Problem Set 2

Due by **9:30 a.m. on Tuesday 28 March**. Lateness penalties (as specified on the syllabus) will apply to submissions after that time, unless you supply documentation of an illness or family emergency.

Please either write neatly in dark ink (not pencil) or type.
If you type:

- You will get an exciting stamp of thanks. (I found my ink pad!)
- You are welcome to submit your work via e-mail as a PDF to Zach.

You may not discuss these questions with anyone else. The work you submit must be your own.

Translations - Section 6.1:

Translate the following sentences into symbolic form using the suggested letters to represent simple statements. (2 pts each)

a. It is not the case that if Argentina votes yes, then Brazil will vote no and Chile will vote no. (A, B, C)

b. You win the contest if and only if you don't violate any rules and your entry is selected by the judges. (W, V, S)

c. If neither Kasich nor Rubio will win the Primary, then Clinton would beat Trump in the General Election. (K, R, C)

d. You will pass the class if you study hard and do the homework. (P, S, H)

e. You won't do the homework unless you make time in your busy schedule. (H, M)

Tautologies, Contradictions, and Contingencies - Section 6.3:

Use a truth table to determine whether the following statements are tautologous, contradictory, or contingent. (5 pts each)

f. $(F \supset (G \supset F))$

g. $((\sim A \cdot B) \supset (A \vee \sim C))$

Equivalent, Contradictory, Consistent, or Inconsistent - Section 6.3:

Use truth tables to determine whether the following two pairs of statements are logically equivalent or contradictory, **and** whether they are consistent or inconsistent.. (10 pts each)

h. (A ≡ (~A v B)) (A · B)

i. (M ⊃ (K ⊃ P)) (K · M) ⊃ P))

j. (G · (E v P)) ~(G · E) · ~(G · P)

Truth-Tables - Section 6.4:

Determine the truth values of the following symbolized statements using **direct** truth-tables. Let **A** and **B** be **true**, and **X** and **Y** be **false**. Circle/highlight your answer (i.e. circle/highlight the column of the truth-table that represents the truth-value of the dominant operator). (10 pts each)

k. (~(A · B) ⊃ (~X v ~Y))

l. (~((~Y v A) ≡ (A ⊃ Y)))

Truth-Tables - Sections 6.4/6.5:

Determine whether the following arguments are valid or invalid using **either direct or indirect** truth-tables. Circle/highlight the relevant portions of your truth-table that justifies your answer as to whether the argument is valid/invalid. **Note**: You are only required to solve 3 of the following 4 problems. If you successfully complete all 4, then you will get 10 points of extra credit. (10 pts each)

m. (P ⊃ Q)
(Q ⊃ P)
~((P · Q) · ~(~P · Q))

n. (P v Q)
(Q ⊃ R) · (P ⊃ R)
~((P · Q) · ~(~P · Q))

o. (E ⊃ ~F)
(~C v F)
(D ⊃ (C · E))
(C ≡ ~D)

p. F ≡ G
~(F v ~G)
~G · F