TANGLE Modification Causes Problems in METAFONT and PK Files

Thomas J. Reid

Texas A&M University

FOREWORD: Notice to sites using a version of TANGLE which preserves case for Pascal identifier names. This includes some implementations under VAX/VMS and most under AOS/VS. Sites running TANGLE under other operating systems may also be affected.

In tracking down a problem recently encountered in some PK files created by GFtoPK Version 1.3 under VAX/VMS it was found that TANGLE was generating incorrect Pascal source code. The problem shows up in GFtoPK in section 75 ⟨Write two-byte short character preamble⟩. The WEB statement:

```
flag_byte := flag_byte +
             comp_size div 65536 + 4 ;
```

was converted by TANGLE into:

```
flag_byte:=flag_byte+
           comp_size div 65540;
```

TANGLE has provisions which prevent it from adding constants when one is adjacent to a "*," "/," "MOD" or "DIV." However, the VAX/VMS change file which is used here (and at many other sites as well) modifies TANGLE to preserve the case of Pascal keywords and identifiers; the keywords "div" and "mod" were not being recognized as "DIV" and "MOD," respectively, because of the case difference.

The TANGLE bug is easily fixed by revising sections 105 ⟨Contribution is * or / or DIV or MOD⟩ and 110 ⟨If previous output was DIV or MOD⟩ to include tests for "div" and "mod." The problem can be fixed by inserting the WEB code at the end of this article into your change file for TANGLE. Again, this fix only applies to versions of TANGLE which have been modified to keep Pascal identifiers in lowercase.

Implications of Bug

TANGLE was run before and after making the fix to determine the extent of its impact. The programs tested consist of

WEAVE	GFtoPK	PKtype	POOLtype
TANGLE	GFtoDVI	PXtoPK	TFtoPL
BIBTEX	MFT	PKtoPX	PLtoTF
METAFONT	GFtoPXL	TEX	DVItype
GFtype			

Of these, only METAFONT, GFtoPK and PXtoPK were affected.

GFtoPK was wrong only in section 75 ⟨Write two-byte short character preamble⟩ while PXtoPK was affected in sections 44 (**Writing the packed file**) and 69 ⟨Write two-byte short character preamble⟩. The GFtoPK and PXtoPK bugs result in unusable PK files for large size fonts (cminch, some magsteps of cmr17, etc.). METAFONT was affected in five statements: one statement in section 232 (**procedure** *init_big_node*) and four statements in section 566 (**procedure** *wTek_coor*). Section 566 was modified to support on-line displays on a Tektronix terminal, so the invalid code in this section does not impact any fonts created by META-FONT. In section 232, the statement

```
name_type(q+s):=half(s)+x_part_sector;
```

is converted by TANGLE into the remarkable

```
mem[q+s].hh.b1:=(s)div 7;
```

through the wonders of WEB macros. The correct Pascal code for the statement should be

```
mem[q+s].hh.b1:=(s)div 2+5;
```

The impact of this bug has not yet been assessed, although it does not seem to have made very much difference on any of our fonts.

Additions to WEB change file for TANGLE

```
@x
@ @<Contribution is \.*...@>=
((t=ident)and(v=3)and@|
 (((out_contrib[1]="D")and(out_contrib[2]="I")and(out_contrib[3]="V")) or@|
 ((out_contrib[1]="M")and(out_contrib[2]="O")and(out_contrib[3]="D")) ))or@|
@^uppercase@>
 ((t=misc)and((v="*")or(v="/")))
@y
@ @<Contribution is \.*...@>=
((t=ident)and(v=3)and@|
 (((out_contrib[1]="D")and(out_contrib[2]="I")and(out_contrib[3]="V")) or@|
 ((out_contrib[1]="d")and(out_contrib[2]="i")and(out_contrib[3]="v")) or@|
 ((out_contrib[1]="M")and(out_contrib[2]="O")and(out_contrib[3]="D")) or@|
 ((out_contrib[1]="m")and(out_contrib[2]="o")and(out_contrib[3]="d")) ))or@|
@^uppercase@>
 ((t=misc)and((v="*")or(v="/")))
@z


@x
@ @<If previous output was \.{DIV}...@>=
if (out_ptr=break_ptr+3)or
 ((out_ptr=break_ptr+4)and(out_buf[break_ptr]=" ")) then
@^uppercase@>
  if ((out_buf[out_ptr-3]="D")and(out_buf[out_ptr-2]="I")and
    (out_buf[out_ptr-1]="V"))or @/
    ((out_buf[out_ptr-3]="M")and(out_buf[out_ptr-2]="O")and
    (out_buf[out_ptr-1]="D")) then@/ goto bad_case
@y
@ @<If previous output was \.{DIV}...@>=
if (out_ptr=break_ptr+3)or
 ((out_ptr=break_ptr+4)and(out_buf[break_ptr]=" ")) then
@^uppercase@>
  if ((out_buf[out_ptr-3]="D")and(out_buf[out_ptr-2]="I")and
    (out_buf[out_ptr-1]="V"))or @/
    ((out_buf[out_ptr-3]="d")and(out_buf[out_ptr-2]="i")and
    (out_buf[out_ptr-1]="v"))or @/
    ((out_buf[out_ptr-3]="M")and(out_buf[out_ptr-2]="O")and
    (out_buf[out_ptr-1]="D"))or @/
    ((out_buf[out_ptr-3]="m")and(out_buf[out_ptr-2]="o")and
    (out_buf[out_ptr-1]="d")) then@/ goto bad_case
@z
```