Homework 1 - Discrete Math - Due 06/09/15

Assigned: 05/31/15
Due: 06/09/15

Please make sure to clearly write your name at the top of your hand-in. Also, indicate if you worked with anybody and also indicate how many hours total you worked on the homework. This looks like more homework than it is since many problems are quite simple and others have solutions in the back. Feel free to discuss any problems (including the bonuses) on the class mailing list. I am also required to remind all students of the academic integrity policy at http://www.cs.nyu.edu/web/Academic/Graduate/academic_integrity.html. Any violations of this policy may result in failure of the course and being reported to the head of the department.

Reading
- Read Chapter 1 for general review (this is more of an intro to topic)
- Read Sections 2.1-2.3 and 2.5 for content (read this with more focus), section 2.4 for general interest if time allows.
- Read Sections 3.1-3.4

Problems
- Section 2.1 (page 37) #12-15, 17, 21, 30, 31, 45.
- Section 2.2 (page 49) #20 (all parts), 23 (all parts), 36.
- Section 2.3 (page 61) #3, 4, 8, 9, 39, 40.
- Section 2.5 (page 94) #1, 2, 7, 8, 13, 14, 17, 18.

BONUS Problems Try working on these to the best of your ability

I) The following puzzle is attributed to Einstein and is known as the zebra puzzle:

Five men from different countries and different jobs live in consecutive houses on the same street. These houses are painted different colors, and the men have different types of pets and different favorite beverages. Determine who owns a
zebra and whose favorite beverage is seltzer given the following: The Englishman lives in the red house, the Spaniard owns a dog, the Japanese man is a painter, the Italian drinks tea, the Norwegian lives in the first house on the left, the green house is immediately to the right of the white one, the photographer breeds snails, the diplomat lives in the yellow house, milk is the favorite drink of the person living in the middle house, the owner of the green house drinks coffee, the Norwegian’s house is next to the blue one, the violinist drinks O.J., the fox is the pet in a house next to the physician’s house, and a horse is the pet in a house next to the diplomat.

II) Do you think the following argument is valid?

“If Superman were able and willing to prevent evil, he would do so. If Superman were unable to prevent evil, he would be impotent. If he were unwilling to prevent evil, he would be malevolent. Superman does not prevent evil. If Superman exists, he is neither impotent nor malevolent. Therefore, Superman does not exist.”

State which rules of inference you use, and use $p, q, r$ variables to verify your claim.

III) Here is a puzzle by Lewis Carroll. What is the conclusion of the following premises?

- No interesting poems are unpopular among people of real taste.
- No modern poetry is free from affectation.
- All your poems are on the subject of soap-bubbles.
- No affected poetry is popular among people of real taste.
- No ancient poem is on the subject of soap-bubbles.