Gerald's Column
by Gerald Fitton

This month I shall introduce a new 'theme'. I am not sure exactly how to describe this theme (without causing someone offence!) so, for my simple (simplified?) opening shot I shall describe it with the question: "What will you use your next computer for?"

Gerald's Columns GC9812 & GC9902

I embark upon this theme with some trepidation knowing that I shall make some enemies by so doing. I recall my article GC9812 (in the December 1998 edition of Archive) in which I referred to PCI slots as part of my wish list for the next RISC OS computer. I received a torrent of correspondence suggesting that I had "Buzzword Disease".

Perhaps, now that some time has passed and the Iyonix machine (not Phoebe) has been released, those who are inclined to do so might have another look at the comments which I made in GC9902 under the headings "Standards" and "Machine Design".

Certainly, before you rush off an email of complaint to me or our noble and long suffering Editor you might like to check back and consider whether the remarks I made then were as outrageous as they seemed to be at the time. Then, armed with that 'history', you might reconsider the language you should use in your email to either of us!

The Extra Chance

I have some 'unfinished business' which concerns the relationship between classical Hypothesis Testing and the Bayesian approach to the advancement of knowledge.

Even though I have had quite a number of replies I am postponing my public response because some of them have a philosophical depth which deserves more consideration than I have been able to give to them up to now. I thank all those who have written to me. Each of you will have received an individual reply and, in some cases correspondence continues.

One correspondent told me that it has changed completely his view of what we might call Scientific Knowledge; indeed, he says my articles have changed his life! Since I stopped being a tutor to students at the college where I worked, it has become rare for anyone to say (with conviction) that I have "changed their life" for the better! I don't know whether I am flattered or concerned. I am sure you will appreciate that when I receive emails like this it does make me think twice before putting 'pen to paper' for Archive!

The Extra Chance

Let me summarise the 'problem'. It is to quantify the probability that a coin is unbiased after it has come up heads five times in a row. From the point of view of those who believe in conventional Hypothesis Testing if the Null Hypothesis, H_0, is that the coin is unbiased and the Event E is that the coin comes up heads five times then $P(E|H_0) = 1/32$.

Null Hypotheses are regarded as suspect if $P(E|H_0)$ is less than 5%.

If we reject H_0 because 1/32 is smaller than 5% (the phrase 'Confidence Limits' comes to mind), then we are left with H_1, a Hypothesis about which we know absolutely nothing!

Applying the methodology of conventional Hypothesis Testing, after rejecting the Hypothesis that the coin is unbiased, we are forced to accept that the coin is (probably) biased. When asked to quantify this statement the usual response is to say that there is only 1 chance in 32 that the coin is unbiased.
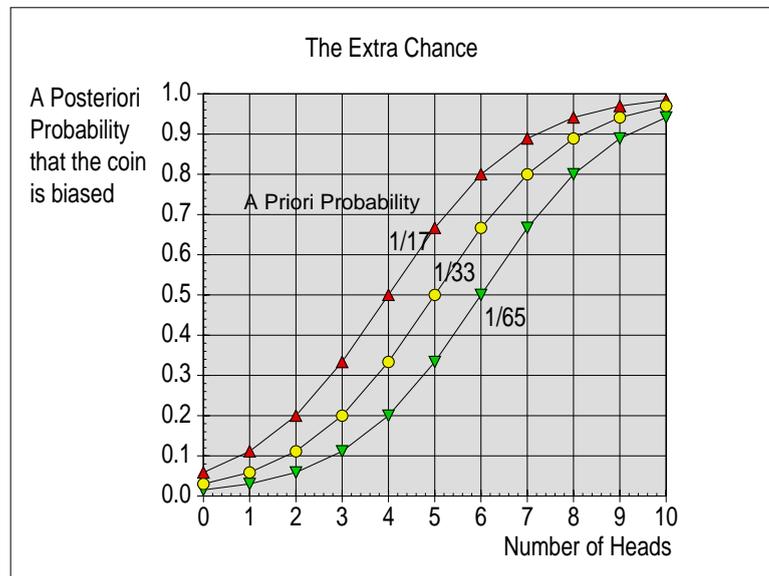
'Proof' in the case of DNA testing for forensic evidence at a crime scene is usually expressed as a number calculated solely on such a rejection of the Null Hypothesis.

The Bayesian viewpoint is slightly different.

An 'a priori' probability of $H_1 = 1/33$ increases to an 'a posteriori' of 1/2 after five 'flippin heads—so why is $P(E|H_0) = 1/32$ and not 1/33?

Where has the extra chance (1 in 33 instead of 1 in 32) come from?
Or, if you prefer to support Hypothesis Testing viewpoint, then where has it gone?

The Early Days

Now to introduce my new theme with some history.

If my memory serves me rightly then Personal Computers (PCs) made their debut about twenty five years ago. I remember using what was called a Programmable Calculator about five years before that for doing repetitive sums; the earliest PCs were used for the same sort of thing namely for doing repetitive.

Those early PCs were not particularly speedy when it came to doing even simple things with large amounts of data. Consequently, the wages departments of most large companies did not use computers but mechanical punched cards, the Hollerith machine supplied by IBM (International Business Machines), for Data Processing.

Input and Output

Why did I buy a Personal Computer?

Along with many other purchasers of these early Personal Computers I devised programs which had small amounts of input and output but lots of processing. I shall quote a couple of examples so that you will see what I mean.

My mother was born on the 20th March 1900. What day of the week was that?

I am sure that I was not unique in writing a program in BASIC which had as its input a date such as my mother's birthday and returning the day of the week. In my defence my BASIC program did a little more than returning the day of the week. For my mother it returned (on screen, in system font of course) the text message "Full of Grace".

My second example is this. Is 1234567891 a prime number?

The input for this is the number 1234567891 and the output is either a simple "Yes" or "No" but it could be the factors of that number. I recall writing a recursive program which produced answers in minutes using BBC BASIC.

What these programs have in common is that the amount of data which has to be entered into the computer is small compared with the size of the program. All the early uses of those early personal computers had the characteristic that the program was much larger than the input and output data.

I suppose I bought my first computer, a BBC B, because I knew that I would enjoy writing simple programs which would answer questions similar to the two examples I have quoted.

I chose the BBC computer rather than an IBM PC for two reasons. The principal one was that BBC BASIC had a wonderful write up in the computer magazine I read; the other reason was that it, like the Apple machine, offered colour and the IBM PC did not.

BBC BASIC

In the early 1980s I was teaching at the local College. At that time nearly all the Computer Lecturers were Mathematicians. The exception was one man from industry who had used a mainframe computer for Data Processing. All our computing courses had a heavy bias towards programming in BBC BASIC.

For a few wonderful years those students who were good at maths and logic were able to do wondrous mathematical things with BBC BASIC on these first affordable personal computers. The only programming language taught at our College was BBC BASIC.

Paint and Draw

I don't want to dwell too much on the early history of personal computing but, to leave out graphics would be a serious omission.

My personal opinion is that the Macintosh PC was much better for graphics than was the BBC PC. Nevertheless, Draw and, to a lesser extent, Paint, crept into the IT curriculum.

Word Processing

There is no doubt that WordWise was an excellent program which many lecturers I knew used to generate their lecture notes. Our Editor, Paul Beverley, produced many articles about the use of WordWise. It had its own text oriented programming language which could be used to semi automate repetitive (textual) processes.

Spreadsheets

View was a relatively simple spreadsheet but its advent was the beginning of the end for the use of BBC BASIC for doing sums.

The biggest single advantage of a spreadsheet over BASIC is that much more data can be entered into the program. The second is that, like Paint, Draw and WordWise, the data could be saved as a separate highly visible and editable file which stands alone, detached from the program which processed it.

The WIMP GUI

The IBM PC, like the BBC computer, used the command line interface whilst the Macintosh had already progressed to a Graphic User Interface using what became known as WIMP, an acronym standing for Windows, Icons, Mouse and Pointer.

If I recall correctly, the Archimedes was released in 1988 still with a command line interface. However, it wasn't long before, with an upgrade of the RISC OS operating system, it became both multitasking and the second machine (after the Macintosh) to use the WIMP GUI.

This advancement (the introduction of a WIMP GUI) spelt the end of BASIC for many of the tasks for which it had become famous. The excellence of BBC BASIC was no longer the major selling point of the Archimedes machine. The command line interface was 'on the way out' and used only for 'special occasions!

Ten Years Later

What were personal computers used for in the early 1990s?

The emphasis shifted from mathematical programs written in BBC BASIC, not to the use of spreadsheets (though these did attract new and old users), but to document production using packages such as Impression. Microsoft Word did not exist.

It was at about this time that our Editor started producing the Archive magazine. However, he did not do this using Impression on an Archimedes but he used, guess what, an Apple Macintosh personal computer because of its superior handling of graphics.

There is no doubt that new users of Personal Computers were not Mathematicians wanting to know whether 1234567891 was a prime number, nor did they want to know whether their mother was born on a Tuesday. They wanted to write letters to friends and business colleagues or, like our Editor, they wanted to produce a magazine at relatively low cost.

Although Graphics were used by a few Archimedes users, most of those wishing to use a computer for graphics bought an Apple Macintosh machine. All the Graphic Design courses at our College included an IT element which was based on the Apple Macintosh.

The Internet

Bill Gates got it wrong.

He was quite sure that the Internet would not catch on.

During the late 1990s the growth of the Internet, from Google to on line shopping and banking, has been the greatest single selling point for those who have never been interested in buying or using a computer before.

These days most people new to computing, when asked why they have bought a computer have a one word answer, "Surfing". My 13 year old grandson is instructed to do research for his homework by using the Internet. I have had to give him my oldest laptop in order that he doesn't have to use his dad's work machine or go round to a friend's house when he wants to find out about Napoleon or how a heart works.

Why Study the Past

It is said that only by studying our past shall we be able to accept our future. In this series of articles I want to discuss with you how I see the uses of Personal Computers developing in the future. I want you to consider how these uses will be developed and made available to you at a price we can afford.

Inevitably some background history is essential to such a discussion, for without a knowledge of this history we shall be at the mercy of the most recent craze, surfing!

So where are we now?

Personal Computers were first used by enthusiasts who did their own programming and, typically, wrote programs which had a strong mathematical content. Later word processing took over from programming as the single most important reason for buying a personal computer. Nowadays the Internet has that prime position.

So (somewhat ungrammatically) I ask again: "What will you use your next computer for?"

Communication

Please contact me by email (preferred) or by letter if you have any questions or comments. Please email me at <Archive@abacusline.demon.co.uk> and not <gerald@abacusline...>.