NOTES ON WRITING UP: ENGLISH AND MATHEMATICS

These notes are designed to help you when it comes to writing up your project. But you may find them useful during the course – e.g., for assessed coursework, etc. No doubt you already have some experience in writing up mathematics on a PC. These brief notes are designed to build on that. I include them here so that you all get them, right at the start.

Document Preparation.
Word-processing – with spreadsheets and databases one of the three basic IT skills – you have met already. You will also have used the equation editor facility in a word-processing package (usually some version of Word). Some student projects use only this, and this may be adequate at undergraduate level. But no one would pretend that it produces mathematics of textbook standard, or particularly attractive in appearance.

If you want the professional look, **learn TeX** (pronounced 'tech, as in 'loch – created by the great American Donald E. Knuth, and available free). There are numerous dialects, principally LaTeX (created by Leslie Lamport). Most staff and research students in the Department are TeX users, and courses are available. It takes some time to learn – a couple of days hard work in my case – but the benefits are permanent.

You will be typing a long document in your project. You might consider **learning to touch-type**. Some of you will have learned at school. I learned in my last year as a PhD student, to type my thesis; I have used it ever since (for all my papers, books and lecture notes). Learning to touch-type is just as sensible, and necessary, as learning to drive, swim etc. in my opinion.

Your word-processing package will have a *spell-checker*, and a *grammar-checker*. Use them – they will pick up typos and the like, as well as any defects in your spelling. There is no excuse nowadays for spelling mistakes etc. in documents.

Use of English.
You can all express yourselves in clear written English – or you could not have obtained the A Levels (or non-UK equivalent) that got you here. But most of us can improve – and some will need to improve, to avoid losing marks in your project.
Punctuation. You are all familiar with the *full stop* (US: period) that ends a sentence, and the *comma* that most sentences of any length need somewhere.

For some, that's as far as it goes. Note also:

The *semi- colon*, ; This is used to separate two sentences, which are so close in meaning that they go better together than consecutively. Both parts – before and after the semi-colon – should be sentences in their own right.

The *colon*, : The main use of this is as with the semi-colon, but where the part after serves as a climax, or 'punch-line, to the part before. The colon is also useful for introducing lists, or announcing what follows, e.g., ' we obtain the following equation:

(and then the equation is displayed on the next line).

The *apostrophe*, ' This has two uses:

(a) the genitive, to indicate possession (Imperial's Huxley Building, etc.);

(b) to indicate omitted letters (It's a fine day. I can't find my pen.)

Beware the 'rogue apostrophe', one that is out of place – this always stands out, and betrays ignorance. Especially, 'its', the neuter of 'his' or 'her', has *no* apostrophe (it's = it is). Take care also with genitive plurals: a citizen's right, but Citizens' Advice Bureau, etc.

Punctuating Mathematics. Think of mathematical symbolism and display as just an extension of ordinary language. In particular, every sentence needs a closing full stop, *even if it ends in display.* Often, punctuation will be needed at the end of display (depending on the sentence structure).

Sentence Structure. Not every group of words beginning with a capital and ending with a full stop is a sentence. A sentence has to *say something* (unlike a phrase, or a slogan, say), and so has to contain a main verb. The verbs – the doing words – dictate the structure of the sentence. It helps to distinguish between main verbs (in main clauses) and subordinate verbs (in subordinate clauses), if you remember your school grammar well enough to recognize these terms. (For reference: a main verb says something in its own right; a subordinate verb only says something within the context of the sentence as a whole.) Only sentences complicated enough to contain more than one main verb need colons or semi-colons. If in doubt, keep things simple, and keep sentences short by breaking them in two if necessary. But don't overdo the simplicity. If your sentences just consist of simple sentences linked by commas – e.g.,

> The cat sat on the mat, the dog bit the cat.

— your written English will read like that of a seven-year old. Commas as (mis)used in the sentence displayed above are called *splicing commas* (because they splice what should be separate sentences together), and are a

give-away sign of *bad style*. Avoid them! (The only kind of sentence that can take lots of main verbs with only commas is narrative:

'I came in, hung my coat up, put the kettle on, fed the cats, ... ')

If you feel your prose style has room for improvement here, the best way to help yourself is to look at how authors whose style you admire punctuate. Note:
1. If you think the above is too fancy, it isn't: these concepts are automated in the grammar-checker you use.
2. These ideas – grammar and syntax – are involved in computer programming.
Parentheses. These are simply brackets. You know the rules here: every opening bracket (needs its closing bracket), and the sentence must still make sense if the parenthetical material – the brackets and what they contain – is omitted. There are two other ways of punctuating parenthetical material in English – by dashes, and by commas. Note that parenthetical dashes, and *parenthetical commas*, must come in *pairs*, like brackets. Handling brackets correctly in mathematics is essential – basic mathematical literacy. Handling parenthetical commas correctly is just as important when writing prose.
Spelling. If anything, English grammar is 'too simple', in that one can ignore it most of the time (unlike in a more tightly structured language such as German or French, where one has no option but to use grammatical terms and concepts). By contrast, English spelling is appallingly complicated, even for native speakers – a consequence of the language's history, as 'Norman French grafted onto Anglo-Saxon'. The only spelling rule I know that really works is

I before E except after C

– so 'piece, but 'receive. (The reason I decided to include this handout, at risk of seeming pedantic, is that I regularly read otherwise excellent projects whose authors evidently dont know this.) One common stumbling-block even among well-educated adults is knowing when to double consonants. The crux is that a single consonant between two vowels suggests a long vowel before it, while a double consonant suggests a short vowel before it. Thus, 'rob' (short o) gives 'robber baron' (short o), while 'robe' (long o) gives 'robing room' (long o).
Subjunctive. You may remember the rule

'Iffing and wishing take were.

The lyrics of some but not all pop songs get this right. Thus the late, great Frankie Vaughan, 'If I were a tower of strength ... ', but alas, 'If I was in LA ... ' (The Mamas and the Papas, California Dreamin').

Reference. If you need more, I recommend doing what the experts do – consult Fowler:

H. W. FOWLER,*A dictionary of modern English usage*, Oxford University Press, 1926 (for punctuation, see under 'stops').

For a very readable recent best-seller, see

Lynne TRUSS: *Eats, Shoots & Leaves: The Zero Tolerance Approach to Punctuation*, Profile Books, 2003.

NOTE some notorious pitfalls for the unwary:

'their' = plural of his/her/its, but 'there' as in 'here and there;

'to', 'too' and 'two' – and again,

its and it's.

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