Homework 1.

1. Translate each of the following sentences into symbolic form. First identify the elementary component sentences, and abbreviate each with a (distinct) capital letter. (We have suggested letters after each sentence.) Then translate the original sentence using the symbols $\vee$, $\&$, $-$, $\rightarrow$ for the logical words "or", "and", "not", "if…then…".

   (a) If Wittgenstein wrote the *Tractatus* then he certainly didn't invent the printing press. (W, I)

   (b) It's just not true that if Jane Austen wrote it then it has a happy ending. (W, H)

   (c) Hegel was either a great philosopher or he was a raving lunatic. (G, R)

   (d) Sieglinde will survive, and either her son will gain the Ring and Wotan's plan will be fulfilled or else Valhalla will be destroyed. (S, G, F, D)

   (e) Wotan and Alberic will not both be satisfied. (W, A)

2. Translate the following arguments into sentence logic form, and put them into standard form. (We have suggested letters for the elementary sentences.)

   (a) It is plainly not true both that Aquinas was an angel and that Occam sold his soul to the devil. But Aquinas was an angel. So, Occam surely sold his soul to the devil. (A, S)

   (b) If God does not exist, then life is meaningless. But life is meaningless. Therefore, God doesn't exist. (G, M)

   (c) Either I will join Ivy and become a robber baron, or I will join Terrace and become a nihilist. So, I will either join Ivy or become a nihilist. (I, R, T, N)

3. Interpret "E", "J", and "M" as meaning that the earth is the third planet from the sun, that Jupiter is, and that Mars is, and work out the truth values of the following sentences (i.e., their real truth values, in the actual case).

   (a) $(M \,\&\, J) \vee E$

(b) $(-M \vee J) \rightarrow E$

(c) $-((-M \,\&\, -E) \,\&\, -J)$

4. Prove that the following argument forms are valid. You may use the following rules of inference: MPP, MTT, DN.

   (a) 1. $P \rightarrow (Q \rightarrow R)$
   2. $P \rightarrow Q$
   3. $P \qquad / R$

   (b) 1. $\neg\neg Q \rightarrow P$
   2. $\neg P \qquad / \neg Q$

5. Identify one **invalid** argument from Problem #2. Use your knowledge of truth tables to show that (as far as the "sentence structure" of the argument is concerned) there could be a situation where the premises are true and the conclusion is false. (Remember that logic is "blind to the actual facts" — as far as logic is concerned, any elementary sentence could be either true or false.)