

## 1 Comparative Programming languages 2003

It has been said that "you can only become a really effective user of a programming language if you have a good understanding of how all its features are implemented". Discuss to what extent this is true. Your answer should include consideration of the representation of data, function calling mechanisms, space allocation and the implementation of object oriented features for a variety of different languages. [20 marks]

### ANSWER NOTES:

This is a rather general questions inviting students to discuss many aspects of language design, implementation and specification covered in the course.

Many points will gain marks.

Implementation details do not necessarily respect the language specification. They may lead the programmer to use features that are non standard. Other compilers may implement things differently.

It is possible that the language standard is actually given in terms of a simple abstract implementation, but this is rarely done.

Clearly someone who has considerable understanding of one or more implementations of the language will know its finer details very well and will probably be a better user as a result.

Understanding how exception handling or multiple inheritance is implemented probably helps in the understanding of these features.

Knowledge of twos complement arithmetic or IEEE floating point is also probably useful.

The cost of passing arrays by name or by value in ALGOL 60 is really determined by the implementation. Knowledge of whether a language is sometimes held up by a garbage collector may be relevant in a realtime system.

The number of points that can be made are endless....