Executive Summary

January 4, 2005

This report outlines the work done by five 3rd year MEng students on our group project entitled "A User Friendly, Type Safe, Graphical Shell". As part of this project, we have produced a system entitled "Kevlar" that demonstrates that graphical command shells are possible, and many problems or limitations with existing shells are surmountable.

A command shell is a user interface to the underlying operating system. Historically they are command-line based, and come with a suite of small, powerful but modular programs that can be used conjunctively to solve many user problems. For example the program **ls** can list the contents of the current directory, the command **grep** can search text for lines that match a regular expression pattern; but taking the output of **ls** and feeding it into **grep** can let you find all log files written in 2001 or 2002:

```
ls | grep -E "^web-200[12].log$"
```

Kevlar's aim was to make the command shell idiom graphical, and to solve many of the usability issues with existing shells, such as inconsistent help and the location of the right program for a job. We also extended the shell model in novel and interesting ways, by adding types to the pipes that join programs, futher extended by allowing type-parameters to range across these types. We also made the pipe model more flexible than Kevlar's command-line counterparts, programs can have multiple explicitly named and typed input and output pipes. Further, we allow programs to export a high level description for the acceptable-values of their arguments and provide construction time validation of their values, with visual feedback for the user should there be errors.

The report opens with an overview of our achievements, predominantly the usability issues present in existing shells that Kevlar does not suffer. We then discuss existing products and projects in the workflow and visual shell area, before outlining the design and implementation of Kevlar.

The most exciting part of our project was the Usability Study, and as part of our evaluation, we consider the opinions of real users of our project, and how we were able to respond to them. Finally, we conclude by reflecting upon the implications of what Kevlar shows is possible, and what could be the future for Kevlar-like systems.

Figure 1 A Screenshot of Kevlar. Being executed is the equivalent of **ls** | **grep -E "^web-200[12].log$"**