CL1 class exam January 2001 - answers and post-mortem

This is quite long but includes material you can regard as revision notes …

1. (a) Moore's law shows that PC speeds are doubling every 18 months or so which equates to a factor of 10 every 5 years. One mark for the speed (I'd accept anything from 8 (2^3) to 32 (2^5) or thereabouts) and one for mentioning Moore's law or showing you know speed is increasing by some factor each year. You did this well though the range of predictions was from 1 MHz to 10,000 GHz.

   (b) Disk speed, speed of the motherboard, speed of graphics card, presence and size of cache, quality of software running on the machine, speed and quantity of RAM (e.g. too small) and state of the disk (eg fragmentation), network speed. Having a lot of information on a computer hard disk will not generally slow it down unless the disk is fragmented or so nearly full as to prevent the swap file from expanding. Someone correctly said "word size" but I would not expect many folk to get that. Rather few of you said "disk speed".

   Some of you said "whether the interfaces are serial or parallel". On the face of it, yes, as a parallel interface has more wires and may be able to shift more data. Actually, no, because development of most parallel interfaces to peripherals stopped and faster serial chips were developed. Serial interfaces require smaller and cheaper plugs and sockets and less expensive cables. Wireless interconnections require none at all, hence one attraction of Bluetooth. A properly screened parallel printer or monitor cable can cost £80.

   (c) Hardware is getting cheaper and faster, people aren't. Companies can't make as much profit on hardware as services so they prefer to bundle services + hardware. Some of you pointed out that modern products are more information-orientated which lends itself to services to provide the info - it's a perfectly valid point. Some of you pointed out that complex devices are reaching a wider and less technically aware population and need services to support them and make them useable. Some said "because people want them" which I couldn't argue with either. Someone also quoted "convergence" – as technologies converge they will drag in some components that bring a service requirement with them.

   Example: I saw advertised the other day digital picture frames (LCD panels in a fancy frame) - $250 + $60 p.a. service charge for an ISP so you can download artwork when not showing your holiday pics…

   (d) Once data is written to a disk, deleting it, formatting it and even (given the will to recover it) writing over it again cannot guarante to erase it. The doctor should remove and retain or destroy her hard disk before letting the PC go. A lot of you trashed the whole PC which isn't strictly necessary but you might as well once the disk's gone. Some of you said "have it deleted by experts" which got you the marks though I'd guess this would cost more than the value of the 2nd-hand PC.

Some of you said "take a copy of the data first" which is fair enough and probably got you one mark. Most of you did this well. I should add that PC file systems are partcularly bad at leaving deleted material recoverable. I'm told it is much more difficult to recover deleted material under Linux.

(e)   the colour tag "#8c8c9c" represents $8c_{16}$ units of Red, $8c_{16}$ units of Green and $9c_{16}$ units of Blue. Take 8c and count up 8 on your fingers … 8d … 8e … 8f … 90 … 91 … 92 … 93 … **94**.
The tag is <BODY BGCOLOR="#8c949c">. **Why** did I ever think it was a good idea to talk about Hexadecimal in this course? You didn't like this question at all. I gave the mark to anyone with a "4" in the units column of any of the three hex numbers. It's always written "RGB" by the way not "RBG".   There will **not** be a question on hex in the June exam or the resit.

2.   (a)   Straight from the slides. Points I was expecting:
        Matched to purpose
        Intuitive for novice
        Supportive of advanced user
        Unobtrusive
        Tolerant of experimentation, fail-safe
        Self-tutoring
Points I wasn't but accepted:
        Easy to install
        Portable (not sure what that means exactly here)
        Robust
        Compatible with many data formats
        Helps you work better / faster

(b)   Text editor: just manipulates plain text e.g. programs, HTML source
Word processor: provides many facilities for layout and style of text, adding images and so on
DTP: I would say the distinction is one of style. Distinction is tricky but I'd say for DTP's the style comes first and the text 'poured in'. With word processors the content comes first and the style added later.
Web authoring package: All of the above plus the ability to link to other sites, site management tools, etc. etc.

Some of you said or implied that text editors could only edit text already prepared – not true.

(c)   1.   It has to provide some means for you to indicate that you want to include a mail attachment.
2.   It may compress the file in some way (not with a GIF as it happens as this is compressed already)
3.   It has to convert the file to a **non-**binary representation such as BINHEX or UUencoding.
4.   It has to (include a MIME tag in the header to) tell the far end that what follows is a GIF image

What you will see is the mail header including a line such as "MIME-

type=application/gif" followed by lines of upper-case letters and symbols containing the file. A mark for each of 3 and 4 above plus saying that a large block of text follows. 1 and 2 might net you a half-mark each. I particularly wanted you to say the file had to be converted from binary to some text representation and wanted you to remember 'MIME'. If I commented anywhere "hex, not symbols" then that was my mistake. A lot of you said the picture would be represented as a string of 1's and 0's which is not quite the case.

(d) Straight from the handout.

back problems. Usually caused by poor posture and can be alleviated by experimenting with monitor angle, keyboard angle, worktop height, ensuring that the chair is correctly adjusted, that there are footrests if required, etc. Also exercise programmes can help or just taking breaks. Avoid lifting heavy weights such as monitors and laser printers by oneself.

headaches. Caused by poor lighting, a faulty monitor, poor posture (directly through being too close to the screen or indirectly as a result of pain elsewhere) etc. Alleviate by having lighting checked and if necessary replaced, checking location of screen relative to windows, fitting blinds. Have eyes tested., etc. etc

repetitive strain injury. Caused by repetitive actions with the hands or wrists while typing. Alleviate through wrist rests, moulded keyboards, posture, taking breaks, strapping the wrist (where RSI is already reported), checking pattern of work and nature of software and in extreme cases stop using keyboard and use voice-to-data software instead.

Poor posture does **not** cause RSI directly, repetitive movement does that though poor posture can exacerbate it. The radiation from computer screens is **not** the same as radioactivity. Radioactivity is transmitted by particles (alpha radiation), high energy electrons (beta) or very high energy rays (gamma). Radiation from VDUs comes from much lower-energy electrons. You still don't want a face full of it though and modern monitors are designed to minimise it. The main problem with VDUs is squinting to look at them because the lighting is all wrong or they're faulty or badly set up.

exercise regimes or just taking a break from staring at the screen and standing up and walking around all help.

Points I wasn't expecting but usually accepted: Temperature of room, absence of clutter (tripping hazards such as cables). Some of you said the computers would be harmed if the room was too hot. I think if it was hot enough to harm a PC you'ld not want to stick around. Curiously one thing that affects hard disks is if the air gets too **dry** as very dry air doesn't carry away heat at all well. Most machine labs have humidifiers primarily to reduce static electricity but this is a seconsary reason.

Some of you interpreted the question to relate to the computing infrastructure i.e. slow networks etc. I think the question was reasonably clear given two sides of

material in the notes but I gave a mark for a reasonable answer in this vein anyway.

3. (a) email: rapid-ish, informal, impersonal, not 100% reliable, sender can be impersonated (I wouldn't book air tickets on email alone unless I knew the sender or had other corroborative detail). Not everyone has mail or checks their mail frequently.

letter: slow, formal, nearly 100% reliable; confirmation by letter more (e.g. legally) binding

fax: rapid, can be formal, nearly 100% reliable if fax machine says it went OK. I didn't think the time zone problem was an issue here – this would be an office-to-office exchange so wouldn't wake the person up at night.

phone: fairly informal, interactive, 100% reliable but person needs to be there and awake so less suitable if there's a large time zone difference such as with Hong Kong.

A couple of you pointed out that there might conceivably be censorship in and out of Hong Kong. I hadn't thought of that but it's a valid point. Cost isn't really an issue between fax, letter and email but is relevant to a phone call. Letter and fax produce a permanent record of the message, email is less persistent and phone not at all; you can't send a map/images over a voice call; you can mailshot with email (and fax if you have a sophisticated machine); language issues are different for email and phone – people can use a translation service on email or alternatively may speak a language better than they write it. Also for first contact, directory services for postal addresses and phone numbers may be more comprehensive than for email.

You got marks if you generally showed you knew the pros and cons of each means of communication and most did this well. A note about cost: The important cost is actually **time** – an employee can cost a company £100/hour to maintain – a phone call takes a couple of minutes but mail can take a good deal longer to compose. This cost can be way more than the cost of even an international call.

(b) As written, the formula has D1 as a relative reference in both rows and columns and B6 absolute in the rows and relative in the columns. Dragging a cell with this formula will make both the row and column of the reference to D1 change and the column of the reference to B6 change
(i)   0.   (formula will become =B6 * D2). NOT 1500 – this would be the result of dragging the formula =B$6 * D1
(ii)   =B6 * D1; My incorrect formula had B6 partially absolute when it should have been relative and the exchange rate relative when it should have been absolute.

You didn't do this as well as I'd have expected given you did a practical on spreadsheets. I tried to give a mark if you showed you knew what was supposed to be absolute and what was relative but basically you either got this or you

didn't.

(c)   I asked this question because integrity is probably the single most important feature of a database. If a database loses integrity it will drift further and further away from a true representation of the world and searches will generate wrong, missing and inconsistent results (e.g. my search on music by "REM" wouldn't locate tracks attributed to "R.E.M."). You got marks if you knew the term meant data had to be recorded correctly and why inconsistent data would give problems. Simple errors (30/2/2001) should be caught at the data entry and validation stage.

(d)   As you zoom in, features appear (such as detail), disappear (such as large-scale topography), colours change, proportions of lines change, text appears and so on. If you were at the lecture and awake this should have been a gift. I didn't stress this but some of you correctly pointed out that you would have to arrange it such that zooming in didn't just end you up with big blocky pixels which is another aspect of the same problem.

I qualified some marks with a "+" or a "-" – sort of a half mark here or there. I never took a mark off for two "-" but gave an extra mark for two "+".

Technique and red tape

There were quite a few perfectly good answers to totally the wrong question which I had to mark 0. You can lose as many marks on not reading the question and not having an exam strategy than on not knowing your material.

Please note you should fold and stick down the corner on the front page of your exam script – this preserves your anonymity. Also you should fill in the question numbers on the grid at the front – it all makes life a little easier for us.