
MathinSite: Java Maths on the Web

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The MathinSite web site is currently under development. Its main aim is to deepen students' mathematical understanding promoted by, amongst other things, the use of Java applets with a strong graphical content.

From Visual Basic to Java to Intranet to Internet

In the August 1995 CTI *Maths&Stats* Newsletter, an article appeared concerning Visual Basic (VB) mathematics software [Edwards, P., (1995)]. Each VB program related specifically to one topic (eg. the Exponential Function, Projectiles) taking the form of a PC "Windows" application. At the time, these were placed on individual PCs on one of the campuses of Bournemouth University (BU) and were well received by students in tutorials and, by some, for use in their own time. Unfortunately, inquisitive users soon corrupt software on individual PCs! With no serious network on that part of the campus at this time and the need to constantly reinstall the software and its accompanying raft of .dll files, the software became unsustainable – even though further VB modules were still being developed.

Then came Java...

Java applets are programs written in the Java programming language that run through any web browser (Internet Explorer, Netscape Navigator, etc.) under any operating system and on any computer – especially, over the Internet. This was just what was required to promote a wider, more robust, tamper-proof dissemination of the software. The VB implementation was a 'labour of love' completed out of work time. How could time be found to learn Java and transcribe the VB software into Java applets? Fortunately, in 1999, application was successfully made to BU's Learning & Teaching fund so financing one of BU's Software Engineering undergraduates on Industrial Placement to make inroads into the transcription.

Courtesy required that local funding required a local presentation and so late in 1999 the first applets appeared on the BU Intranet (only). Since they were mainly for the author's own students, this was no drawback. The students gave the applets some comprehensive testing and feedback listed a number of bugs that had not been found during the initial development. It was just a shame that this could not be financed to develop the software for a wider audience.

Then came the National Teaching Fellowship Scheme award...

In July 2000, the author was one of twenty lecturers in the country who were awarded a Teaching Fellowship - with an accompanying bursary. Although the local funding for development had ceased, the further cash injection ensured that the project could continue for a further three years. Initially it was decided to employ another Industrial Placement student but, on further thought, the exciting prospect of becoming *au fait* with Java proved too seductive and part of the bursary funded the author 'buying out' some of his time from BU. Courtesy now required that national funding required a national presentation and so late in 2000 the first applets appeared on the Internet at the MathinSite web site [MathinSite, 2000].

... and the problems?

Upon its arrival in the 1990s, Java was hailed as a platform-independent programming language, ie. applets written on *any* system should work

- The software cannot be corrupted by inappropriate data input since the sliders only allow ranges of values for which the applet will not crash.
- The working of an applet cannot be changed by the end-user. It has a task to do, points to make, and users cannot alter the program to perform other tasks.
- Each applet is accompanied by a worksheet. This is useful for lecturers who want their own students to use the applets in something more than a haphazard fashion. Obviously the worksheets provided are not mandatory and there will be those who want to write their own.
- The applets are immediately accessible anywhere in the world at any time from any computer with an Internet connection.

How should MathinSite be used?

MathinSite's applets are not intended for use as a self-learning package. There is little explanatory text on the screen; it is not a textbook on a computer. The emphasis is on student interaction, students finding out for themselves. It is not possible to ask a student, "Go and use MathinSite to learn about ...". And it is most certainly not a replacement for face-to-face contact.

Students will already have had the appropriate lecture. After this, MathinSite can be used in tutorials to supplement the learning, to deepen the understanding. If tutorial time is in short supply, students can be directed to MathinSite to undertake follow-up work on their own since the worksheets give guidance through each topic.

The Future

What is, and will be, available is total self-indulgence on the part of the author. "This is what I want for *my* engineering students." Hopefully, it will be useful to others. The site's "Coming Soon" page lists applets likely to appear in the near future. Some are already in the bag but need debugging. Development of applets can be slow and they have to work perfectly when going worldwide Internet (even so, let me know of any bugs that are bound still to be there). Requests may be taken, but writing the applets and then the tutorial sheets is very time consuming. Obviously, if there are any readers who wish to contribute applets/worksheets to the site (if not already under construction at MathinSite) in the same format and with the same underlying philosophy, they will be considered, for fame not fortune, for inclusion.

In the meantime, bookmark the site, there's plenty more to come – in time.

References

- [1] P Edwards, (1995) A Visual Approach to Understanding Mathematics, *CTI Maths&Stats Quarterly Newsletter*, 6(1), 2 - 7 ISSN 0959-3950
Also available at: <http://www.bham.ac.uk/ctimath/reviews/aug95/visual.pdf>
[Accessed 1/12/00]
- [2] MathinSite is available at:
<http://mathinsite.bmth.ac.uk>

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