

# Attempted validation of the GNU Pascal compiler

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## 1 Introduction

The Pascal Validation Suite (PVS, [2]) was developed by A H J Sale and myself over the period 1979-1984. The purpose of the PVS is to check compliance the ISO-7185. This was originally for the 1980 version of the standard but can also be used for the 1990 version of the standard [1].

The latest version of the PVS, 5.7 states:

- that British Standards Institution (BSI)'s copyright is acknowledged;
- that no representation is made on the basis of use of the Suite which might suggest that a third-party validation had been carried out;
- that any other representation of the results of running the Suite must describe performance on the whole suite and not simply on selected tests.

## 2 Compiler being tested

The GNU Pascal compiler `gpc-344d2-10.4` downloaded from the Internet on 21st December 2005, and run on an Apple G5 running Tiger (OS X 10.4).

Due to the number of problems listed below, only the 221 conformance tests have been run. All the tests used the `--classic-pascal` option. The original tests were changed from MS-DOS line ending to Unix, and the extension changed from `PAS` to `pas`.

## 3 The list of compliance issues

The following test programs failed to show compliance:

1. CONF003: Produced a large number of warning (which is acceptable), then

```
CONF003.pas:298: error: set constructor range is empty
CONF003.pas:299: confused by earlier errors, bailing out
```

2. CONF005:

CONF005.pas:35: error: 'forward' is a keyword in ISO 7185 Pascal, UCSD Pascal,  
CONF005.pas:35: error: Borland Pascal, Pascal-SC, VAX Pascal, Sun Pascal,  
CONF005.pas:35: error: traditional Macintosh Pascal

3. CONF032:

CONF 032.pas:26: error: ISO 7185 Pascal allows only simple constants

4. CONF041:

CONF 041.pas: In function 'MaxChar':  
CONF 041.pas:40: error: ISO 7185 Pascal allows only simple constants  
CONF 041.pas:41: error: ISO 7185 Pascal allows only simple constants

5. CONF063:

CONF 063.pas: In main program:  
CONF 063.pas:40: error: set constructor range is empty

6. CONF065:

CONF 065.pas: In main program:  
CONF 065.pas:41: error: this use of packed record fields is an extension of Borland  
CONF 065.pas:41: error: Pascal, traditional Macintosh Pascal  
CONF 065.pas:41: error: this use of packed record fields is an extension of Borland  
CONF 065.pas:41: error: Pascal, traditional Macintosh Pascal  
CONF 065.pas:47: error: operation on incompatible sets  
CONF 065.pas:47: error: assignment between incompatible sets  
CONF 065.pas:52: error: operation on incompatible sets  
CONF 065.pas:52: error: operation on incompatible sets  
CONF 065.pas:54: error: operation on incompatible sets  
CONF 065.pas:54: error: operation on incompatible sets  
CONF 065.pas:56: error: this use of packed record fields is an extension of Borland  
CONF 065.pas:56: error: Pascal, traditional Macintosh Pascal  
CONF 065.pas:58: error: this use of packed record fields is an extension of Borland  
CONF 065.pas:58: error: Pascal, traditional Macintosh Pascal

7. CONF072:

CONF 072.pas: In procedure 'Booleans':  
CONF 072.pas:53: error: this use of packed record fields is an extension of Borland  
CONF 072.pas:53: error: Pascal, traditional Macintosh Pascal  
CONF 072.pas:65: error: this use of packed record fields is an extension of Borland  
CONF 072.pas:65: error: Pascal, traditional Macintosh Pascal  
CONF 072.pas: In procedure 'EnumeratedTypes':  
CONF 072.pas:79: error: this use of packed record fields is an extension of Borland  
CONF 072.pas:79: error: Pascal, traditional Macintosh Pascal  
CONF 072.pas:92: error: this use of packed record fields is an extension of Borland  
CONF 072.pas:92: error: Pascal, traditional Macintosh Pascal

```

CONF 072.pas: In procedure 'Integers':
CONF 072.pas:104: error: this use of packed record fields is an extension of Borland
CONF 072.pas:104: error: Pascal, traditional Macintosh Pascal
CONF 072.pas:118: error: this use of packed record fields is an extension of Borland
CONF 072.pas:118: error: Pascal, traditional Macintosh Pascal
CONF 072.pas: In procedure 'Reals':
CONF 072.pas:130: error: this use of packed record fields is an extension of Borland
CONF 072.pas:130: error: Pascal, traditional Macintosh Pascal
CONF 072.pas:144: error: this use of packed record fields is an extension of Borland
CONF 072.pas:144: error: Pascal, traditional Macintosh Pascal
CONF 072.pas: In procedure 'SubrangeOfInteger':
CONF 072.pas:160: error: this use of packed record fields is an extension of Borland
CONF 072.pas:160: error: Pascal, traditional Macintosh Pascal
CONF 072.pas:173: error: this use of packed record fields is an extension of Borland
CONF 072.pas:173: error: Pascal, traditional Macintosh Pascal

```

#### 8. CONF073:

```

CONF073.pas: In procedure 'next':
CONF 073.pas:49: warning: constructing limited integer set '0 .. 255';
CONF 073.pas:49: warning: use '--setlimit=NUMBER' to change the size limit at compile time.
CONF 073.pas:49: error: operation on incompatible sets
CONF 073.pas:50: warning: constructing limited integer set '0 .. 255';
CONF 073.pas:50: warning: use '--setlimit=NUMBER' to change the size limit at compile time.
CONF 073.pas:50: error: operation on incompatible sets
CONF 073.pas:50: error: assignment between incompatible sets
CONF 073.pas: In procedure 'Sets':
CONF 073.pas:51: error: this use of packed record fields is an extension of Borland
CONF 073.pas:51: error: Pascal, traditional Macintosh Pascal
CONF 073.pas:66: error: this use of packed record fields is an extension of Borland
CONF 073.pas:66: error: Pascal, traditional Macintosh Pascal
CONF 073.pas: In procedure 'Arrays':
CONF 073.pas:104: error: this use of packed record fields is an extension of Borland
CONF 073.pas:104: error: Pascal, traditional Macintosh Pascal
CONF 073.pas:119: error: this use of packed record fields is an extension of Borland
CONF 073.pas:119: error: Pascal, traditional Macintosh Pascal
CONF 073.pas: In procedure 'Products':
CONF 073.pas:145: error: this use of packed record fields is an extension of Borland
CONF 073.pas:145: error: Pascal, traditional Macintosh Pascal
CONF 073.pas:160: error: this use of packed record fields is an extension of Borland
CONF 073.pas:160: error: Pascal, traditional Macintosh Pascal
CONF 073.pas: In procedure 'Unions':
CONF 073.pas:212: error: this use of packed record fields is an extension of Borland
CONF 073.pas:212: error: Pascal, traditional Macintosh Pascal
CONF 073.pas:227: error: this use of packed record fields is an extension of Borland
CONF 073.pas:227: error: Pascal, traditional Macintosh Pascal

```

#### 9. CONF120:

```

CONF 120.pas: In function 'MaxChar':
CONF 120.pas:32: error: ISO 7185 Pascal allows only simple constants
CONF 120.pas:33: error: ISO 7185 Pascal allows only simple constants

```

10. CONF132:

CONF 132.pas:19: error: ISO 7185 Pascal allows only simple constants

11. CONF145:

CONF 145.pas: In main program:

CONF 145.pas:23: warning: constructing limited integer set '0 .. 255';

CONF 145.pas:23: warning: use '--setlimit=NUMBER' to change the size limit at compile time.

CONF 145.pas:23: error: set constructor range is empty

12. CONF147:

CONF 147.pas: In main program:

CONF 147.pas:40: error: operation on incompatible sets

CONF 147.pas:42: error: operation on incompatible sets

CONF 147.pas:43: error: operation on incompatible sets

13. CONF148:

CONF 148.pas: In function 'MaxChar':

CONF 148.pas:48: error: ISO 7185 Pascal allows only simple constants

CONF 148.pas:49: error: ISO 7185 Pascal allows only simple constants

14. CONF150:

CONF 150.pas: In function 'MaxChar':

CONF 150.pas:37: error: ISO 7185 Pascal allows only simple constants

CONF 150.pas:38: error: ISO 7185 Pascal allows only simple constants

15. CONF163:

CONF 163.pas: In function 'MaxChar':

CONF 163.pas:40: error: ISO 7185 Pascal allows only simple constants

CONF 163.pas:41: error: ISO 7185 Pascal allows only simple constants

16. CONF181:

CONF 181.pas: In main program:

CONF 181.pas:24: error: constant out of range

CONF 181.pas:24: error: constant out of range

CONF 181.pas:24: warning: ';' after 'do'

17. CONF200:

CONF 200.pas:19: error: ISO 7185 Pascal allows only simple constants

18. CONF215:

```
CONF 215.pas:16: error: 'forward' is a keyword in ISO 7185 Pascal, UCSD Pascal,  
CONF 215.pas:16: error:  Borland Pascal, Pascal-SC, VAX Pascal, Sun Pascal,  
CONF 215.pas:16: error:  traditional Macintosh Pascal
```

All the above failed to compile — there was no instance of a correct Pascal program executing apparently incorrectly. Hence it appears that around 203 tests were correctly processed, but these have not been checked individually.

## 4 The list of deviance issues

The following test programs failed to show compliance by compiling without an error:

1. DEV009:

```
DEV009.PAS: In main program:  
DEV009.PAS:21: warning: ISO Pascal requires a digit after the decimal point  
THE VALUE OF I IS 1.2300000000000000e+02  
DEVIATES...6.1.5-4 (DEV009)
```

2. DEV020:

```
DEVIATES...6.1.7-7 (DEV020)
```

3. DEV021:

```
DEVIATES...6.1.7-8 (DEV021)
```

4. DEV022:

```
DEVIATES...6.1.7-9 (DEV022)
```

5. DEV023:

```
CASE 1 : AB  
CASE 2 : ABCD  
CASE 3 : ABCD  
DEVIATES...6.1.7-10 (DEV023)
```

6. DEV043:

```
DEVIATES...6.2.2-12 (DEV043)
```

7. DEV044:

DEVIATES...6.2.2-13 (DEV044)

8. DEV070:

DEVIATES...6.4.3.2-5 (DEV070)

9. DEV073:

DEVIATES...6.4.3.3-8 (DEV073)

10. DEV075:

DEVIATES...6.4.3.3-18 (DEV075)

11. DEV079:

DEVIATES...6.4.3.3-22 (DEV079)

12. DEV110:

DEVIATES...6.5.4-4 (DEV110)

13. DEV112:

OUTER FUNCTION  
DEVIATES...6.6.1-4 (DEV112)

14. DEV141:

DEVIATES...6.6.3.6-10 (DEV141)

15. DEV144:

DEV144.PAS:23: warning: 'Read' without variables to read -- ignored  
DEVIATES...6.6.5.2-20 (DEV144)

16. DEV145:

DEV145.PAS:22: warning: 'Write' without values to write -- ignored  
DEVIATES...6.6.5.2-22 (DEV145)

17. DEV184:

DEVIATES...6.7.2.5-7 (DEV184), PERMITTED

18. DEV250:

NOTASTRING = Z  
DEVIATES...6.9.3.6-3 (DEV250)

19. DEV256:

DEV256.PAS:21: warning: identifier 'f' in program heading is not a variable of file type  
DEVIATES...6.10-8 (DEV256)

## References

- [1] ISO/IEC 7185:1990. Programming Languages — Pascal.
- [2] Wichmann B A & Ciechanowicz Z J (Editors). *Pascal Compiler Validation*. Wiley: London, 1983.

## A Document details

- 1. Started December 2005.
- 2. Deviance test added, 26th Dec 2005.