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365 **E.4.38 `lp` — Send files to a printer**

366 **E.4.39 `ls` — List directory contents**

367 **E.4.40 `mailx` — Process messages**

368 **E.4.41 `mkdir` — Make directories**

369 **E.4.42 `mkfifo` — Make FIFO special files**

370 **E.4.43 `mv` — Move files**

371 **E.4.44 `nohup` — Invoke a utility immune to hangups**

372 **E.4.45 `od` — Dump files in various formats**

373 **E.4.46 `paste` — Merge corresponding or subsequent lines of files**

374 **E.4.47 `pathchk` — Check pathnames**

375 **E.4.48 `pax` — Portable archive interchange**

376 **E.4.49 `pr` — Print files**

377 **E.4.50 `printf` — Write formatted output**

378 **E.4.51 `pwd` — Return working directory name**

379 **E.4.52 `read` — Read a line from standard input**

380 **E.4.53 `rm` — Remove directory entries**

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381 **E.4.54 `rmdir` — Remove directories**

382 **E.4.55 `sed` — Stream editor**

383 **E.4.56 `sh` — Shell, the standard command language interpreter**

384 **E.4.57 `sleep` — Suspend execution for an interval**

385 **E.4.58 `sort` — Sort, merge, or sequence check text files**

386 **E.4.59 `stty` — Set the options for a terminal**

387 **E.4.60 `tail` — Copy the last part of a file**

388 **E.4.61 `tee` — Duplicate standard input**

389 **E.4.62 `test` — Evaluate expression**

390 **E.4.63 `touch` — Change file access and modification times**

391 **E.4.64 `tr` — Translate characters**

392 **E.4.65 `true` — Return true value**

393 **E.4.66 `tty` — Return user's terminal name**

394 **E.4.67 `umask` — Get or set the file mode creation mask**

395 **E.4.68 `uname` — Return system name**

396 **E.4.69 `uniq` — Report or filter out repeated lines in a file**

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E.4.70 `wait` — Await process completion

E.4.71 `wc` — Word, line, and byte count

E.4.72 `xargs` — Construct argument list(s) and invoke utility

E.5 User Portability Utilities Option

Editor's Note: This section is unused in this revision of the standard.

E.6 Software Development Utilities Option

Editor's Note: The text of the Rationale for this section has been temporarily located in Section 6, adjacent to the text it is explaining. The text will return to this annex after the completion of balloting.

This is the first of the optional utility environments. The working group decided there were two basic classes of systems to be supported: general application execution and software development. The first is widely used and is the primary reason for the development of this standard. The second, however, represents only a (small?) subset of the first; the users are generally only those who are developing or installing C or FORTRAN applications.

Therefore, all the development environments are optional, giving users the option of specifying a smaller, (presumably) less expensive system. There are three separate optional environments, so that C-only or FORTRAN -only users do not have to specify unneeded components. As further languages are supported by this standard, their environments will also be optional.

An implementation must provide all three of these utilities to claim conformance to this section.

See section **E.4** for a discussion of utilities excluded from this group.

E.6.1 `ar` — Create and maintain library archives

E.6.2 `make` — Maintain, update, and regenerate groups of programs

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E.6.3 `strip` — Remove unnecessary information from executable files

E.7 Language-Independent System Services

Editor's Note: The text of the Rationale for this section has been temporarily located in Section 7, adjacent to the text it is explaining. The text will return to this annex after the completion of balloting.

E.7.1 Shell Command Interface

E.7.2 Access Environment Variables

E.7.3 Regular Expression Matching

E.7.4 Pattern Matching

E.7.5 Command Option Parsing

E.7.6 Generate Pathnames Matching a Pattern

E.7.7 Perform Word Expansions

E.7.8 Get POSIX Configurable Variables

E.7.9 Locale Control

E.8 C Language Development Utilities Option

Editor's Note: The text of the Rationale for this section has been temporarily located in Annex A, adjacent to the text it is explaining. The text will return to this annex after the completion of balloting.

This is the second of the optional utility environments.

An implementation must provide all three of these utilities to claim conformance to this section.

See section **E.4** for a discussion of utilities excluded from this group.

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444 ### E.8.1 `c89` — Compile Standard C programs

445 ### E.8.2 `lex` — Generate programs for lexical tasks

446 ### E.8.3 `yacc` — Yet another compiler compiler

447 ## E.9 C Language Bindings Option

448 *Editor's Note: The text of the Rationale for this section has been temporarily*
449 *located in Annex B, adjacent to the text it is explaining. The text will return to this*
450 *annex after the completion of balloting.*

451 ### E.9.1 C Language Definitions

452 ### E.9.2 C Numerical Limits

453 ### E.9.3 C Binding for Shell Command Interface

454 ### E.9.4 C Binding for Access Environment Variables

455 ### E.9.5 C Binding for Regular Expression Matching

456 ### E.9.6 C Binding for Match Filename or Pathname

457 ### E.9.7 C Binding for Command Option Parsing

458 ### E.9.8 C Binding for Generate Pathnames Matching a Pattern

459 ### E.9.9 C Binding for Perform Word Expansions

460 ### E.9.10 C Binding for Get POSIX Configurable Variables

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461 ### E.9.11 C Binding for Locale Control

462 ## E.10 FORTRAN Development and Runtime Utilities Options

463 *Editor's Note: The text of the Rationale for this section has been temporarily*
464 *located in Annex C, adjacent to the text it is explaining. The text will return to this*
465 *annex after the completion of balloting.*

466 This is the third and fourth of the optional utility environments.

467 See section **E.4** for a discussion of utilities excluded from this group.

468 ### E.10.1 `asa` — Interpret carriage control characters

469 ### E.10.2 `fort77` — FORTRAN compiler

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Annex F
(informative)

Sample National Profile

Editor's Note: All uses of the term ''character set'' this annex have been changed to ''coded character set'' without further diff marks.

This annex is an example of a country's needs with respect to this standard and how those needs relate to other international standards as well as national standards. The example provided is included here for informative purposes and is not a formal standard in the country in question. It is provided by the Danish Standards Association [1] and is as accurate as possible with regards to Danish needs.

F.1 (Example) Danish National Profile

This is the definition of the Danish Standards Association POSIX.2 profile. The subset of conforming implementations that provide the required characteristics below is referred to as conforming to the ''Danish Standards Association (DS) Environment Profile'' for this standard.

This profile specifies the following requirements on implementations:

(1) In POSIX.2 section 2.13.1, the limit {COLL_WEIGHTS_MAX} shall be provided with a value of 4. All other limits shall conform to at least the minimum values shown in Table 2-16.

(2) The following options shall be supported according to POSIX.2 section 2.13.2:

---

1) Further information may be obtained from the Danish Standards Association, Attn: S142u22A8 Baunegaardsvej 73, DK-2900 Hellerup, Denmark; FAX: +45 39 77 02 02; Email: `u22a8@dkuug.dk`

The data is also available electronically by anonymous FTP or FTAM at the site `dkuug.dk` in the directory `i18n`, where some other example national profiles, locales, and *charmaps* may also be found. They are also available by an archive server reached at `archive@dkuug.dk`; use '`Subject: help`'' for further information.

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POSIX2_C_BIND	Optional.
POSIX2_C_DEV	Optional.
POSIX2_FORT_DEV	Optional.
POSIX2_FORT_RUN	Optional.
POSIX2_LOCALEDEF	Required; the system shall support the creation of locales as described in 4.35.
POSIX2_SW_DEV	Optional.

F.1.1 Danish Locale Model

Editor's Note: This subclause is offered as rationale for the current state of this example annex. It will not necessarily appear in this form in any final version of the annex.

Creating a national locale for Denmark has been a quite elaborate effort. Time and again, we thought we had reached an agreement on the locale, but then some aspect disrupted the entire work, and we more or less had to start all over.

We think we have identified the cause of these problems to a general uncertainty regarding the exact purpose of a ''national'' locale. If we look at the Danish situation (which we know pretty well by now), we have identified several levels of locales, depending on the ''complexity'' of the collating sequence (or more generally sorting different kinds of text):

(1) *Byte/machine level.* Here everything is sorted according to the character's byte value.

(2) *Character/utility level.* Here we want to work almost on the same level as (1), i.e., character by character, but obeying a (simple) collating sequence that ensures that, for example, upper- and lowercase letters are equivalent, or that national characters are sorted correctly. The characters still do not have any ''implicit'' meaning, and the comparison of two strings is still deterministic; i.e., strings that are different at level 1 are still different at level 2.

(3) *Text/application level.* Here we want to be able to search in text looking for specific words or items. The comparison is still performed on a character-by-character basis, but possibly ignoring some characters that are not important, and determinism is not important either.

(4) *Semantic/dictionary/library/phone-book level.* Entire words like ''the'' are omitted from comparisons; maybe soundex is required. This probably requires specially developed software.

Our problem has been the conflicting requirements from each of these levels, which we optimistically have tried to combine into a single national locale (ignoring level 4, however). The POSIX Locale is aimed at level 2; i.e., at a rather low level. Many of our attempts to write a national Danish locale have failed because we have actually tried to write a level 3 locale, and finding that it did not work as

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an alternative to the default POSIX locale at level 2.

The locale we now provide is the final compromise between level 2 and level 3, by taking our latest attempt aimed at level 3, and make the comparison completely deterministic, and thus bring it down to level 2.

We also have found that we may need to include some more information in the identification of a specific locale than just the country code, the language code, and the coded character set, since what we have had most problems with was the purpose or scope of a specific locale; i.e., is it just a nationalized version of the POSIX Locale (e.g., extended with <ae>, <o/>, and <aa> at the proper positions), is it aimed at text search (ignoring certain characters), or is it on an even higher level? Many such alternative locales would certainly be useful for various classes of problems or applications, so our model for the locale name identification string includes a *<version>* parameter.

We hope by providing these comments to have clarified our intention with the locale definitions to save other countries from doing our mistakes all over.

F.2 Locale String Definition Guideline

The following guideline is used for specifying the locale identification string: [2)]

> "%2.2s_%2.2s.%s,%s", *<language>*, *<territory>* , *<coded-character-set>*, *<version>*

where *<language>* shall be taken from ISO 639 {B1} and *<territory>* shall be the two-letter country code of ISO 3166 {B4}, if possible. The *<language>* shall be specified with lowercase letters only, and the *<territory>* shall be specified in uppercase letters only. An optional *<coded-character-set>* specification may follow after a <period> for the name of the coded character set; if just a numeric specification is present, this shall represent the number of the international standard describing the coded character set. If the *<coded-character-set>* specification is not present, the encoded character-set-specific locale shall be determined by the **CHARSET** environment variable, and if this is unset or null, the encoding of ISO 8859-1 {5} shall be assumed. A parameter specifying a *<version>* of the locale may be placed after the optional *<coded-character-set>* specification, delimited by <comma>. This may be used to discriminate between different cultural needs; for instance, dictionary order versus a more systems-oriented collating order.

---

2) The guideline was inspired by the *X/Open Portability Guide* {B31}.

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F.3 Scope of Danish National Locale

This national locale covers the Danish language in Denmark. In addition, Faroese and Greenlandic LC_TIME and LC_MESSAGES specifications have been defined; the rest of the Danish national locale shall be used for these locales as well.

This locale is designed to be coded character-set independent. It completely specifies the behavior of systems based on ISO/IEC 10646 {B11} (with ISO 6429 {B5} control character encoding) together with many 7-bit and 8-bit encoded character sets, including ISO 8859 character sets and major vendor-specific 8-bit character sets (with ISO 6429 {B5} or ISO/IEC 646 {1} control character encoding when applicable).

This locale is portable as long as the character naming in the charmap description file ISO_10646 for ISO/IEC 10646 {B11} is followed. Examples of such charmap files for ISO/IEC 10646 {B11} and ISO 8859-1 {5} are shown in F.5.1 and F.5.2.

The collating sequence is completely deterministic and is aimed for usage in system tools. Other Danish collation sequences with nondeterministic properties, which may be needed for some application programs, are not covered by this locale.

The LC_TYPE category of the locale is quite general and may be useful for other locales; also the LC_COLLATE category, though specifically Danish, may be a good template from which to generate other locales.

Following the preceding guidelines for locale names, the national Danish locale string shall be:

da_DK

F.3.1 da_DK — (Example) Danish National Locale

```
escape_char     /
comment_char    %
% Danish example national locale for the language Danish
% Source: Danish Standards Association
% Revision 1.7 1991-05-07

LC_CTYPE

digit   <0>;<1>;<2>;<3>;<4>;<5>;<6>;<7>;<8>;<9>

xdigit  <0>;<1>;<2>;<3>;<4>;<5>;<6>;<7>;<8>;<9>;/
        <A>;<B>;<C>;<D>;<E>;<F>;<a>;<b>;<c>;<d>;<e>;<f>

blank   <SP>;<HT>;<NS>

space   <SP>;<LF>;<VT>;<FF>;<CR>;<HT>;<NS>

upper   <A>;<B>;<C>;<D>;<E>;<F>;<G>;<H>;<I>;<J>;/
        <K>;<L>;<M>;<N>;<O>;<P>;<Q>;<R>;<S>;<T>;/
        <U>;<V>;<W>;<X>;<Y>;<Z>;<A!>;<A'>;<A/>>;<A?>;/
```

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```
            <A:>;<AA>;<AE>;<C,>;<E!>;<E'>;<E/>>;<E:>;<I!>;<I'>;/                1
            <I/>>;<I:>;<D->;<N?>;<O!>;<O'>;<O/>>;<O?>;<O:>;<O//>;/              1
            <U!>;<U'>;<U/>>;<U:>;<Y'>;<TH>;<A->;<C/>>;<C.>;<E->;/               1
            <E.>;<G/>>;<G(>;<G.>;<G,>;<H/>>;<I?>;<I->;<I.>;<I;>;/               1
            <J/>>;<K,>;<H//>;<IJ>;<L.>;<L,>;<N,>;<OE>;<O->;<T//>;/              1
            <NG>;<A;>;<L//>;<L<>;<S'>;<S/>>;<S<>;<S,>;<T<>;<Z'>;/               1
            <Z<>;<Z.>;<R'>;<R,>;<A(>;<L'>;<C'>;<C<>;<E;>;<E<>;/                 1
            <D<>;<D//>;<N'>;<N<>;<U?>;<O">;<U->;<U(>;<R<>;<U0>;/                 1
            <U;>;<U">;<W/>>;<Y/>>;<T,>;<Y:>;<A<>;<A_>;<'A>;<A1>;/
            <A2>;<A3>;<B.>;<B_>;<D_>;<D.>;<D;>;<E(>;<E_>;<E?>;/
            <F.>;<G<>;<G->;<G//>;<H:>;<H.>;<H,>;<H;>;<I<>;<I(>;/
            <J(>;<K'>;<K<>;<K_>;<K.>;<K;>;<L_>;<M'>;<M.>;<N.>;/
            <N_>;<O<>;<O(>;<O_>;<O;>;<O1>;<P'>;<R.>;<R_>;<S.>;/
            <S;>;<T_>;<T.>;<U<>;<V?>;<W'>;<W.>;<W:>;<X.>;<X:>;/
            <Y!>;<Y.>;<Z/>>;<Z(>;<Z_>;<Z//>;<EZ>;<G'>;<'B>;<'D>;/
            <'G>;<'J>;<'Y>;<ED>;<IO>;<D%>;<G%>;<IE>;<DS>;<II>;/
            <YI>;<J%>;<LJ>;<NJ>;<Ts>;<KJ>;<V%>;<DZ>;<A=>;<B=>;/
            <V=>;<G=>;<D=>;<E=>;<Z%>;<Z=>;<I=>;<J=>;<K=>;<L=>;/
            <M=>;<N=>;<O=>;<P=>;<R=>;<S=>;<T=>;<U=>;<F=>;<H=>;/
            <C=>;<C%>;<S%>;<Sc>;<=">;<Y=>;<%">;<JE>;<JU>;<JA>;/
            <I3>;<A%>;<E%>;<Y%>;<I%>;<O%>;<U%>;<W%>;<A*>;<B*>;/
            <G*>;<D*>;<E*>;<Z*>;<Y*>;<H*>;<I*>;<K*>;<L*>;<M*>;/
            <N*>;<C*>;<O*>;<P*>;<R*>;<S*>;<T*>;<U*>;<F*>;<X*>;/
            <Q*>;<W*>;<J*>;<V*>

lower       <a>;<b>;<c>;<d>;<e>;<f>;<g>;<h>;<i>;<j>;/
            <k>;<l>;<m>;<n>;<o>;<p>;<q>;<r>;<s>;<t>;/
            <u>;<v>;<w>;<x>;<y>;<z>;<ss>;<a!>;<a'>;<a/>>;/
            <a?>;<a:>;<aa>;<ae>;<c,>;<e!>;<e'>;<e/>>;<e:>;<i!>;/
            <i'>;<i/>>;<i:>;<d->;<n?>;<o!>;<o'>;<o/>>;<o?>;<o:>;/
            <o//>;<u!>;<u'>;<u/>>;<u:>;<y'>;<th>;<y:>;<a->;<c/>>;/
            <c.>;<e->;<e.>;<g/>>;<g(>;<g.>;<g,>;<h/>>;<i?>;<i->;/
            <'n>;<kk>;<i;>;<j/>>;<k,>;<h//>;<i.>;<ij>;<l.>;<l,>;/
            <n,>;<oe>;<o->;<t//>;<ng>;<a;>;<l//>;<l<>;<s'>;<s/>>;/
            <s<>;<s,>;<t<>;<z'>;<z<>;<z.>;<r'>;<r,>;<a(>;<l'>;/
            <c'>;<c<>;<e;>;<e<>;<d<>;<d//>;<n'>;<n<>;<u?>;<o">;/
            <u->;<u(>;<r<>;<u0>;<u;>;<u">;<w/>>;<y/>>;<t,>;<a<>;/               1
            <a_>;<'a>;<a1>;<a2>;<a3>;<b.>;<b_>;<d_>;<d.>;<d;>;/
            <e(>;<e_>;<e?>;<f.>;<g<>;<g->;<g//>;<h:>;<h.>;<h,>;/
            <h;>;<i<>;<i(>;<j(>;<k'>;<k<>;<k_>;<k.>;<k;>;<l_>;/
            <m'>;<m.>;<n.>;<n_>;<o<>;<o(>;<o_>;<o;>;<o1>;<p'>;/
            <r.>;<r_>;<s.>;<s;>;<t_>;<t.>;<u<>;<v?>;<w'>;<w.>;/
            <w:>;<x.>;<x:>;<y!>;<y.>;<z/>>;<z(>;<z_>;<z//>;<ez>;/
            <g'>;<'b>;<'d>;<'g>;<'j>;<'y>;<ed>;<nS>;<sB>;<a=>;/
            <b=>;<v=>;<g=>;<d=>;<e=>;<z%>;<z=>;<i=>;<j=>;<k=>;/
            <l=>;<m=>;<n=>;<o=>;<p=>;<r=>;<s=>;<t=>;<u=>;<f=>;/
            <h=>;<c=>;<c%>;<s%>;<sc>;<='>;<y=>;<%'>;<je>;<ju>;/
            <ja>;<io>;<d%>;<g%>;<ie>;<ds>;<ii>;<yi>;<j%>;<lj>;/
            <nj>;<ts>;<kj>;<v%>;<dz>;<a%>;<e%>;<y%>;<i%>;<a*>;/
            <b*>;<g*>;<d*>;<e*>;<z*>;<y*>;<h*>;<i*>;<k*>;<l*>;/
            <m*>;<n*>;<c*>;<o*>;<p*>;<r*>;<*s>;<s*>;<t*>;<u*>;/
            <f*>;<x*>;<q*>;<w*>;<j*>;<v*>;<o%>;<u%>;<w%>;<A5>;/
            <I5>;<U5>;<E5>;<O5>;<tU>;<yA>;<yU>;<yO>;<wA>;<a6>;/
            <i6>;<u6>;<e6>;<o6>;<TU>;<YA>;<YU>;<YO>;<WA>;<KA>;/
            <KE>;<ff>;<fi>;<fl>;<ft>;<st>

alpha       <A>;<B>;<C>;<D>;<E>;<F>;<G>;<H>;<I>;<J>;/
```

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```
<K>;<L>;<M>;<N>;<O>;<P>;<Q>;<R>;<S>;<T>;/
<U>;<V>;<W>;<X>;<Y>;<Z>;<a>;<b>;<c>;<d>;/
<e>;<f>;<g>;<h>;<i>;<j>;<k>;<l>;<m>;<n>;/
<o>;<p>;<q>;<r>;<s>;<t>;<u>;<v>;<w>;<x>;/
<y>;<z>;<-->;<A!>;<A’>;<A/>>;<A?>;<A:>;<AA>;<AE>;/
<C,>;<E!>;<E’>;<E/>>;<E:>;<I!>;<I’>;<I/>>;<I:>;<D->;/
<N?>;<O!>;<O’>;<O/>>;<O?>;<O:>;<O//>;<U!>;<U’>;<U/>>;/
<U:>;<Y’>;<TH>;<ss>;<a!>;<a’>;<a/>>;<a?>;<a:>;<aa>;/
<ae>;<c,>;<e!>;<e’>;<e/>>;<e:>;<i!>;<i’>;<i/>>;<i:>;/
<d->;<n?>;<o!>;<o’>;<o/>>;<o?>;<o:>;<o//>;<u!>;<u’>;/
<u/>>;<u:>;<y’>;<th>;<y:>;<A->;<C/>>;<C.>;<E->;<E.>;/
<G/>>;<G(>;<a->;<c/>>;<c.>;<e->;<e.>;<g/>>;<g(>;<G.>;/
<G,>;<H/>>;<I?>;<I->;<I.>;<g.>;<g,>;<h/>>;<i?>;<i->;/
<I;>;<J/>>;<K,>;<H//>;<IJ>;<L.>;<L,>;<N,>;<OE>;<O->;/
<T//>;<NG>;<’n>;<kk>;<i;>;<j/>>;<k,>;<h//>;<i.>;<ij>;/
<l.>;<l,>;<n,>;<oe>;<o->;<t//>;<ng>;<A;>;<L//>;<L<>;/
<S’>;<S/>>;<S<>;<S,>;<T<>;<Z’>;<Z<>;<Z.>;<a;>;<l//>;/
<l<>;<s’>;<s/>>;<s<>;<s,>;<t<>;<z’>;<z<>;<z.>;<R’>;/
<R,>;<A(>;<L’>;<C’>;<C<>;<E;>;<E<>;<D<>;<D//>;<N’>;/
<N<>;<U?>;<O">;<U->;<U(>;<R<>;<U0>;<U;>;<U">;<W/>>;/ 1
<Y/>>;<T,>;<Y:>;<r’>;<r,>;<a(>;<l’>;<c’>;<c<>;<e;>;/
<e<>;<d<>;<d//>;<n’>;<n<>;<u?>;<o">;<u->;<u(>;<r<>;/
<u0>;<u;>;<u">;<w/>>;<y/>>;<t,>;<a<>;<A<>;<a_>;<A_>;/ 1
<’a>;<’A>;<a1>;<A1>;<a2>;<A2>;<a3>;<A3>;<b.>;<B.>;/
<b_>;<B_>;<d_>;<D_>;<d.>;<D.>;<d;>;<D;>;<e(>;<E(>;/
<e_>;<E_>;<e?>;<E?>;<f.>;<F.>;<g<>;<G<>;<g->;<G->;/
<g//>;<G//>;<h:>;<H:>;<h.>;<H.>;<h,>;<H,>;<h;>;<H;>;/
<i<>;<I<>;<i(>;<I(>;<j(>;<J(>;<k’>;<K’>;<k<>;<K<>;/
<k_>;<K_>;<k.>;<K.>;<k;>;<K;>;<l_>;<L_>;<m’>;<M’>;/
<m.>;<M.>;<n.>;<N.>;<n_>;<N_>;<o<>;<O<>;<o(>;<O(>;/
<o_>;<O_>;<o;>;<O;>;<o1>;<O1>;<p’>;<P’>;<r.>;<R.>;/
<r_>;<R_>;<s.>;<S.>;<s;>;<S;>;<t_>;<T_>;<t.>;<T.>;/
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```
417             (<d=>,<D=>); (<ds>,<DS>); (<dz>,<DZ>); (<e=>,<E=>); (<f=>,<F=>);/
418             (<g%>,<G%>); (<g=>,<G=>); (<h=>,<H=>); (<i=>,<I=>); (<ie>,<IE>);/
419             (<ii>,<II>); (<io>,<IO>); (<j%>,<J%>); (<j=>,<J=>); (<ja>,<JA>);/
420             (<je>,<JE>); (<ju>,<JU>); (<k=>,<K=>); (<kj>,<KJ>); (<l=>,<L=>);/
421             (<lj>,<LJ>); (<m=>,<M=>); (<n=>,<N=>); (<nj>,<NJ>); (<o=>,<O=>);/
422             (<p=>,<P=>); (<r=>,<R=>); (<s%>,<S%>); (<s=>,<S=>); (<sc>,<Sc>);/
423             (<t=>,<T=>); (<ts>,<Ts>); (<u=>,<U=>); (<v=>,<V=>); (<y=>,<Y=>);/
424             (<yi>,<YI>); (<z%>,<Z%>); (<z=>,<Z=>); (<a%>,<A%>); (<a*>,<A*>);/
425             (<b*>,<B*>); (<c*>,<C*>); (<d*>,<D*>); (<e%>,<E%>); (<e*>,<E*>);/
426             (<f*>,<F*>); (<g*>,<G*>); (<h*>,<H*>); (<i%>,<I%>); (<i*>,<I*>);/
427             (<j*>,<J*>); (<k*>,<K*>); (<l*>,<L*>); (<m*>,<M*>); (<n*>,<N*>);/
428             (<o%>,<O%>); (<o*>,<O*>); (<p*>,<P*>); (<q*>,<Q*>); (<r*>,<R*>);/
429             (<s*>,<S*>); (<*s>,<S*>); (<t*>,<T*>); (<u%>,<U%>); (<u*>,<U*>);/      1
430             (<v*>,<V*>); (<w%>,<W%>); (<w*>,<W*>); (<x*>,<X*>); (<y%>,<Y%>);/      1
431             (<y*>,<Y*>); (<z*>,<Z*>)                                               1

432     END LC_CTYPE

433     LC_COLLATE

434     % Ordering algorithm:                                                          1
435     %  1. Spaces and hyphen (but not soft hyphen) before punctuation               1
436     %     characters, punctuation characters before numbers,                       1
437     %     numbers before letters.                                                  1
438     %  2. Letters with diacritical marks are members of equivalence classes        1
439     %  3. Upper case letters before corresponding lower case letter.               1
440     %  4. Specials are ignored when comparing letters, but then they are considered 1
441     %  5. The alphabets are sorted in the order of appearance in ISO 10646:        1
442     %     Latin, Cyrillic, Greek, Arabic and Hebrew.                               1
443     %  6. In Danish, the letter combination ‘aa’ is equivalent to ‘<aa>’           1
444     %                                                                              1
445     % The ordering algorithm is in accordance with Danish Standard DS 377         1
446     % and the Danish Orthography Dictionary (Retskrivningsordbogen, 1986).        1
447     % It is also in accordance with Faroese and Greenlandic orthography.          1

448     collating-element <A-A> from <A><A>                                            1
449     collating-element <a-a> from <a><a>                                            1
450     collating-element <A-a> from <A><a>                                            1
451     collating-element <s-s> from <s><s>                                            1
452     collating-element <i-j> from <i><j>                                            1
453     collating-element <I-J> from <I><J>                                            1
454     collating-element <o-e> from <o><e>                                            1
455     collating-element <O-E> from <O><E>                                            1
456     collating-element <t-h> from <t><h>                                            1
457     collating-element <T-H> from <T><H>                                            1
458     collating-element <n-g> from <n><g>                                            1
459     collating-element <N-G> from <N><G>                                            1

460     % collating symbols, <CAPITAL> or <SMALL> letters first                        1
461     % <CAPITAL> letters before <SMALL> letters                                     1

462     collating-symbol <CAPITAL>
463     collating-symbol <BOTH>
464     collating-symbol <SMALL>

465     collating-symbol <NO-ACCENT>
466     collating-symbol <ACUTE>
```

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```
collating-symbol <GRAVE>
collating-symbol <CIRCUMFLEX>
collating-symbol <TILDE>
collating-symbol <MACRON>
collating-symbol <BREVE>
collating-symbol <DOT>
collating-symbol <DIAERESIS>
collating-symbol <CEDILLA>
collating-symbol <UNDERLINE>
collating-symbol <STROKE>
collating-symbol <DOUBLE-ACUTE>
collating-symbol <OGONEK>
collating-symbol <CARON>
collating-symbol <CYRILLIC>
collating-symbol <GREEK>
collating-symbol <ALPHA-1>
collating-symbol <ALPHA-2>
collating-symbol <PRECEDED-BY-APOSTROPHE>
collating-symbol <SPECIAL>
collating-symbol <ACC0>
collating-symbol <ACC1>
collating-symbol <ACC2>
collating-symbol <ACC3>
collating-symbol <ACC11>
collating-symbol <ACC12>

% letter;accent;case;specials                                    1

order_start forward;backward;forward;forward

<CAPITAL>
<BOTH>
<SMALL>

<NO-ACCENT>
<ACUTE>
<GRAVE>
<CIRCUMFLEX>
<TILDE>
<MACRON>
<BREVE>
<DOT>
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<GREEK>
<ALPHA-1>
<ALPHA-2>
<PRECEDED-BY-APOSTROPHE>
<SPECIAL>
<ACC0>
<ACC1>
```

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```
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521  <ACC3>
522  <ACC11>
523  <ACC12>

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526  <HT>    <SP>
527  <VT>    <SP>
528  <CR>    <SP>
529  <LF>    <SP>
530  <FF>    <SP>
531  <->     <SP>
532  <//>    <SP>
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534  <">     IGNORE;IGNORE;IGNORE
535  <Nb>    IGNORE;IGNORE;IGNORE
536  <DO>    IGNORE;IGNORE;IGNORE
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