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23A

PASCAL NEWS



M. Pickel

PASCAL USERS GROUP (U.K.)

Pascal News 23a is a supplement, to plug the lengthening gap between US originating 23 and 24. Readers will note that its contents are quite different from those of previous editions. There is a shift of emphasis from matters of concern at leading edge University level, to those of concern to producers and users of inexpensive standardised products.

That shift has been wholly dictated by the content of material submitted for publication. Whether it is a temporary side-step or a permanent change, will also be decided by contributors (to future editions). PUG(UK) is the servant of you the subscribers and as such, will publish material originating from any section of the user community.

We are all indebted to each contributor but Tony Heyes's generosity in offering his Bibliography suite of programs for refinement through the medium of PN is particularly appreciated. Constructive critiques are welcome.

There is a widening of the user base and an overdue deployment of resources to that end, evidenced by the complementary nature of articles from widely differing sources. Read on and judge for yourselves. Although you will find that 23a is pitched at quite a different level from that of your usual expectations of PN, I sincerely hope that you will welcome it as a stop-gap until 24 becomes available from Rick, Andy, and Co.

The following is offered as an illustration of the scene which prompted the production of a supplement.

Intrigued by advertising which referred to "mere humans", I went along to the personal computer show at the Barbican on September 12th.

Imagine the disappointment at failing to find anything innovative or even mildly interesting. Discovered that with a single exception, exhibitors did not know whether standard Pascal was implemented on the machines offered to the public. More than one of those asked, replied "Yes, it's called UDCS or something like that". At one stand, sponsored by British Petroleum, the Department of Trade and Industry, the Council for Educational Technology, and others, an 'expert' merely looked blank and suggested that I ask someone else. 'Someone Else' replied "We are only interested in things for use in Education". At the

National Computing Centre stand, another expert, when asked if his stand offered any information about standard Pascal and its implementation or use in a microcomputer environment, replied "No, there is no demand", deftly followed by "Can I help you sir?" to someone standing behind me. In some instances, the initial answer was "Yes", followed by misrepresentative flannel when a demonstration was requested.

Met a guy who holds a powerful position in the largest education authority in Britain. He believes that BASIC is an "appropriate" language for the "mass" of young people who "won't bother" to become seriously interested in the technology. I should admit at this point, that had my first experience of a perception of machine intelligence been through the medium of BASIC (or COBOL, FORTRAN, etc.), I might easily have joined the ranks of those who either "won't bother" or are suitably unimpressed by obscure combinations of hunches, guesses, and a dash of perceptual skill which only occasionally fail.

And now for something different --

1. To those of you who requested supply of back numbers, I regret that I still haven't found a solution to the very high direct and indirect costs of small numbers of reprints. Even when you are willing to cover all costs, there remains the burden of manual labour and time. Any ideas?
2. PLEASE, if you must use purchase orders, include subscription with it. Otherwise there will be a drowning in paperwork.
3. I still haven't resolved the problem of how to service subscribers to PUG(USA). Unfortunately, if they are serviced out of local funds, the EFFECT (whatever the intention) is subsidisation of more prosperous PUG(USA) by barely solvent PUG(UK) and a detrimental effect on local service.

In a similar vein, escalating costs necessitate an increase in the numbers of subscribers, or, an increase in subscription cost for '83. It is suggested that a subscription of 25 Pounds per annum for firms and institutions, with a personal subscription of half that amount, would be equitable.

Very Late News :

23rd October '82

Received a call from Andy Mickel yesterday evening. Apparently there has been another change of US editor. This accounts for the delay in producing PN24.

The good news is :

- (a) That production of 24 is now progressing again.
- (b) That I will receive a number of copies of back issues of PN. If you did not receive any editions prior to 22/23, please let me have details plus a large stamped addressed envelope for each copy you are due.

With any luck we may end up with a few surplus copies, so if you would like to make purchases (sorry no more than one copy of each edition allowed) please also let me know.

I hope we can now satisfy everyone who was disappointed by the very patchy coverage of subscribers that resulted from the 1981 attempt to service European subscribers directly from USA.

Remember the new address and telephone number for MIG(UK) is :

P.O. Box 52,
Pinner,
Middlesex. HA5 3FE
UK.

Tel: 01 866 3816

There aren't any agreed procedures and deadlines (yep) for including European originating material in future editions, but if you have material you would like to publish please send it as soon as possible to the UK address. If for any reason I can't have it included in the next edition, the option is still there to produce further UK supplements.

From Wireless World.

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I.T. and M.I.S.S.

One of the aims of Information Technology Year and the Microelectronics Education Programme is to involve schoolchildren in the use of microcomputers and related electronic devices. There are the M.E.P., the Micros in Schools Scheme, exhibitions and events throughout the year and beyond. It is, perhaps, fortunate that Mr Callaghan happened to be watching television on the evening the programme "Now the Chips are Down" was broadcast and was spurred into action then, or we would probably find the propaganda even more frenetic than that now being put out by the energetic Mr Baker, the prophet of IT.

Information Technology is a curiously diffuse name for a Year. The official definition, "the acquisition, processing, storage, dissemination and use of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications" appears to encompass most of the activities of the average person, except eating and one or two other processes, although the use of a computer is not often considered essential to the more basic of these.

So far as its involvement of schoolchildren is concerned, the publicity is decidedly shrill, the Minister's aim being to have a computer in every secondary school by the end of the year and even to think about providing them for primary schools.

There can be no argument that young people must be aware of computers and how to use them, but it does seem possible that the present blaze of publicity tends to obscure the point that computers are a means, not an end. There is also the question of how the micros are to be used in schools.

According to the fifth edition of the Concise Oxford Dictionary (now, admittedly, modified), a computer is "a calculator - an electronic calculating machine" - an unfortunate description, taken too literally by at least some of those responsible for introducing youngsters to

computing, with the result that the school micro is often given to the senior maths teacher to guard with his life, presumably on the grounds that computers are electronically mathematical and possess no relevance to any other subject.

In other schools, the computer is treated as a kind of totem, and the pupils are taught "Computer Studies". As a subject, computing (meaning programming) is a singularly empty one, unless the pupil learning it intends to become a programmer. A computer is an aid to the process in which it is used - in this instance, learning - and an element of transparency to the user rather than an obscuring of the subject by undue attention to the computer must be the aim.

Clearly, an overnight transformation, after which every teacher would be using a micro as to the manner born, is hardly feasible. But, until the school micro (or one of its terminals or even a micro owned by a pupil or teacher) can be used naturally, as is a dictionary or pocket calculator or a video recorder, it will dominate the learning process. Utmost priority should be given to teachers from all disciplines, from home economics to athletics, to use the computer as an aid, rather than as a distraction, so that pupils who are not to specialize in science or engineering can see that it is of advantage to them to be at ease with computers, but no more than that.

The Inner London Education Authority is aware of these problems and is educating teachers in the use of computers so that, even though there may be only one micro or terminal in the classroom, the pupils will learn the place of a computer by, to use ILEA's word, "osmosis". However, there is evidence aplenty that education authorities in other areas are either hypnotized or revolted by the new equipment and, accordingly, either enshrine it or pass it to the school computer fanatic to impress people with.

In short, a computer is a useful tool, but that is all it is: it can help or it can dangerously hinder learning, and only the education of teachers in its natural use as an aid can decide which.

ProPascal

is a native-code Pascal compiler for Z80-based microcomputers. It is designed to run under CP/M or CDOS, in a memory area of at least 48K RAM. The minimum disc storage required is two 120K drives.

Pro Pascal was produced by Prospero Software of London, England, and released in October 1981. The range of machines on which it is currently running includes:—

Apple + Softcard, Clenlo Conqueror, Comart Communicator, Cromemco, Digico Prince, Feltron Compulady, Gemini, Hewlett-Packard 125, Kontron Psi-80, Nascom 3, NEC PC8000, North Star Horizon & Advantage, Pet + Softbox, RML 380Z, Sharp MZ80B, Superbrain, TeleVideo, Vector MZ, Xerox 820, Zilog MCZ

Pro Pascal is a complete implementation of the recently published BSI/ISO Standard for Pascal, with just two restrictions: conformant array parameters are not included, and files may not be defined within structured- or pointer-types. A number of important extensions have been added to the language, making Pro Pascal suitable for a wide range of applications in the professional, business, scientific or educational sectors.

Standard features

Data types:

integer	range -2147483647 to +2147483647 (4 bytes)
real	7-digit precision, range E -38 to E +38 (4 bytes)
char	ASCII 128-character set (1 byte)
boolean	false, true (1 byte)
enumerated	up to 256 constants (1 byte)
subranges	including 1- and 2-byte integers
arrays	any number of dimensions
records	including variant records
sets	up to 128 elements (16 bytes)
pointers	(2 bytes)
files	text and non-text

Statements:

assignment
procedure call
GOTO (including jumps out of blocks)
compound (BEGIN ... END)
IF ... THEN ... ELSE ...
CASE
REPEAT ... UNTIL ...
WHILE ... DO ...
FOR ... TO/DOWNTO ... DO ...
WITH ... DO ...

Operators:

arithmetic	+ - * / DIV MOD
logical	AND OR NOT
comparison	< = > <= <> >=
set	+ - * IN [...]

Procedures and functions:

procedure/function declarations (fully recursive)
value, VAR, procedural and functional parameters

Standard procedures

reset, rewrite, get, put
read, readln, write, writeln, page
new, dispose, pack, unpack

Standard functions:

abs, sqr, trunc, round, ord, chr
pred, succ, odd, eof, eoln
sin, cos, exp, ln, sqrt, arctan

Extensions

Data types:

string[n]	dynamic-length strings (1 to 255 bytes)
longreal	16-digit precision, range E -308 to E +308 (8 bytes)

Statements:

CASE ... OTHERWISE

Additional procedures:

delete, insert, str (string handling)
assign, close, erase (CP/M file interface)
update, seek (random-access file handling)
chain, putcomm, getcomm (program chaining)
move (assignment without type checking)

Additional functions:

concat, copy, length, pos (string handling)
fstat (does this CP/M file exist?)
cstat (has a key been pressed?)
memavail (how much dynamic storage left?)
rand (random number generator)

Separate compilation:

SEGMENT (as well as PROGRAM)
COMMON (as well as VAR)
EXTERNAL (as well as FORWARD)

Lexical enhancements:

Source file inserts ({\$ I filename})
Identifiers containing underscore (___)
Hex constants (e.g. 01FFH)
Longreal constants (e.g. 1.0D0)

Trademarks

Advantage, North Star: North Star Computers
Apple: Apple Computer
CDOS, Cromemco: Cromemco
CP/M: Digital Research
Pet: Commodore Business Machines
Softcard: Microsoft Consumer Products
Superbrain: Intertec Data Systems
TeleVideo: TeleVideo Systems
Z80: Zilog Corporation

Date :

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Pascal - an effective language Standard

B A Wichmann, 6/5/82

Article formed the basis of piece in
Computer Weekly by Philip Hunter, 11th Feb 1982, page 14

Mr Nick Hughes
Pascal Users Group (UK)
Shetlandtel
Wall
Shetland SE2 9PF

Your reference

Our reference

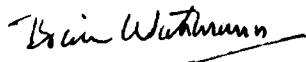
Date 13 May 1982

Dear Nick

Congratulations for getting PUG(UK) off the ground again. I enclose a contribution, labels for those having enquired about the Pascal validation suite, and a notice about the Standard. Could you ask PUG to change their policy statement on the back cover to refer to ISO 7135 rather than Jensen and Wirth?

Concerning the question of the transmission of Pascal via the CET telesoftware system, I now understand that this is possible.

Yours sincerely



BRIAN WICHMANN

ENC

Over the last few years, the programming language Pascal has grown in popularity very greatly. It is widely used for teaching in Universities, is available on most micro-processors and main-frames as well. In fact, Pascal is one of the few languages that form a bridge between microprocessor systems and the main-frame world.

Until recently, there has been one drawback to Pascal as a general purpose software tool. The definition of the language was not very precise and in consequence, the portability of Pascal programs was problematic. The British Standards Institution(BSI) set up a group under Dr Tony Addyman to produce a standard definition of the language. This was later superseded by an ISO group also under Tony Addyman. Last October, ISO agreed to the standardization of Pascal, and after editorial work on the document, BSI published the Standard in February of this year (BS 6192).

What does this mean for users of Pascal? The portability of Pascal programs should be much improved provided suppliers implement the Standard and users write their programs to conform to the Standard. One might think that the position with Pascal is no different from that of COBOL or FORTRAN and yet portability problems arise with these languages. There are several reasons for believing that Pascal is different:

1. The Pascal standard is more comprehensive than that of COBOL or FORTRAN. For instance, the COBOL and FORTRAN standards do not require that an invalid program is rejected by a compiler. The Standard for these languages is just a definition of a language rather than a set of requirements for a compiler. This is clearly not very satisfactory since we all write incorrect programs on occasions.
2. The Pascal Standard is simple and devoid of a multitude of options. If the language has lots of options, then program portability is reduced because a program may not be valid without a specific option. COBOL has a large number of options and FORTRAN 77 has two major levels (essentially distinct languages) whereas Standard Pascal has just one option, affecting only one part of the language. This option is to allow procedures to handle arrays whose size varies from call to call. This option, level 1 Pascal, would allow Pascal programs to call FORTRAN routines in many systems.
3. The Pascal test suite is more searching than that of COBOL and FORTRAN. This is essentially a consequence of the definition of the language. The National Physical Laboratory has been collaborating with the University of Tasmania on the construction of this suite for over two years. About 400 copies of the test suite have been sold worldwide. A new version of this suite has recently been issued to correspond to the new ISO Standard. Unlike the COBOL and FORTRAN test suites, the one for Pascal includes incorrect programs which must be rejected: ones to examine the error-handling capability of a compiler, and the "quality" of an implementation. The quality tests indicate if there is any small limit to the complexity of

programs that a system can handle and also assesses the accuracy of real arithmetic.

All the major components to make Pascal a good Standard are now available, that is, a Standard definition and tests to verify conformance of a compiler to the Standard.

A Standard and tests to check conformance to the Standard are not alone quite sufficient. The test procedures must be used and results made known to those using Pascal compilers. This can be achieved by independent testing of compilers which is currently being investigated by BSI (Hemel Hempstead). BSI have a wealth of experience with testing other goods but this is their first venture into computer software. For this reason, both NPL and NCC are assisting BSI in this important development.

The last step in this process is to encourage users to request a Standard compiler from the suppliers and for suppliers to meet that demand. As a contribution to this last step, NPL held a conference on this topic with its collaborators. Professor Arthur Sale from the University of Tasmania addressed the conference making it an international event. The other key speakers were John Charter from BSI who described how a validation service run by BSI would work, Professor Jim Welsh from UMIST who described how the Standard can be implemented and Lyndon Morgan from NCC who described a guide written to support the test procedures. Also Barry Byrne, from ICL explained how the provision of a standard compiler for Pascal is advantageous in both marketing and for internal use. Mr Ken Thompson from the European Commission explained the usefulness of international standards within the Community and some of the problems in their effective exploitation.

This program contains five errors, often undetected by compilers. Can you spot them?

```
program test;
const
  nil = '0';
begin
  if nil # '0' then
    writeln( 'WRONG', +nil, .123)
  else
    writeln( 'RIGHT' )
end.
```

Try it on your system and see how many errors are detected.

- Errors
1. program must contain output as parameter.
 2. nil cannot be used as an identifier (it is a reserved word).
 3. # is written as < > (not equals).
 4. nil cannot follow a sign.
 5. a decimal point must follow a digit.

The corrected program is:

```
program test(output);
const
  nil = '0';
begin
  if nil <> '0' then
    writeln( 'WRONG', nil, 0.123)
  else
    writeln( 'RIGHT' )
end.
```

Although this test is only an illustration, it does show the wide ranging capabilities of current compilers. The results of compilers tested so far can be summarised thus:

Compiler	Errors detected	Accuracy of error messages	Recovery from last error
A	4	3	4
B	2.5	2	3
C	2	2	2
D	1	2	1
E	2.5	3	2
F	3.5	3	3
G	4.5	4	3
H	5	4	4
I	3.5	1	2

All the marks are out of 5. The half marked for detecting an error indicates that the error message was confusing enough for it to be unclear if the error was properly detected. Naturally, the last two columns are subjective.

by

DAVID BLYTH, Standardisation Office,
National Computing Centre

1 Introduction

Few Pascal users can be unaware of the recent publication of the British Standard for the language which will shortly be adopted internationally. Many users have heard of the suite of validation programs, developed by the University of Tasmania and the National Physical Laboratory, which can be used to check on the standard-conformance of an implementation. This suite is readily available and any user who has a copy can use it to test his own compiler or interpreter. For those brave users who undertake such testing this article presents a brief guide to the steps involved and draws upon experience gained at NCC in a joint NPL/NCC/BSI project to develop and document the validation procedures.

2 The Pascal Standard and Validation Suite

The Pascal standard defines the language itself and the manner in which Pascal programs are to be handled by an implementation. The validation suite contains over 400 test programs whose purpose is to check whether or not an implementation accepts the language as defined in the standard and whether or not programs which are accepted behave as the standard says they should. The standard and the validation suite have been developed in parallel with the result that the suite will provide an exceptionally strenuous test of any implementation. An implementation which performs well under test can be used with confidence in its conformance and reliability.

The suite contains eight types of test program which investigate respectively, conformance, deviance, implementation-defined features, implementation-dependent features, error handling conformance arrays, quality and extensions. These classes of tests are quite distinct and are used in characteristic ways.

2.1 Conformance Tests

Conformance test programs attempt to check that an implementation provides those features required by the standard and that it does so in the manner which the standard specifies. These programs are all correct standard Pascal. If the implementation conforms to the standard these programs all compile and execute. If a conformance test program fails then it is an indication that the implementation does not conform to the standard.

2.2 Deviance Tests

Deviance test programs check whether

- (i) the implementation provides an extension of Pascal;

- (ii) the implementation fails to check or limit in an appropriate manner some feature of Pascal;
- (iii) the implementation incorporates some common error.

No deviance test program is standard Pascal. Each such program contains exactly one such deviation. When a deviance test is run the results are inspected for evidence that the implementation does in fact detect the deviation. If it does not then the implementation does not conform with the standard.

2.3 Implementation-Defined Features

The standard defines an implementation-defined feature as one which may differ between implementations but which is defined for any particular processor. A conforming implementation must be accompanied by a document that provides a definition of all its implementation-defined features. The test programs for implementation-defined features are intended to show how these features are handled in any particular implementation. If they aren't handled in the manner claimed then the implementation does not conform.

2.4 Implementation-Dependent Features

An implementation-dependent feature may differ between implementations and is not necessarily defined for any particular implementation. Here the implementor can either state in his documentation that use of such features is not reported or else have the implementation issue some diagnostic for which such a use is encountered. The test programs in this area are designed to determine the behaviour of the implementation. The implementation conforms only if it behaves as claimed or reports implementation-dependent usages.

2.5 Error-Handling

An error is defined, in section 3.1 of the standard, to be a violation by a program of the requirements of the standard that the implementation is not obliged to detect. An implementation only fails to conform in respect of error-handling if it fails to process an error in the manner claimed in the documentation. The error-handling tests each present the implementation with one error with the aim of determining exactly what the implementation does with it.

2.6 Conformance Arrays

An implementation may conform with the standard at level-0 or at level-1. In plain terms it can either have conformance arrays or it can't. If conformance arrays are provided then all of the features specified for them must be provided according to the standard.

