

MATH/CSE 1019 Discrete Math for Computer Science

Assignment 1

Released: September 17, 2012

Due: 1:00pm, September 24, 2012

Notes:

1. No late submissions will be graded.
2. Submit your assignment using the dropbox, which is located on the 1st floor of LAS.
3. You must do the assignment by yourself
4. Submit this assignment only if you have read and understood the policy on academic honesty on the course web page. If you have questions or concerns, please contact the instructor.

Questions:

1. (4 points) Consider the following propositions.
p: Tomorrow will be rainy.
q: Tomorrow will be snowy.
r: Tomorrow there will be strong winds.
(1) Use p, q, r and connectives to write down a compound proposition representing each of the following sentences:
a) Tomorrow will be either rainy or snow, and the wind will not be strong.
b) Tomorrow will be neither rainy nor snowy, and the wind will be strong
(2) Use De Morgan rule to obtain the negations of (1a) and (1b)
2. (2 points) Consider the following two predicates:
F(x): x uses the Windows operating system
G(x): x owns an iphone
The domain for quantifiers is the set of students in our class. Translate the following formulas into English sentences.
(1) $\forall x (F(x) \vee G(x))$
(2) $\exists x (\neg F(x) \wedge G(x))$
3. (4 points) What is the truth value for the following formulas? The domain consists of all real numbers. Explain why your answer is correct.
(1) $\forall x \exists y ((x-y)^2 = 3)$
(2) $\exists x \forall y \forall z (y/x = z)$
4. (4 points) Show the logical equivalence of $p \rightarrow (q \rightarrow r)$ and $\neg (p \wedge q) \vee r$.
(1) Solve the problem using a truth table.
(2) Solve the problem by developing a series of logical equivalences.