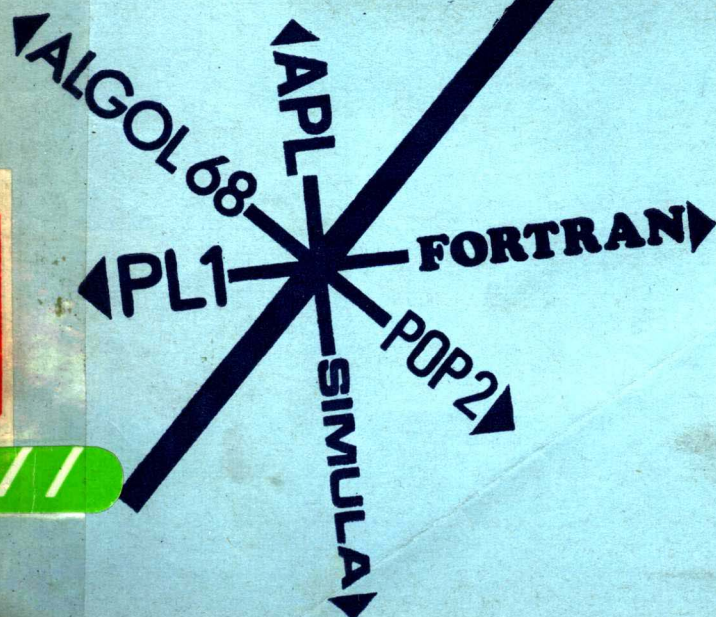


Proceedings of a British Computer Society Conference

# High Level Programming Languages — the way ahead







COMPUTERS AND THE PROFESSIONAL

# **High Level Programming Languages – The Way Ahead**

British Computer Society conference proceedings

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## PREFACE

This volume derives from a tape recording of the complete proceedings of the B.C.S. conference "High Level Programming Languages - The Way Ahead", held at the University of York October 4th - 6th 1972. The papers were taken from this recording and edited before being finally checked and amended by the particular speakers. This process was not followed for the questions following each paper nor for the comments from the floor during the panel session. Although I am sure I have extracted the essence from these comments I apologise to anyone who feels I have not caught the exact nuance of their particular point, this could be due to the language used, the way it was used, or the compilation process.

I would like to thank the speakers who replied so promptly with their amended papers, the staff of the typing pool at Teesside Polytechnic, who typed the original drafts, and finally David Hartley and the B.C.S. Conference Department who organised this conference. These people are the ones who did all the hard work.

D. Simpson  
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## CONFERENCE INTRODUCTION

D.F. Hartley

University of Cambridge

In this short introduction I would like to explain the motivation behind the setting up of this conference on high level languages by the British Computer Society.

In this topic it is reputed that there are some gaps. Some people talk about the gap between the academics and industry, others about the gap between the designers and users and there are also the gaps between the different applications areas. We have tried to bring together members of the various groups who populate the sides of these gaps so that they can talk over their problems and discuss their ideas. Indeed someone asked if we were going to try and narrow these gaps, widen them or keep them just nicely apart.

Our aim is to look at that mythical beast the general purpose language and to try and ascertain the objectives for such a language. Various speakers will then tell us how their language is developing so that we may finally come back to the objectives and see if there is a gap between what is wanted and what is offered.

The conference falls into five sessions:- objectives, new language developments, the case for special purpose languages, will the objectives be met, and final thoughts. These are the virtual sessions of the conference, as opposed to the real sessions printed in the timetable. The idea of virtual/real concepts is now well known; IBM users have recently been told about these - the rest of you knew about them all along.



## HIGH LEVEL PROGRAMMING LANGUAGES - THE WAY BEHIND

C.A.R. Hoare

University of Belfast

In this talk I wish to discuss three points only - quite simple ones.

Firstly, that the designers of high level programming languages in current use have had a very bad idea of what the objectives of their design should be.

Secondly, that they have been largely incompetent to achieve even those objectives that they have set themselves.

Thirdly, that so far from learning from their mistakes, language designers actually became more misguided and more incompetent in the years 1954-1966.

I shall illustrate these points by considering the three most widely used programming languages of the present day FORTRAN, COBOL and PL/I, all designed within the period mentioned. Of these I believe that the first (FORTRAN) was the only one which set sensible objectives and met them to a high degree. I exclude ALGOL 60 not because it is, for its purpose, better than any of the above languages, not because it is less widely used than them; but for the rather surprising reason that the designers of the language failed altogether to declare what their objectives were! It is, therefore, impossible to judge whether they were sensible objectives or whether they have been met.

### 1. FORTRAN

Let us start with the first language, FORTRAN. This was designed in 1954 with two declared objectives.

I quote from the article:- "The Fortran Automatic Coding System" by J.W. Backus and twelve others. Proc Western Joint Computer Conference AFIPS vol. 11 1957. "The goal