Application-Oriented Languages : Project summary.

Hoare has listed the following as qualities which users (should) seek in the programming languages:

1. Simplicity
2. Security
3. Fast translation
4. Efficient object code
5. Readability
6. Machine independence
7. Stability of specification
8. Use of familiar notations
9. A large and useful library
10. Existing popularity
11. Sponsorship by a rich and powerful organisation

The design of certain languages in the ALGOL tradition (ALGOL 60 itself, ALGOL W, SIMULA, PASCAL ..) gives grounds for hope that these objectives (except the last) are reconcilable to a high degree. A significant factor in their success has been a deliberate pursuit of generality, and the exclusion of problem-oriented features which are specific to any particular domain of application.

In contrast the language PL/I represents an attempt to include a wide variety of application-oriented features. While it has achieved a considerable commercial success, it did not aim at the objectives above and it certainly did not achieve them all. And yet there is no doubt that the majority of computer programmers would rather use an application-oriented language than a general-purpose one, as the following table illustrates.

Application Area	Languages used
Commercial Data Processing	COBOL, RPG
Science and Engineering	FORTRAN IV, APL, BASIC
Discrete Event Simulation	SIMSCRIPT, GPSS III, SIMULA I
Command and Control	JOVIAL, CORAL, RTL2
Symbol Manipulation	INTER LISP, SNOBOL, POP II
Systems Programming	PL/360, BLISS, BCPL

Many of these languages achieve many of the objectives specified, but most fail quite badly in one or more of those objectives. In particular all (except SIMULA I) lack security, a quality not fully recognised as both desirable and achievable until recently.

The question therefore arises:

How far is it possible to extend to application-oriented languages the combination of advantages that has been realised in some of the smaller general-purpose languages designed in the ALGOL tradition?

The project aims to study the application areas listed above, together with the special-purpose and general-purpose languages used therein. It will evaluate language features against the stated objectives, and in the light of their intended use, implementation, and mutual interaction. This investigation will aim to answer the fundamental question posed above as well as the following subsidiary questions:

(1) How far is it possible or desirable to retain a general-purpose language (GPL) as a common subset of a number of different application-oriented languages (AOL'S)?

(2) What are the problems arising in a language designed as the union of all of the features of the separate AOL'S?

While a favourable technical answer to these questions might be hoped for, it is reasonable to expect the reverse. In either case the results, which will be published as survey articles or as a book, should prove valuable to future designers of languages, and to those who have to evaluate and select a language for particular uses.