COMP9020 Problems Week 1

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Note: Coloured phrases are hyperlinks.

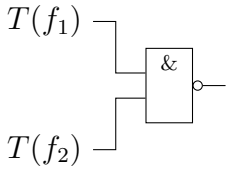
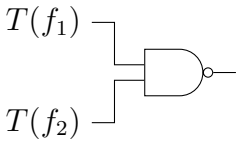
Preliminaries: Register as a forum user. Check whether you can access our course forum. Read the assigned textbook sections and slides 1.

Exercise 1 Recall the example on page 3 of slides 1. Formulate a proof of the proposition. (We sketched this in class but you need to learn how to do this properly.)

Exercise 2 The C programming language has one *ternary* (that is, 3-ary) connective. By giving a truth table define the meaning of the ternary connective $A\,?\,B : C$ that has the value of B if A is **T** and the value of C otherwise. (Yes, python has it, too, but it's written B `if` A `else` C.)

Exercise 3 Give an alternative characterisation of the ternary connective $A\,?\,B : C$ from the previous exercise by providing an equivalent expression in propositional logic (using just the connectives given on page 14 of the slides). Prove that your characterisation is correct.

Exercise 4 Repeat the previous exercise but use only NAND (defined on slide 12) as connective. Attempt to minimise the number of NAND gates. Draw a digital circuit of your solution using the translation T from the slides extended by

logic	**circuit (IEC)**	**circuit (US)**
f_1 NAND f_2		

Don't forget to use our course forum to post solutions or ask questions.