Artifact-assisted Introduction to Programming

Rene Smit

Department of Information Technology

Otago Polytechnic

`rsmit@tekotago.ac.nz`

Research shows that first-time exposure to abstract algorithmic problem solving methods in introductory programming courses discourages and overwhelms many students (Allen and Kolesar. 2005). This results in a disproportionate failure and dropout rate. Our objective is to develop hands-on laboratory experiences that incorporate "real-life" challenges to stimulate students' imagination and motivation so that the learning challenges become less conspicuous.


We have recently run a very successful level 4 course using toy cars with cellular SMS for networking and microcontrollers as a means of control.


We are now looking to cement those resources and expand the concept into our first year BIT introductory programming papers as a means of overcoming student apprehension.

While our primary focus at the level 5 is on programming instruction, we could also expand this initiative into operating systems, networking and student research projects.

Brisset (2005) describes an affordable three dimensional robotic system - a remote-controlled micro helicopter - that would be ideal for our purposes. Brisset states in his HOW TO paper that " RC model helicopter prices have reached a point where all sorts of challenging (ie crash-prone) robotic projects become affordable. [It is now possible] to build a 300g, 3D-capable helicopter with embedded Linux and Bluetooth data link for less than 500 EUR".
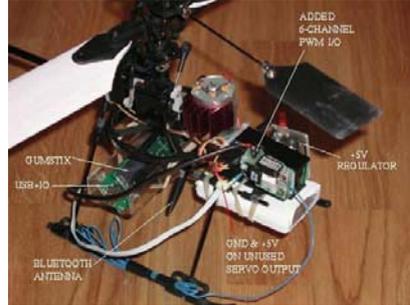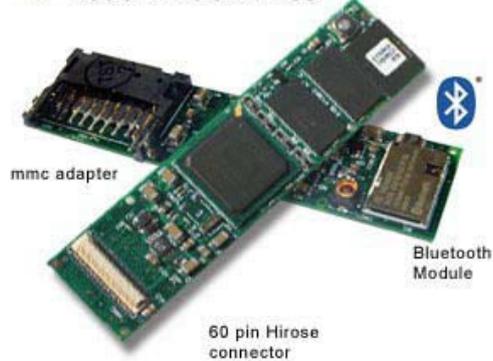
This project provides an excellent opportunity to utilise open source operating systems on single board computers and then to explore the viability of utilising these skills and robots as teaching artefacts and research tools.

Once funding was secured from our Research and Development Committee purchasing of the required equipment enabled development to proceed.

Kolesar, M. V. and V. H. Allan (1995). Teaching computer science concepts and problem solving with a spreadsheet in *Proceedings of the twenty-sixth SIGCSE technical symposium on Computer science education* Nashville, Tennessee, United States ACM Press: 10-13

Brisset (2005) ChRoMicro - Cheap Robotic Microhelicopter HOWTO http://perso.orange.fr/pascal.brisset/chromicro/doc/chromicro.html viewed May 13 2005