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Typesetting Bridge via T_EX

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Abstract *Enhanced plain T_EX macros and a bidding environment for typesetting bridge card distributions and bidding sequences are given. As a follow-up of the L^AT_EX macros given in [12]. Moreover, macros for annotated printing of the course of the play are provided. Examples of use are included.*

1. Introduction

After the publication of [12] Bernard Gaulle among others, asked for similar plain T_EX macros. This article concentrates on

- Translation into plain T_EX of L^AT_EX macros for printing card deals and bidding sequences as published in [12], i.e., emulated `\hand`, `\crdima` macros and NESW-figure, as well as a flexible (`\bbid`, `\ebid`) environment.
- (new) T_EX macros — (`\bplay`, `\eplay`) environment and `\showgame` — for handling the course of the play, in the same spirit as how chess is ‘played’ in print, see [2, 16], i.e., with annotations and preserved data-integrity; no retyping of the hands! This starts in section How the play goes.

The translated macros are enhanced with respect to both language as well as application flexibility. The language flexibility is in the spirit of the ‘international’ DUTCH-sty-option activity, see [4]. Names are provided, via (grouped) macros, which can be redefined easily. Wi-

thin the context of bridge this means definition of the four players, e.g., — In several books, e.g. [13], the players are personalized into: Partner, RHO, YOU, LHO, where R/L-HO mean Right/Left-Hand Oponent. In newspaper columns the names of the players are sometimes given. This, as well as language variations, can be realized easily by redefinitions of `\fih` etc. It must be admitted though, that editing source texts is in general not that difficult, just cumbersome.

As long as card values are represented by digits and letters we don’t need control sequences for them. They can just be typed in, with the representation you like. In English we have A(ce), K(ing), Q(ueen) and J(ack), while in Dutch they read A(as), H(eer), V(rouw), B(oer), along with T(en) — respectively T(ien) — 9, 8, 7, 6, 5, 4, 3, 2.

2. Card deals

`\hand` prints the cards a player holds. `\crdima` (CaRD IMAge) prints all the cards given for every hand in a suitable way. The argument sequences of `\hand` and `\crdima` are similar to the L^AT_EX argument sequences given in [12].

Arguments

`\crdima` takes six arguments:

first argument: text, in particular who is the dealer and what is the vulnerability. For example: N/None, for North dealer

and vulnerability none.

second parameter: text. For example, indication of deal as in Deal 1 or in

```
\vtop{\hbox{Deal:}
  \hbox{demo}}
```

next four arguments: the four hands N, E, S, W, clockwise. Each hand is a call of the `\hand` macro with four arguments: the ♠, ♥, ♦, ♣ cards. Assumed is a box register, `\NESW`, which contains the central figure. As example,

```
$$\crdima{N/None}
  {\vtop{\hbox{Deal:}
    \hbox{demo}}}%
  {\hand{J74}{AJ}{QJT2}{Q874}}%N
  {\hand{K86}{T9542}{874}{T3}}%E
  {\hand{QT952}{Q83}{AK5}{A6}}%S
  {\hand{A3}{K76}{963}{KJ952}}%W
$$
```

yields

N/None	♠ J74		Deal:								
	♥ AJ		demo								
	♦ QJT2										
	♣ Q874										
♠ A3	<table border="1" style="border-collapse: collapse; width: 40px; height: 40px; margin: auto;"> <tr><td></td><td style="text-align: center;">N</td><td></td></tr> <tr><td style="text-align: center;">W</td><td></td><td style="text-align: center;">E</td></tr> <tr><td></td><td style="text-align: center;">S</td><td></td></tr> </table>		N		W		E		S		♠ K86
		N									
W			E								
		S									
♥ K76		♥ T9542									
♦ 963	♦ 874										
♣ KJ952	♣ T3										
	♠ QT952										
	♥ Q83										
	♦ AK5										
	♣ A6										

3. Variables and parameters vs. control sequences and arguments

Knuth, [11, p.211], names the possibilities:

“It is sometimes desirable to pass information from one macro to another, and

there are several ways to do this: by passing it as an argument, by putting it into a register, or by defining a control sequence that contains the information.”

It is not straightforward to me what to provide via arguments, what via registers and what via control sequences from one macro to another. The above is the TeX terminology and well-defined, while in Pascal-like programming we call the possibilities:

- transfer via parameters (by name, reference or value),
- via global variables, and
- via procedures.¹

In command languages (and also in ADA) we distinguish between parameters bound to a position and bound via keywords in free order along with defaults.

In `\crdima` the texts and hands, and in `\hand` the cards for every colour, are provided via arguments. Another approach is to provide all this information via control sequences. Control sequences for the vulnerability and dealer information, as well as general information, i.e., — Control sequences for cards per colour and player, i.e., `\Ns`, for North’s ♠’s, etc. One could then introduce something like `\showgame`, with *no* arguments, which uses these control sequences. This is done in the section on How the play goes.

So, there is essentially one ‘variable’ left, the representation of the NESW-figure. One could use the optional parameter mechanism, see e.g. [3], with the disadvantage of supplying this parameter for every deal once a personalized layout, different from the default, has been chosen. In my opinion this kind of variability which is no longer there once perso-

¹In numerical mathematics we also have what is called reverse communication.

nalized, can best be provided via a register, e.g., a box register in this case, and not via an optional parameter. When no figure is wanted, just ‘empty the box’, and when you like one of your own use `\setbox\NESW\hbox{...}`. The notation for the players used in the NESW-figure is contained in control sequences, `\N` etc.

In the bidding environment the notation for the players is also contained in control sequences, `\fih`, etc. This provides language as well as order flexibility. Annotation commands — `\alert`, `\think`, `\qthink`, etc. — are local to the environment.

In the play environment the same control sequences for the notation of the players are used. Furthermore, the cards played have to be given in natural notation, e.g., ♠8. The (`\bintermezzo`, `\eintermezzo`) environment is more user-oriented disguise for `\noalign`.

Remark

It is tempting to ponder about where keyword parameters come in (see e.g., [1]). The functionality is already there. Think of modifying the contents of a register or redefinition of a control sequence. An example is given in the section on application flexibility.

Notation

For the names of the control sequences for the hands I adopted upper case letters `\N`, `\E`, `\S`, `\W`, `\NS`, `\EW`, and for the colours of the cards I used lower case letters `\s`, `\h`, `\d`, `\c`. This convention also holds for name combinations in the (toks register) control sequences for the cards per hand per colour, i.e., `\Ns`, etc. Note that we have `\NS` and `\Ns`, denoting respectively the North-South combination and North’s ♠’s.

4. Bidding

The bidding environment is not based on tabbing, but `\halign` is directly used. This means that the bid sequences are lines within `\halign`, with four columns, and have to obey its syntax. The given card deal takes the following ACOL bidding

```
North East South West
1♣A no 1♠ ...no
2♠ no 4♠ a.p.
```

^A means Alert, conventional bid
...means think’ pause

obtained via

```
{\smallskip\narrower\noindent
\bbid
\bbid
1\c\alert& no& 1\s&\think no\cr
  2\s& no& 4\s& a.p.\cr
\noalign{\vskip.5ex}
\alert\ means Alert,
  conventional bid\hidewidth\cr
\hbox to3ex{\think means think'
  pause\hidewidth\cr
\ebid
\smallskip}
```

Remarks

One has to have a nodding knowledge of T_EX. A `\annotation` command has to be written, in the same spirit as a footnote or endnote.²

Another issue is whether we should test upon illegal biddings. I did not do this because it will restrict the use of the macros, e.g., illegal biddings are needed in arbiter material.

Application flexibility

One example is changing order of players in bid sequence by redefinitions, e.g.,

²A simple approach could be a command with two arguments where the first argument contains the annotation symbol(s) and the second argument contains the explanation and are passed on to (toks) control sequences. `\ebid` must be redefined such that the annotation(s) will appear.

first hand is West (`\def\fh{West}`) etc. Another is using a different naming, e.g., `\def\fh{Partner}` etc., or another language. In the following the order is modified and French is used.

```

Ouest Nord Est Sud
- 1♣A pas 1♠
pas 2♠ pas 4♠
pas pas pas

```

obtained via

```

{% Local change,
% note that the order is free
\def\fh{Ouest}\def\seh{Nord}
\def\thh{Est}\def\foh{Sud}
{\smallskip\narrower
\bbid
--& 1\c\alert& pas& 1\s\cr
pas& 2\s& pas& 4\s\cr
pas& pas& pas\cr
\ebid \smallskip}
}% end local change

```

Remarks

Note the keyword functionality. One can also modify the symbols in the NESW-figure by local redefinition of `\N`, etc., followed by

```
\setbox\NESW\hbox{\NESWfig}.
```

For the French language only redefinition of `\def\E{0}` is needed. See **b** or section on Endplay Analysis, where `\N` etc., are personalized.³ The general disadvantage of flexibility is the need for discipline; no consistency is forced upon. The advantage is freedom, and the question is how to use it.

5. Macro texts

The provided NESW-figure is implemented via a ‘ruled’ table. The N, E, S, W symbols are provided via control sequences. The positioning obeys `\halign` rules.

³This modification can be simplified when the NESW-figure is not put in a register, i.e., `\def\NESW{\hbox{\NESWfig}}` and `\NESW` are used,

Source texts

```

\hand, \crdima, \NESW, and
(\bbid, \ebid)

\def\hand#1#2#3#4{%
\vtop{\hbox{\strut\s\enspace#1}
\hbox{\strut\h\enspace#2}
\hbox{\strut\d\enspace#3}
\hbox{\strut\c\enspace#4}}%end \vtop
}%end \hand
%
\def\crdima#1#2#3#4#5#6{%
%purpose: layout bridge hand
%#1 left upper text
%#2 right upper text
%#3, #4, #5, #6: N, E, S, W hands
\ vbox{\halign{
&##\quad\cr
#1& #3& #2\cr
& $\vcenter{#6}$& $\vcenter{\copy\NESW}$&
& $\vcenter{#4}$\cr
& #5& \cr
}& }%end \halign
}%end \vbox
}%end \crdima
%
\def\NESWfig{%
\ vbox{\font\small=cmr9
\def\str{\vrule height2.2ex%
depth.75ex width 0pt}
\offinterlineskip\tabskip0pt\hrule
\halign{\vrule\hskip2pt\relax
##\hfil\tabskip3pt&
\str\hfil##\hfil&
##\hskip2pt\relax\hfil\vrule
\tabskip0pt\cr
& \hbox to 0pt{\hss\N\hss}& \cr
\W& \phantom{N}& \E\cr
& \str\hbox to 0pt{\hss\S\hss}& \cr
}& }%end \halign
\hrule}%end \vbox
}% end \NESWfig
\setbox\NESW\hbox{\NESWfig}
%
\def\ebid{\errormessage{%
bbid command is missing}}
%
\def\bbid{\bgroup%
\def\ebid{\egroup\egroup\egroup}
\def\alert{$^A$}
\def\think{\llap{$\ldots$\thinspace}}
\def\qthink{\llap{?$\ldots$\thinspace}}
% etc.
\vtop\bgroup
\halign to4\wr\bgroup\tabskiplex&
##\hfil\cr

```

```
\fih& \seh& \thh& \foh\cr
}%end \bbid
```

Remark

Plain T_EX macros for nicely rounded frames, L^AT_EX's 'ovals', have been published, see [8]. They can be used for another frame in NESW.

6. Some more examples

Example a

In order to illustrate general bidding theory from the viewpoint of one hand only, the `\hand` macro can be used. The following layout, heavily used in [7],

♠ AKJ42	North	East	South	West
♥ AK9	1♠	no	1NT	2♣
♦ T832	?			
♣ T				

is obtained via

```
{\smallskip\narrower
\hbox to \hsize{\hss
\hand{AKJ42}{AK9}{T832}{T}%
\quad\hfil
\bbid
1\s& no& 1NT& 2\c\cr
? \cr
\ebid
\hss} \smallskip}
```

Example b

For issues related to defense play one often displays only the dummy hand and your own hand. The following example — layout and text — is from [5].

♠ AJ632	N W E You
♥ 43	
♦ KQ7	
♣ A85	

```
♠ 985
♥ 852
♦ AJ5
♣ KQT3
```

	North	East	South	West
	-	-	-	1♠
	no	2♥	no	2SA
	no	4♥	a.p.	

Against 4♥ South starts ♣K, taken with ♣A. Leader continues ♥AKQ. On the third round of ♥'s, partner discards ♦9 (indicates interest in ♠). Leader continues with ♦2, how do you continue?

The example is obtained via

```
{\def\S{You} % local change
\setbox\NESW\hbox{\NESWfig}
{\smallskip\narrower\noindent
\crdima{}{}%
{}{\hand{985}{852}{AJ5}{KQT3}}%S
{\hand{AJ632}{43}{KQ7}{A85}}%W
\smallskip}
}%end local change NESW-figure
\setbox\NESW\hbox{\NESWfig}% restore

{\smallskip\narrower\noindent
\bbid
--& --& --& 1\s\cr
no& 2\h& no& 2SA\cr
no& 4\h& a.p.\cr
\ebid \smallskip}
```

Remark

In a similar way W-N, N-E, E-S hands, or W-E, N-S hands, or one hand only, with NESW-diagram, can be displayed simply by a suitable call of `\crdima`.

Example c

In discussing endplays only a few cards are left. The following endplay — positional squeeze— from [10], is given.

♠ AJ S leads ♣A,
 ♥ K W is squeezed
 ♦ -
 ♣ -
 ♠ KQ ♠ 7
 ♥ A ♥ 9
 ♦ - ♦ T
 ♣ - ♣ -
 ♠ 2
 ♥ 4
 ♦ -
 ♣ A



```

\hbox to \hsize{\hss W:\enskip
  \hand{AJ8}{AKT94}{8}{KT98}\hfil
    E:\enskip
  \hand{--}{J8}{AKQ54}{AJ7543}
    \hss}%
\smallskip}

{\smallskip\narrower\noindent
\def\bbidcmp{\bgroup%
\def\ebid{\egroup\egroup\egroup}
\vtop\bgroup
\halign to3\vr\bgroup\tabskiplex#
      ##\hfil\cr
\fiht \seh\cr
}%end \bbidcmp
  
```

The example is obtained via

```

{\smallskip\narrower\noindent
\crdima{}\vtop{\hbox{S leads \c A,}
  \hbox{W is squeezed}}}%
{\hand{AJ}{K}{--}{--}}%N
{\hand{7}{9}{T}{--}} %E
{\hand{2}{4}{--}{A}} %S
{\hand{KQ}{A}{--}{--}}%W
\smallskip}
  
```

Example d

Finally, a bidding competition. It illustrates how the (\bbid, \ebid) environment can be adapted to this application. We have two partnerships: Sjoerd&Martijn and Tsjip&Evert. The material is borrowed from [17].

W/All,	South	bids	4♠.
W: ♠ AJ8	E: ♠ -		
♥ AKT94	♥ J8		
♦ 8	♦ AKQ54		
♣ KT98	♣ AJ7543		

Sjoerd Martijn	Tsjip Evert
1♥ 2♣	1♥ 2♦
4♠ by South	4♠ by South
no ¹ 5♠ ²	dbl 6♣
7♣ no	no

¹ Forcing pass
² Grand slam try
 obtained via

```
{\smallskip\narrower
```

```

\hbox to \hsize{\hss
  {%Sjoerd&Martijn
  \def\fiht{Sjoerd}\def\seh{Martijn}
  \bbidcmp
  1\h#2\c\cr
  4\s by South\hidewidth\cr
  no$^1$ 5\s$^2$\cr
  7\c# no\cr
  \noalign{\vskip.5ex}
  $^1$ Forcing pass\hidewidth\cr
  $^2$ Grand slam try\hidewidth\cr
  \ebid}%end Sjoerd&Martijn
  \quad\hfil
  {%Tsjip&Evert
  \def\fiht{Tsjip}\def\seh{Evert}
  \bbidcmp
  1\h#2\d\cr
  4\s by South\hidewidth\cr
  dbl# 6\c\cr
  no\cr
  \ebid}%end Tsjip&Evert
  \hss}%end \hbox
\smallskip}
  
```

Remarks

Note that apart from contextual layout, the given \crdima and \hand macros as well as the bidding environment can be used in a similar way as the L^AT_EX predecessors. So ‘drivers’ — e.g., in my (Pascal) deal program, for prints of tournament plays — hardly need to be adapted.

Furthermore, L^AT_EX users can also make use of these enhanced versions at the expense of \halign’s syntax for the

bid sequences.

7. How the play goes

Explanatory schemes of a play are used for instance on viewgraphs instantly along a match, in books about play technique, or in newspaper columns when discussing interesting matches or puzzles. In order to do this systematically and unambiguously something similar to the ‘algebraic’ notation in chess, see [2, 16], is needed.

Agreed, reading a book filled mostly with (algebraic) notation tables is quite dull and we can never replace the literary gifted commentator. So, this reduces the practical value of the exercise, but for solutions of puzzles it might be quite efficient, although I don’t expect that many solutions will be sent in using T_EX, in spite of a quite numerous NBB (75,000 members), [5], to name but one union. On the other hand the systematic approach eliminates misprints in shown phases, while discussing a play.

Anyhow, it was great fun, and I learned a lot from it.

What we need is a compact unambiguous notation which contains per trick the information about the cards played and who led. Who gained the trick can be deduced from the general knowledge of the contract and the lead. In this way every trick is self-contained, apart from global information. To print all this information I used basically a table with four columns — the players — and thirteen rows — the tricks. In each row the lead is marked by ‘*’, or whatever you chose.⁴ Apart from printing the cards

⁴On viewgraphs underlining is commonly used; this can be implemented, but because of entailed inflexibility I refrained from it. I also introduced that each player ‘keeps his lane’, and did not follow

played (along with trick number), the cards in every hand — the (toks register) control sequences \Ns, etc. — are updated. The use is illustrated below.

8. Let us play a game

The following appeared in ‘Meulenbroek’s column’ last Christmas.⁵

Puzzle	♠ KQ76	6NT,										
	♥ J98	by East										
	♦ J942											
	♣ 65											
♠ AJ3	<table style="border-collapse: collapse; margin: 0 auto;"> <tr><td style="padding: 2px 5px;">N</td><td></td><td></td></tr> <tr><td style="padding: 2px 5px;">W</td><td style="padding: 2px 5px;">E</td><td></td></tr> <tr><td></td><td style="padding: 2px 5px;">S</td><td></td></tr> </table>	N			W	E			S		♠ T9	
N												
W	E											
	S											
♥ K653		♥ A2										
♦ AK3		♦ T5										
♣ AQT		♣ KJ9xxxx										
	♠ 8542											
	♥ QT74											
	♦ Q876											
	♣ 2											

Problem

How must NS defend in order to guarantee 1 trick?

Solution

Start with a ♥ lead in order to break communication. N must discard ♥’s and S must discard ♠’s.

Trick	North	East	South	West	NS	EW
1.	♥ 8	♥ 2	♥ 4*!	♥ K-		1
2.	♣ 5	♣ x	♣ 2	♣ A [±]		2
3.	♣ 6	♣ x	♠ 2	♣ Q [±]		3
4.	♥ 9	♣ K	♠ 4	♣ T [±]		4
5.	♠ 6	♣ J*	♠ 5	♠ 3 -		5
6.	♠ 7	♣ 9*	♠ 8	♥ 5 -		6
7.	♦ 2	♣ x*	♦ 6	♠ J -		7

starting in each line with the lead. This can be done along with automation of who gained the previous trick.

⁵Borrowed from [6].

On lead of the next ♣ neither South nor North can be squeezed as can be seen from

Puzzle	♠ KQ	NS squeezed on			
	♥ J	♣ continuation?			
	♦ J94				
	♣ -				
♠ A	<table style="margin: auto; border-collapse: collapse;"> <tr><td style="padding: 2px;">N</td></tr> <tr><td style="padding: 2px;">W E</td></tr> <tr><td style="padding: 2px;">S</td></tr> </table>	N	W E	S	♠ T9
N					
W E					
S					
♥ 63		♥ A			
♦ AK3		♦ T5			
♣ -		♣ x			
	♠ -				
	♥ QT7				
	♦ Q87				
	♣ -				

with continuation

8.	♥ J	♣ x*	♥ 7	♥ 6 -
9.	♦ 4	♦ T*	♦ 7	♦ A -
10.	♦ 9	♦ 5	♦ 8	♦ K*
11.	♦ J	♥ A	♥ T	♥ 3* -
12.	♠ Q	♠ T*	♥ Q	♠ A -
13.	♠ K	♠ 9	♦ Q	♦ 3*1

Input

The above is obtained by

```

\def\lftinf{Puzzle}
\def\rgtinf{\vtop{\hbox{6NT,}
\hbox{by East}}}}

\Ns={KQ76}\Es={T9}\Ss={8542}\Ws={AJ3}
\Nh={J98}\Eh={A2}\Sh={QT74}\Wh={K653}
\Nd={J942}\Ed={T5}\Sd={Q876}\Wd={AK3}
\Nc={65}\Ec={KJ9xxxx}\Sc={2}\Wc={AQT}

\showgame

\subsection*{Problem}
How must NS defend in order to
guarantee 1 trick?

\subsection*{Solution} Start with a \h\
lead in order to break communication.
N must discard \h's
and S must discard \s's.
\smallskip\noindent
\bplay
h8 & h2 & h4*! & hK & -- & 1\cr

```

```

c5 & cx & c2 & & cA* & -- & 2\cr
c6 & cx & s2 & & cQ* & -- & 3\cr
h9 & cK & s4 & & cT* & -- & 4\cr
s6 & cJ* & s5 & & s3 & -- & 5\cr
s7 & c9* & s8 & & h5 & -- & 6\cr
d2 & cx* & d6 & & sJ & -- & 7\cr
\bintermezzo
%\noalign{\smallskip\noindent}
On lead of the next \c\
neither South nor North can be
squeezed as can be seen from%
\def\rgtinf{\vtop{\hbox{NS squeezed on}
\hbox{\c\ continuation?}}}
\showgame
with continuation
\intermezzo
hJ & cx* & h7 & h6 & -- & 8\cr
d4 & dT* & d7 & dA & -- & 9\cr
d9 & d5 & d8 & dK* & -- & 10\cr
dJ & hA & hT & h3* & -- & 11\cr
sQ & sT* & hQ & sA & -- & 12\cr
sK & s9 & dQ & d3* & 1 & 12\cr
8 \eplay

```

10 Remark

The cumulative tricks can be suppressed just by deleting columns 5 and 6; also to empty the head texts can be done via `\def\NS{}` and `\def\EW{}`.

9. Macros for annotated play

The `(\bplay, \eplay)` environment is aimed at printing schematically the played cards. Interleaving remarks, showing the phase of the play etc. can be done within the `(\bintermezzo, \eintermezzo)` subenvironment. `\pc` does two things: it prints the played card and deletes the card from the appropriate hand. `\strip` essentially strips out one symbol from a string. `\showgame` is just a call of `\crdima` with the current values of `\Ns` etc.

Explanation

The problem is to determine dynamically with which colour from which player we

are dealing. In each column of `\bplay` the player is known and passed on to `\pc`, as first argument, see template line of `\halign` in `\bplay`. From the typed information, within the `(\bplay, \eplay)` environment, the colour is passed on as second argument to `\pc`. Symbols after that are handled as text, and influence `\halign`'s columns positioning.⁶ `\strip` is called by `\pc` to delete a symbol. The symbol which has to be located in the string is used as argument separator.

Source texts

```
\def\eplay{\errormessage{%
  bplay command is missing}}
%
\def\bplay{\bgroup\global\trno=0
           %Version 21/3/90
\def\eplay{\egroup\egroup}
\def\bintermezzo{\noalign\bgroup
                 \smallskip\noindent}
\def\aintermezzoof{\smallskip\egroup}
\halign to7\wr\bgroup
\tabskip1ex plus .1ex minus .1ex
\global\advance\trno by 1
\hbox to\wr{\hss\the\trno.\hss}\hfil&
\hbox to\wr{\pc N##\hss}\hfil&
\hbox to\wr{\pc E##\hss}\hfil&
\hbox to\wr{\pc S##\hss}\hfil&
\hbox to\wr{\pc W##\hss}\hfil&&
\hbox to.5\wr{\hss#\hss}\hfil\cr
\omit\hbox to1.5\wr{\TRICK\hss}%
\hbox to \wr{\fih\hss}\hfil&
           %First Hand
\omit\hbox to\wr{\seh\hss}\hfil&
           %SEcond Hand
\omit\hbox to \wr{\thh\hss}\hfil&
           %THird Hand
\omit\hbox to \wr{\foh\hss}\hfil&
           %FOurth Hand
\NS& \EW\cr
}% end \eplay
%
\def\pc#1#2#3{%           Version 3/3/90
%#1 the hand N, E, S, W(uppercase)
%#2 colour s, h, d, or c
%#3 card value A K Q ... 2, or x
% update hand \#1#2; e.g. \Ns
```

⁶Of course use of `\ ...lap{ symbol }` will not affect the columns positioning, but possibly spoil your print.

```
\xdef\hnd{\csname #1#2\endcsname}
\strip{#3}{\hnd}%
% end update hand
% print card in table
\xdef\colour{\csname #2\endcsname}
\colour\thinspace #3%
% %Needed for immediate * mark
% end print card
}% end \pc
%
\def\strip#1#2{%           Version 3/3/90
\def\wis##1#1##2\wis{%
  \global\hnd={##1##2}
  \xdef\pa{##1} \xdef\pb{##2}
  \ifx\pa\empty {\ifx\pb\empty
    \global\hnd={--}}% void colour
  \fi}\fi
}% end \wis
\expandafter\wis\the #2\wis
}% end \strip
%
\def\showgame{%Shows the play, with
%control sequences Ns, ..., Wc,
%(note use of upper case for player)
%\defs: lftinfo, rgtinfo
$$\crdimaf{lftinf}{\rgtinf}%
  {\hand{\the\Ns}{\the\Nh}{\the\Nd}}%
  {\the\Nc}}%
  {\hand{\the\Es}{\the\Eh}{\the\Ed}}%
  {\the\Ec}}%
  {\hand{\the\Ss}{\the\Sh}{\the\Sd}}%
  {\the\Sc}}%
  {\hand{\the\Ws}{\the\Wh}{\the\Wd}}%
  {\the\Wc}}%
$$}% end \showgame
```

Remarks

Use is made of `\halign`, with a counter for the tricks, and of `\noalign` for the intermezzo. One can also use a third, fourth, etc. symbol, after the colour and card value, in order to denote something special, e.g., `!`, for a well-played card. I already adopted the convention to use `*` for the lead. I also added the reader-friendly feature of printing the cumulative number of tricks gained by each side in extra columns.

One abstraction I consider particular useful is the notation of `x` for cards which don't matter.

Another question is what to do when the card is not in the hand? This will yield a T_EX error message.

Flexibility: Endplay Analysis

The analysis below is due to [15] and shows the elegant use of `\showgame` with the global (toks register) control sequences for the cards and the dealer/vulnerability and contract and lead, information, along with the earlier treated flexibility of the notation for players within the NESW-figure.

Analysis	♠ A8653	7♥,
	♥ A4	by South
	♦ AJT	
	♣ A54	
♠ T2	Anton	♠ KQ94
♥ 3	Rens Dick	♥ T82
♦ Q987652	Frans	♦ 43
♣ T86		♣ QJ92
	♠ J7	
	♥ KQJ9765	
	♦ K	
	♣ K73	

♦2 lead is taken with the K, followed by ♠ to A, ♦A (leader discards a ♠), ♠ trumped, ♥K, ♥ to A, again ♠ trumped, followed by all but one trump. The leader arrived at

Squeeze 1	♠ 8	♥5 will squeeze:
	♥ -	W (positionally)
	♦ J	E (automatically)
	♣ A5	
♠ -	♠ K	
♥ -	♥ -	
♦ Q	♦ -	
♣ T86	♣ QJ9	
	♠ -	
	♥ 5	
	♦ -	
	♣ K73	

On ♦ lead other squeezes can be envisioned, e.g.,

Squeeze 2	♠ A8	W squeezed
	♥ -	in ♠/♦
	♦ J	
	♣ -	
♠ KQ	Anton	♠
♥ -	Rens Dick	♥ not
♦ Q	Frans	♦ important
♣ -		♣
	♠ J7	
	♥ 5	
	♦ -	
	♣ -	

This squeeze works whenever West holds ♠KQ (or 5+♠) and ♦Q, etc.

Remark

However interesting other squeeze possibilities — after a trump or ♠ lead — might be, they don't contribute further to 'bridge in print.' The above is meant as an illustration of the use of the macros within the context of a less rigid way of description. Because of the informal way the endplays are arrived at, we had to edit the hands. Of course, it could have been done automatically within the (`\bplay`, `\eplay`) environment. General play commands which will update the hands are once again not that difficult to write.⁷ For the moment I stopped.

Input for Endplay Analysis

The above is obtained via

`{%local adaptation of names in NESWfig`

⁷Informal notation is characterized by incompleteness. In bridge, while discussing the course of a play, it is assumed that the reader knows which player played a card. One could write a general `\strip` command, with a suitable name, which locates the appropriate hand and subsequently strips and prints the card.

```

\def\N{Anton}\def\E{Dick}
\def\S{Frans}\def\W{Rens}
\setbox\NESW\hbox{\NESWfig}
\def\lftinf{Analysis}
\def\rgtinf{\vtop{\hbox{7\h,}
\hbox{by South}}}}
\Ns={A8653}\Es={KQ94}\Ss={J7} \Ws={T2}
\Nh={A4} \Eh={T82} \Sh={KQJ9765}\Wh={3}
\Nd={AJT}\Ed={43} \Sd={K}\Wd={Q987652}
\Nc={A54}\Ec={QJ92}\Sc={K73} \Wc={T86}

\showgame

\ld2 lead is taken with the K, followed by
\s\ to A, \d A (leader discards a \s),
\s\ trumped, \h K, \h\ to A, again
\s\ trumped, followed by all but one
trump. The leader arrived at
\Ns={8} \Es={K} \Ss={--} \Ws={--}
\Nh={--}\Eh={--} \Sh={5} \Wh={--}
\Nd={J} \Ed={--} \Sd={--} \Wd={Q}
\Nc={A5}\Ec={QJ9}\Sc={K73}\Wc={T86}
\def\lftinf{Squeeze 1}
\def\rgtinf{\vtop{
\hbox{\h5 will squeeze:}
\hbox{W (positionally)}
\hbox{E (automatically)}}}
{%Local modification: empty figure
\setbox\NESW\hbox{}
\showgame
}%end local modification empty figure

On \d\ lead other squeezes can be
envisioned, e.g.,
\Ns={A8}\Es={} \Ss={J7} \Ws={KQ}
\Nh={--}\Eh={not}\Sh={5} \Wh={--}
\Nd={J}\Ed={important}\Sd={--}\Wd={Q}
\Nc={--}\Ec={} \Sc={--} \Wc={--}
\def\lftinf{Squeeze 2}
\def\rgtinf{\vtop{\hbox{W squeezed}
\hbox{in \s/\d}}}}
%
\showgame
%
This squeeze works whenever
West holds \s KQ (or 5$^+ $\s) and
\d\ Q, etc.
}%end local change NESWfig

```

Looking back

One could strive after saving some more keystrokes when typing in the information, i.e., adopt 'natural' notation. Therefore one has to change catcodes $_$ (space)

into $\&$, and $\^M$, and $_s$, etc., into $\backslash\text{active}$ with the meaning of respectively $\backslash\text{cr}$, and the colours. This can be done via a ($\backslash\text{bnatural}$, $\backslash\text{enatural}$) environment within both bidding and play environments. For the bidding the information to be typed in will then typically look like

```

\bbid\bnatural
-- 1c no 1s
no 2s a.p.
\enatural\ebid

```

The natural environment is separated from the bidding environment because we needed room for annotations between $\backslash\text{enatural}$ and $\backslash\text{ebid}$. Similar considerations will go through for the play environment.

I refrained from introducing case insensitivity in the card values⁸, and from automatically counting the gained tricks, which is also not too difficult to implement.

The above features can best be added when macros are targetted for a particular application, e.g., for typesetting tournament reports, answers to puzzles, or whatever.

Because of the history of $\backslash\text{crdima}$ and $\backslash\text{hand}$, and because I did not much ponder a priori about the 'data structure,' I started with the natural approach. Looking back I could have started from a 13*4-matrix, where the rows denote the card values and the columns the colours. The value of an array element represents the status, e.g., the card belongs to either N, E, S, W, or has been played, not to mention 'penalty' cards. Updating this structure is simple via the array addressing techniques given

⁸This could be taken care of by suitable programming by paying special attention to $_x$. Except for $_x$ the notation for card values is free and serves language flexibility.

by [9]. `\showgame` (and `\crdima`) as well as `\hand` will become more complicated, however. To be honest, I started in my deal program with 52 numbers for shuffling; these 52 numbers could be generalized into 52 memory locations, suitably addressed.

Looking ahead

What about using these macros interactively, e.g., in bridge play programs, or by commentators on TV? Not only to delete a card will be needed but also the reverse, to insert a card, in order to demonstrate variants.⁹ Of course, some fancy graphics will be indispensable, like showing real card faces instead of symbols and playing the cards, i.e., let them *move*. Animation. Multi-media information exchange, how exciting! My case rests.

Availability macros

This article, with macros included, will be available on `TeX-NL@HEARN`. The previous `LATEX` article is also there. I welcome copies of any publication using these macros, or derivatives thereof. Comments are appreciated.

10. Conclusions

The author claims that bridge publications with respect to card distributions and bidding sequences can be typeset easily with high quality via `LATEX`, see [12], or via `TEX` and the macros given. Furthermore, it is possible to explain the course of a play in print systematically and unambiguously, where updating of the hands is done automatically when a card is ‘played’, i.e., when within the (`\bplay`, `\eplay`) environment

⁹Perhaps best implemented via a conditional delete.

the colour and card value are given, obeying `\halign`’s rules. This display of the course of the play can be interrupted with the `intermezzo` environment, for among others showing the cards still active in the play via `\showgame`.

Proofreading of deals not generated and typed by computer is error prone and remains tiresome.

`TEX` programming differs from ‘structured programming’ not in the least

- in terminology — (positional, keyword) parameters vs. arguments, variables vs. registers and control sequences — and
- in its attitude — proving programs vs. knowing what one is doing.

The (commented) macros are needed roughly two columns; `TEX` is a very powerful tool!

11. Acknowledgements

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```

%(Toks register) control sequences
%for hands used by play macros:
%showgame, pc, strip
\let\NT\newtoks
\NT\hnd%Dynamically one of:
\NT\Ns\NT\Es\NT\Ss\NT\Ws
\NT\Nh\NT\Eh\NT\Sh\NT\Wh
\NT\Nd\NT\Ed\NT\Sd
\NT\Wd %Beware! Already
%in TUGboat.sty in lower case
\NT\Nc\NT\Ec\NT\Sc\NT\Wc
%In central figure NESW
\def\N{N}\def\E{E}\def\S{S}\def\W{W}
%In heading bplay
\def\NS{NS}\def\EW{EW}
\def\TRICK{Trick}
%Definition of hands
%used by bbid, bplay
\def\fih{North} \def\seh{East}
\def\thh{South} \def\foh{West}
%Definition of counters
%used by bplay
\newcount\trno%trick number
%Definition of dimensions
%used in bbid
\newdimen\wr %width column
\wr=7ex \relax
%used in crdima
\newbox\NESW

```

Appendix: Registers and control sequences used

```

%Card definitions
\def\s{\spadesuit}
\def\h{\heartsuit}
\def\d{\diamondsuit}
\def\c{\clubsuit}

```