiv p \wedge 0 \equiv 0$. Where, using the notation of our text, 0 is a contradiction, that is, a statement that is always false. You could also construct a truth table and discover this result from the table. ■



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Solution to Quiz: 4.

The proposition in the final column is true if p and q are both T, but it is F if p is T but q is F. So the truth value of the proposition is different for different truth values of p and q . ■



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Solution to Quiz: 5.

We know all the statements are true except one. Socko's and Muscles' statements contradict each other, so one of these statements must be true and the other false. But if Socko's statement is true, then Fat's statement that Muscles did not kill Sharky is true. This contradicts the fact that there is only ONE true statement in this list. Therefore Socko's statement must be false and Muscles' statement is the only true statement. Now we know Fats' statement is false, so Muscles killed Sharky.



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