General Information (Week 1)

Lecturer of Problem Solving 2013:

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Structure of course:

1h Lecture every week, 1h Seminar in weeks 2,4,6,8,10, 2h Seminar in weeks 3,5,7,9.

3 summative assessments: Tentative schedule:

Two "Take Home Assessments", set in weeks 3 and 5 after lecture.
Third assessment after week 7.

VERY IMPORTANT for take home assessments: You **must not use books, internet or other sources** (other than books listed in the Course Booklet) when working on these assessments, **nor seek help from other people** (e.g. fellow students or your tutors). Assessed work must be **your own authentic work**, and this needs to be confirmed by you **with your signature**! Otherwise no mark will be given to your work.

Webpage with information:

www.maths.dur.ac.uk/~dma0np/probsolv2013/probsolv.html

Recommended book:

Kevin Houston: *How to think like a mathematician*, Cambridge University Press

Logic Problems (Week 1)

Question 1 Decide whether the following statements are true or false.

1. The product of two odd numbers is odd.

2. We have for all real numbers a, b, c: If $b^2 - 4ac < 0$ then $ax^2 + bx + c = 0$ has two real solutions.

3. For all $\epsilon > 0$ there exists a natural number n such that $\frac{1}{n} < \epsilon$.

4. If 7 is a divisible by 3 then 9 is a prime number.

5. 1001 is a prime number or $\int_0^\pi \sin(x^2)dx < 4$.

Question 2 "Who is Who?" There are three people, Anna, Max and Tom, with three different professions: builder, electrician and lecturer. Assuming that all of the following statements are true, find out who is who. Show that this puzzle has only one solution.

1. Today is Monday or Wednesday.

2. If Tom is not the lecturer then Max is the lecturer.

3. Today is Wednesday or Anna is the lecturer.

4. If Tom is the lecturer then Anna is the electrician.

5. If today is Wednesday then Tom or Anna is the lecturer.

6. If Tom is not the builder then today is Wednesday.

7. If Max is the electrician then today is Wednesday.

Question 3 Let A, B be statements. Construct truth tables for the two statements "(not A) or B" and "(A and B) or (not A)". Are these statements equivalent or not?