

SignDraw
a PGF/TikZ-based package for drawing sign language pictures

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Reference

1 Package loading and setup

The package is loaded by writing `\usepackage{signdraw}` in the document preamble.

macro `\signdrawset{<signdraw settings>}`

Configure the package. May be used both in the preamble and in the body of the document. The settings are valid for the rest of the document.

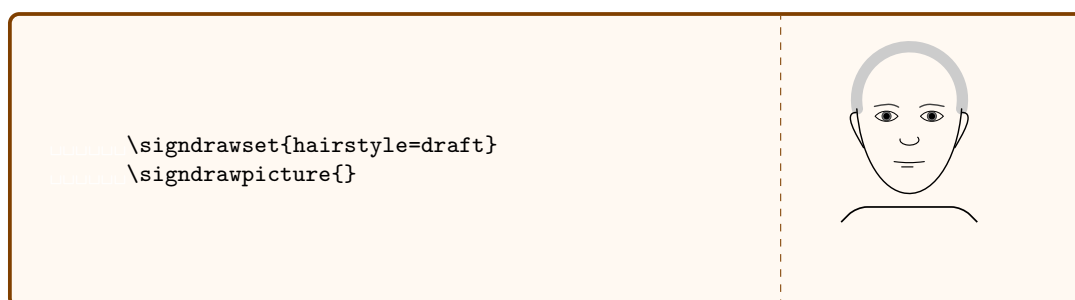
The following keys may be set:

`dominant hand=right|left` right

Sets the dominant hand. For individual pictures, it can be overridden by `reverse hands`.

`hairstyle=snake|draft` snake

Use `hairstyle=draft` to speed-up typesetting of the document.



`gloss alignment=auto|center|left|right` auto

How should the gloss be aligned with respect to a sign? `auto` means `left` for the first sign, `right` for the last sign, and `center` for the other signs.

macro `\signdrawparams{<parameter style definitions>}`

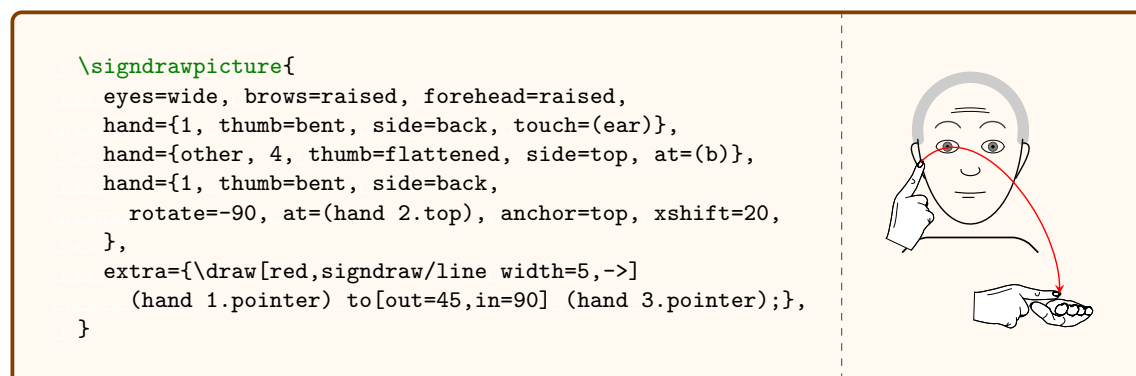
User can define his own shorthands for picture specification. For an example, see [eyes](#).

2 Invocation

macro `\signdrawpicture{<sign>}`

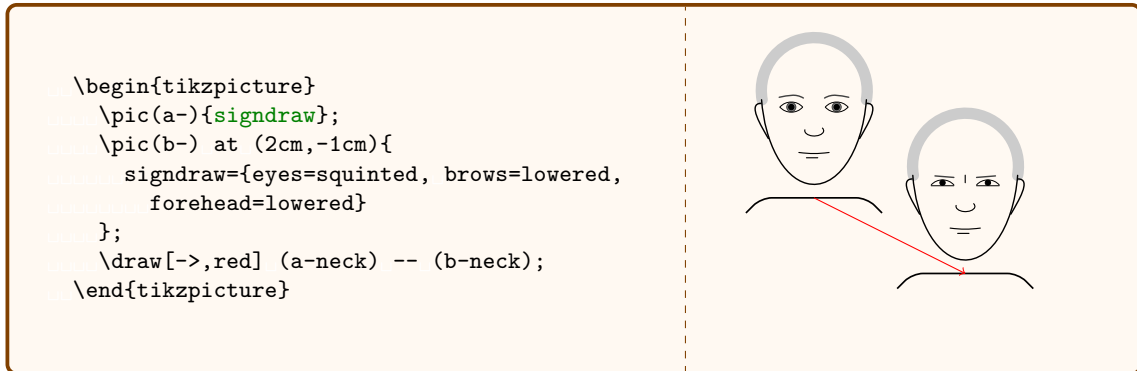
Draw a single sign.

This is the basic way to draw a sign language picture. The `{<signdraw specification>}` argument is a keylist specifying what we want to draw. The keys are listed in [§3.2](#).



TikZ `pic` **signdraw**{⟨sign⟩}

If you need to position several signdraw pictures in a special way, or connect them using TikZ commands, invoke signdraw using TikZ's `pic` command [1, §18].



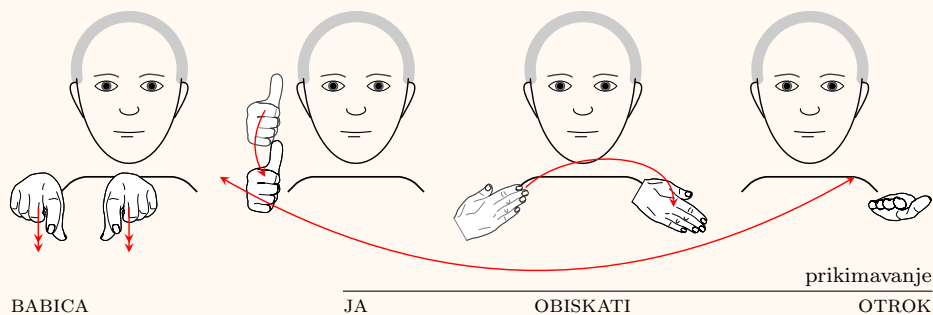
macro **\signdrawsentence**{⟨signdraw sentence specification⟩}

Produces a sequence of signdraw pictures, with a class and non-manual markers. (The current implementation does not implement line-breaking, i.e. all the pictures are put in a single line.) The available keys are listed in §3.1.

```

\signdrawsentence{
  sign={
    gloss={babica},
    hand={fingers={1,bent}, thumb=parallel, side=top, at=(right c)},
    hand={other,fingers={1,bent}, thumb=parallel, side=top, at=(chest center)},
    extra={\draw[red,signdraw/line width=5,->](hand 1.center) -- (right b);
           \draw[red,signdraw/line width=5,->](hand 2.center) -- (belly center);},
  },
  sign={
    gloss={ja},
    hand={fingers={0}, thumb=extended, side=top, at=(right n),rotate=90,draw opacity=0.5},
    hand={fingers={0}, thumb=extended, side=top, at=(right s),rotate=90},
    extra={\draw[red,signdraw/line width=5,->](hand 1.center) to[bend right] (hand 2.center);},
  },
  nmm={prikimavanje, :+},
  sign={
    gloss={obiskati},
    hand={other,fingers={4}, thumb=flattened, side=back, at=(right c),rotate=60,draw opacity=0.5},
    hand={other,fingers={4}, thumb=flattened, side=back, at=(left c),rotate=120},
    extra={\draw[red,signdraw/line width=5,->]
           (hand 1.pointer) to[out=45,in=90] (hand 2.center);},
  },
  sign={
    gloss={otrok},
    hand={fingers={4}, thumb=flattened, side=top, at=(left c)},%4n-tf-t
    extra={\draw[red,signdraw/line width=5,<->](left shoulder) to[bend left] (left s);},
  },
}

```



macro `\hand{<handshape specification>}`

Draws a standalone handshape. Its size is adjusted to current font size. The handshape is specified as in the argument of `hand`, see §3.3.

This is an inline handshape:
`\hand{shape=0-tb-f}`

This is an inline
handshape: ☞

3 Keys

3.1 Sentence

The following keys can be used in the keylist argument of `\signdrawsentence`.

sentence key **sign**=⟨sign⟩ Draw a sign. The format of ⟨sign⟩ is described in §3.2.

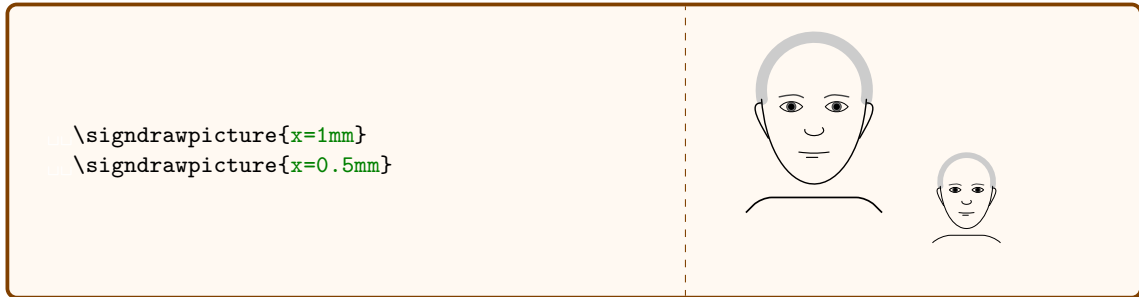
sentence key **nmm**=⟨non-manual marker⟩ Draw a non-manual marker. The format of ⟨non-manual marker⟩ is described in §3.4.

3.2 Sign

The following keys can be used in the keylist argument of `\signdrawpicture` or TikZ picture `signdraw`.

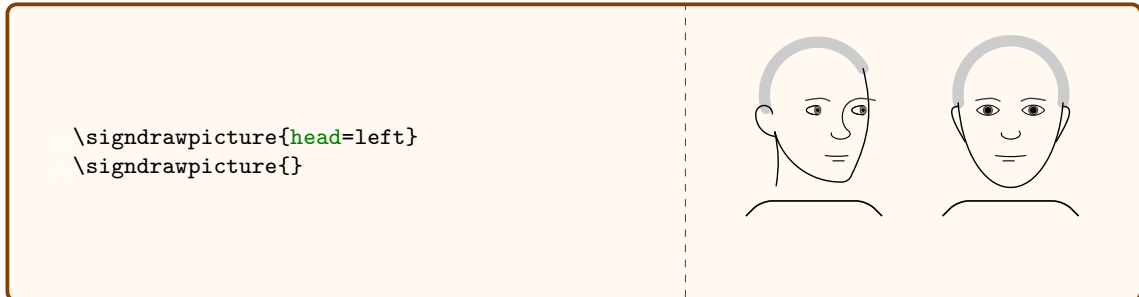
sign key **x**=⟨dimension⟩ 1mm

Set the scale of the picture.



sign key **head**=`central` | `left` | `right` central

Set the direction of the head.



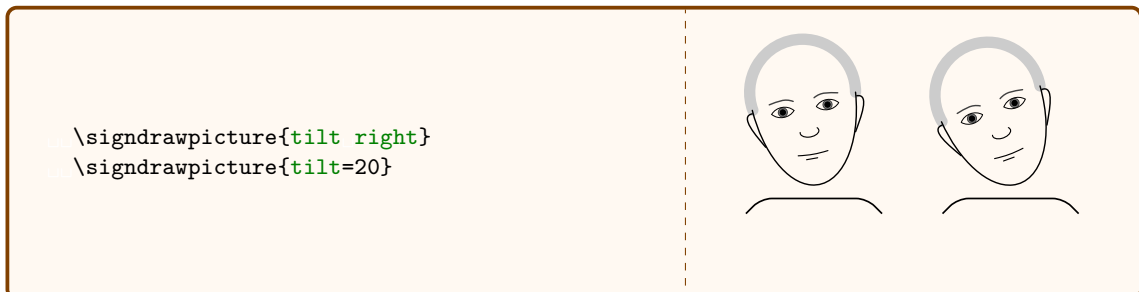
sign key **tilt**=⟨degrees⟩ 0

Set the tilt of the head. (Applies only to `head=central`.)

sign key **tilt left**

sign key **tilt right**

Shortcuts for `tilt=-10` and `tilt=10`.

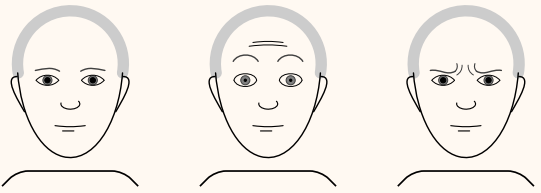


sign key **forehead**=`neutral` | `furrowed` | `lowered` neutral

sign key **brows**=`neutral` | `raised` | `furrowed` | `lowered` neutral

sign key **eyes**=neutral | wide | wh | squinted

neutral

<pre>\signdrawparams{ yn/.style={ eyes=wide, brows=raised, forehead=raised }, wh/.style={ brows=furrowed, forehead=furrowed } } \signdrawpicture{} \signdrawpicture{yn} \signdrawpicture{wh}</pre>	
--	--

sign key **cheeks**=neutral | puffed | sucked

neutral

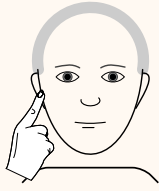
sign key **mouth**=neutral | open | OPEN | sucked | split | tongue | puffed

neutral

sign key **hand**=(hand specification)

Draw a hand with the given position, orientation and shape. For details, see section 3.3.

The drawn hand is a node, so it can be referred to in subsequent code (e.g. in **hand** or **extra**). By default, its name is **hand N**, where N is the sequential number (starting with 1), but the name can be set using TikZ key **name**. The last drawn hand can also be referred to by alias **hand**. To refer to *n*-to-last drawn node, use macro **\hand{n}** (available only in **hand** or **extra**).

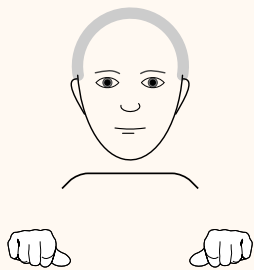
<pre>\signdrawpicture{ hand={ fingers=1, thumb=bent, side=back, touch=(ear) } }</pre>	
---	---

sign key **other hand**=(hand specification)

Like **hand**, but draw the non-dominant hand.

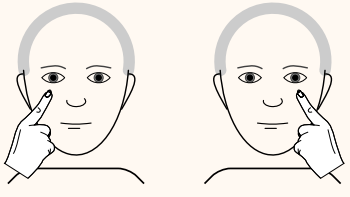
sign key **hands**

Draw both hands at the same time, symmetrically.

<pre>\signdrawpicture{ hands={ fingers=0, thumb=flattened, side=top, at=(b) } }</pre>	
---	---

sign key **reverse hands**

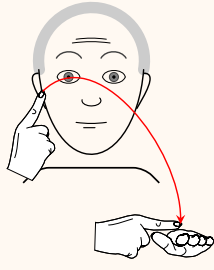
Reverse the dominant and non-dominant hand for this picture.

<pre>\signdrawpicture{ hand={ fingers=1, thumb=bent, side=back, touch=(eye) } } \signdrawpicture{ hand={ fingers=1, thumb=bent, side=back, touch=(eye) }, reverse hands, }</pre>	
--	--

sign key **extra**

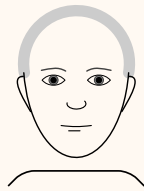
Add arbitrary TikZ code.

Note that **hand** and **extra** keys are processed in the order they are encountered. Below, **extra** must be used below the **hand** keys, as its code refers to coordinates **hand 1** and **hand 3** created by **hands**.

<pre>\signdrawpicture{ eyes=wide, brows=raised, forehead=raised, hand={1, thumb=bent, side=back, touch=(ear)}, hand={other, 4, thumb=flattened, side=top, at=(b)}, hand={1, thumb=bent, side=back, rotate=-90, at=(hand 2.top), anchor=top, xshift=20, }, extra={\draw[red,signdraw/line width=5,->] (hand 1.pointer) to[out=45,in=90] (hand 3.pointer);}, }</pre>	
---	---

sign key **gloss**=⟨text⟩

Gloss the picture.

<pre>\signdrawpicture{gloss={gloss}}</pre>	 <p>GLOSS</p>
--	--

3.3 Hand

3.3.1 Selecting the hand

hand key **other**

Draw the non-dominant hand; more precisely, reverse the dominance.

3.3.2 Handshape

hand key **fingers=0|1|2|3|4**, **spread|extended|bent|flattened|curved**

Select the number and shape of fingers.

The number of fingers can also be given among the **hand** keys.

hand key **thumb=extended|bent|flattened|curved|parallel|touch**

Select the shape of the thumb.

hand key **side=front|back|top|pinky|thumb**

Determine which side of the hand should be fully visible.

hand key **handshape=<special handshape>**

Use a special handshape. Currently one of: **animal**, **pinch**, **tool**.

hand key **shape=<handshape filename>**

An alternative, low-level way of specifying a handshape. See 10 for the list of handshapes and their names.

3.3.3 Position

Any TikZ key, like **at** in combination with **anchor** and **rotate**, may be used to position the hand. Furthermore, the package defines the following keys:

hand key **touch=<coordinate>**

The hand pointer (after the index finger) will touch the given coordinate. Use TikZ key **pos** for precise positioning.

hand key **point=<coordinate>**

The hand will point towards the given coordinate.

3.4 Non-manual markers

This section describes the format of a **<non-manual marker>** specification, which can be used as an argument to **nmm** or **nmm**.

<non-manual marker> is a comma-separated (pgfkeys) keylist. The first argument is interpreted as an implicit **content**, i.e. as the text above the nmm line. If it contains commas **,** or equal signs **=**, enclose it in **{braces}**.

non-manual marker key **content** The text above the nmm line. If it contains commas **,** or equal signs **=**, enclose it in **{braces}**.

non-manual marker key **right** Right-align the text (the default).

non-manual marker key **left** Left-align the text.

non-manual marker key **center** Center-align the text.

non-manual marker key **node options** Formatting of the **content** as a TikZ node.

non-manual marker key **level** Set the level of the non-manual marker.

1

non-manual marker key **1, 2, ... 9** A shorthand for **level=1**, **level=2** ... **level=9**.

non-manual marker key **from=<sign reference>**

non-manual marker key `to`=⟨sign reference⟩

Set the starting and ending sign of the non-manual marker.

In the simplest form, the ⟨sign reference⟩ is simply the sequential number of the sign (enumeration starts at 1). If the argument is omitted, it defaults to the current sign. (When using `mmm` within the `sign`, the current sign is the sign currently being specified. When using `mmm` directly within `\sentence`, it is the last specified sign.)

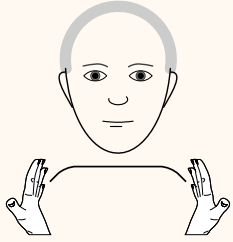
Prefixes `+` and `-` trigger the relative interpretation of the following numeral: `+⟨n⟩` refers to the sign n signs to the right of the current sign; `-⟨n⟩` refers to the sign n signs to the left of the current sign.

On its own, `+` refers to the last sign in the sentence. (Note that due to implementation details, `+0` is interpreted as a `+`.)

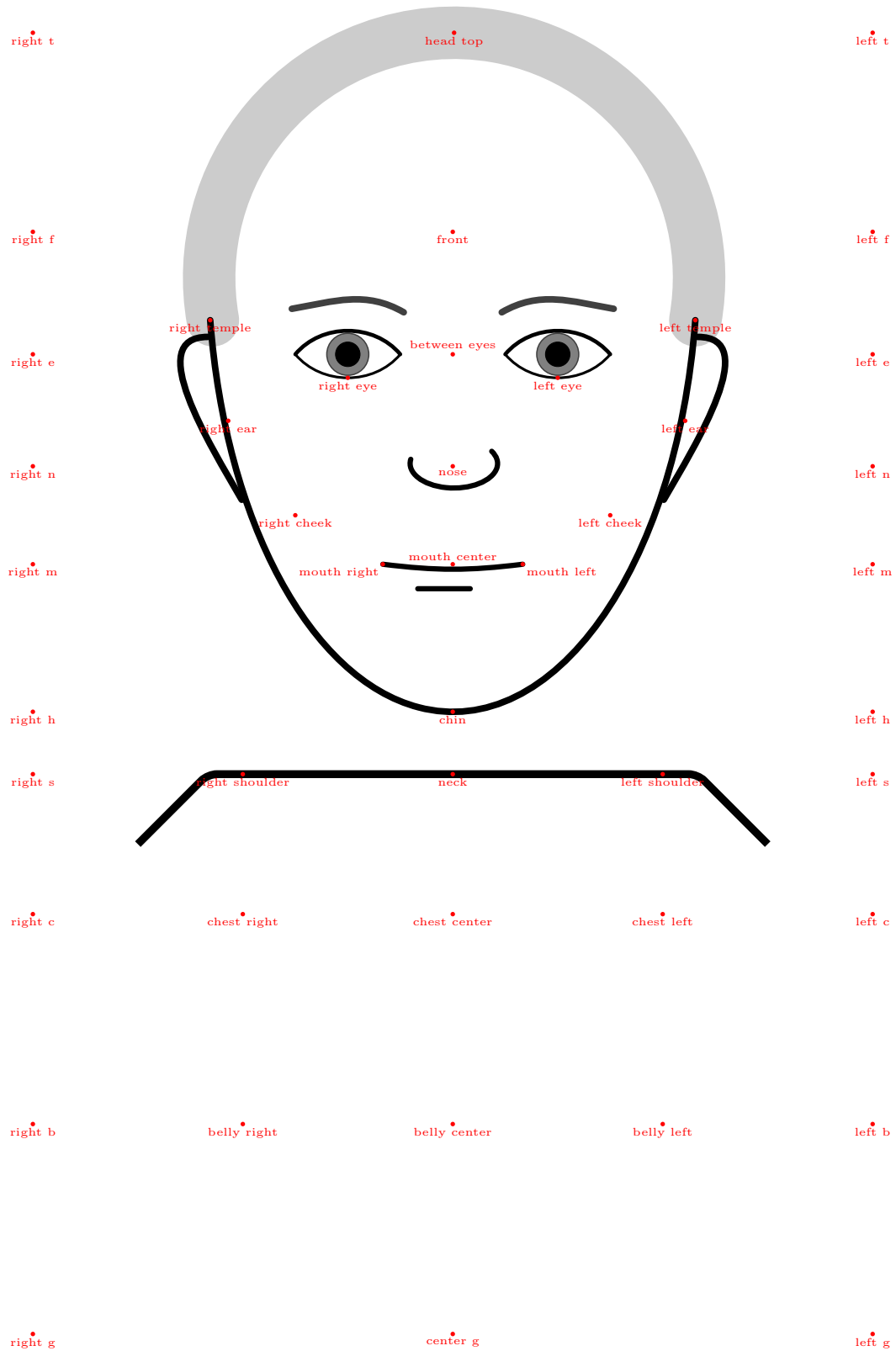
Any non-first argument that contains a colon `:` will be interpreted as an implicit from-to specification, i.e. `⟨from⟩:⟨to⟩` will resolve to `from=⟨from⟩`, `to=⟨to⟩`.

4 Defined coordinates

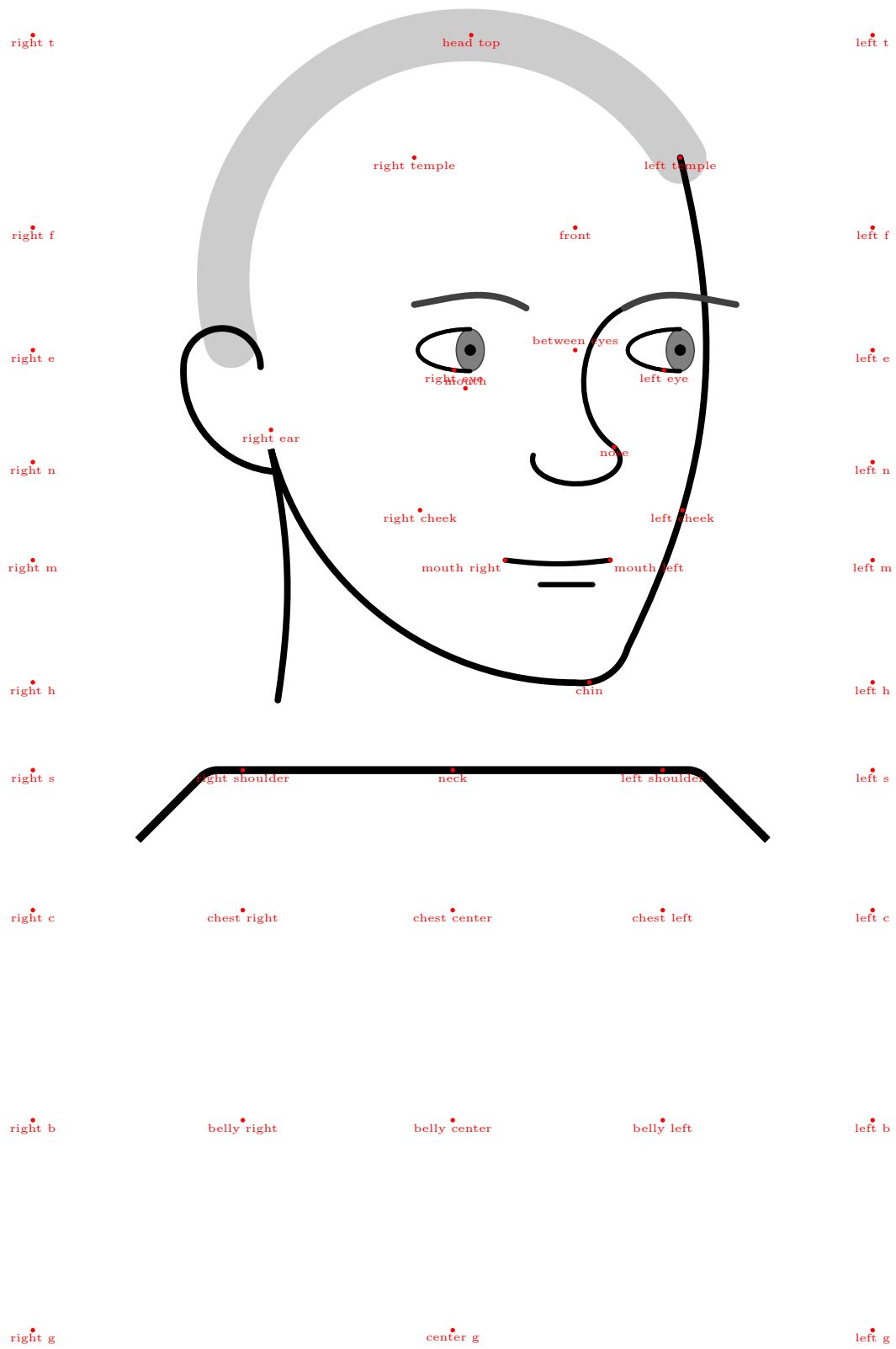
The following pages show a list of coordinates defined withing a `signdrawpicture`. When drawing hands, `left X` and `right X` are automatically mapped to `X` and `other X` depending on whether we are drawing a left or a right hand, which is controlled by key `other hand` and `other` for specific cases, and by dominant-hand setting keys `dominant hand` and `reverse hands`.

<pre>\signdrawpicture{ hand= {fingers={4,spread},side=thumb,at=(c)}, other hand={fingers={4,spread},side=thumb,at=(c)} }</pre>	
---	--

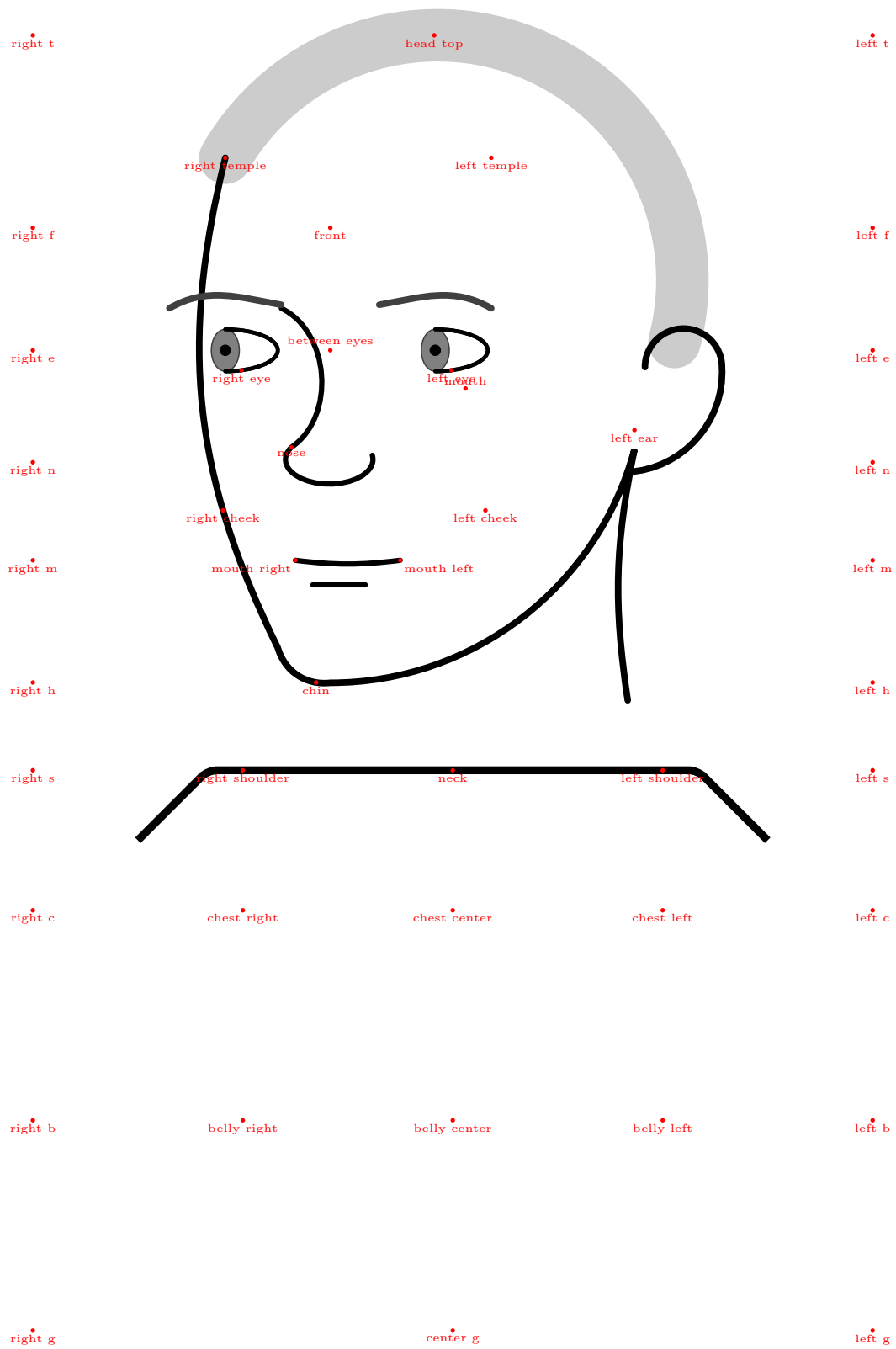
4.1 Central head



4.2 Left head



4.3 Right head



Implementation

Package identification.

```
1 \ProvidesPackage{signdraw}
```

Required packages and TikZ-libraries.

```
2 \RequirePackage{etoolbox}
3 \RequirePackage{tikz}
4 \usetikzlibrary{%
5   shapes,snakes,calc,decorations.pathmorphing,arrows,backgrounds,%
6   positioning,fit,matrix}
7 \RequirePackage{slgloss} % todo: require?
```

Set up pgfkeys namespaces.

```
8 \pgfkeys{/signdraw/.is family}
9 \def\signdrawset{\pgfkeys{/signdraw}}
10 \pgfkeys{/signdraw/params/.is family}
11 \def\signdrawparams{\pgfkeys{/signdraw/params}}
```

5 User interface

Define the main UI macro, a shortcut for a TikZ pic call, intended for drawing a single picture.

```
12 \def\signdrawpicture#1{%
13   \tikz{\pic{signdraw={#1}};}
14 }
```

Define user interface keys and set their default values.

```
15 \signdrawparams{
16   x/.code={\signdraw@x #1},
17   grid/.is if=signdraw@grid,
18   head/.store in=\signdraw@head,
19   tilt/.store in=\signdraw@tilt,
20   tilt left/.style={tilt=-10},
21   tilt right/.style={tilt=10},
22   brows/.store in=\signdraw@brows,
23   forehead/.store in=\signdraw@forehead,
24   eyes/.store in=\signdraw@eyes,
25   mouth/.store in=\signdraw@mouth,
26   cheeks/.store in=\signdraw@cheeks,
27   extra/.code={\appto\signdraw@extra{#1}},
28   hand/.code={\appto\signdraw@extra{\pgfkeys{/signdraw/hands}{hand={#1}}}},
29   other hand/.style={hand={other,#1}},
30   hands/.style={hand={#1},hand={other,#1}},
31   reverse hands/.code={%
32     \edef\signdraw@hand@side{\signdraw@otherside{\signdraw@hand@side}}%
33   },
34 }
35 \newlength\signdraw@x % unit
36 \newlength\signdraw@lw % \signdraw@x-adjusted line width unit
37 \def\signdraw@adjustsizes{%
38   \signdraw@lw 0.0375\signdraw@x\relax
39   \pgfmathsetmacro\signdraw@hand@scale{0.133\signdraw@x / 1mm}%
40   \pgfmathsetmacro\signdraw@hand@linewidth{0.415\signdraw@x / 1mm}%
41 }
42 \signdraw@x 1mm
43 \newif\ifsigndraw@grid
44 \signdraw@gridfalse
45 \def\signdraw@gloss{}%
46 \def\signdraw@glossoptions{}%
47 \def\signdraw@head{central}%
```

```

48 \def\signdraw@tilt{0}%
49 \def\signdraw@head@other{\signdraw@otherside{\signdraw@head}}%
50 \def\signdraw@brows{neutral}%
51 \def\signdraw@forehead{neutral}%
52 \def\signdraw@eyes{neutral}%
53 \def\signdraw@mouth{neutral}%
54 \def\signdraw@cheeks{neutral}%
55 \def\signdraw@extra{}%
56 \def\signdraw@hairstyle{snake}%
57 \tikzset{
58   signdraw/line width/.style={
59     line width=#1\signdraw@lw
60   },
61 }

Implement automatic side-switching.
62 \def\signdraw@otherside@central{}
63 \def\signdraw@otherside@left{right}
64 \def\signdraw@otherside@right{left}
65 \def\signdraw@otherside#1{%
66   \csname signdraw@otherside@#1\endcsname
67 }
68
69 \def\signdraw@setupside#1{%
70   \let\signdraw@orig@space\space
71   \def\signdraw@maybespace{}%
72   \signdraw@@setupside{}{#1}%
73   \def\signdraw@maybespace{ }%
74   \signdraw@@setupside{other}{\signdraw@otherside{#1}}%
75   \let\space\signdraw@orig@space
76 }
77 \def\signdraw@@setupside#1#2{% 0/other, left/right
78   \edef\signdraw@zeroother{#1}%
79   \edef\signdraw@leftright{#2}%
80   \signdraw@@setupside@coordinates
81 }
82 \def\signdraw@@setupside@coordinates{}
83 \def\signdraw@appto@setupside#1{%
84   \appto\signdraw@@setupside@coordinates{%
85     \signdraw@setupside@pgfcoordinate{#1}%
86   }%
87 }
88 \def\signdraw@setupside@pgfcoordinate#1{%
89   \let\side\signdraw@zeroother
90   \let\space\signdraw@maybespace
91   \edef\signdraw@setupside@pgfcoordinate@alias{\tikz@pp@name{#1}}%
92   \let\side\signdraw@leftright
93   \let\space\signdraw@orig@space
94   \edef\signdraw@setupside@pgfcoordinate@real{\tikz@pp@name{#1}}%
95   \pgfnodealias{\signdraw@setupside@pgfcoordinate@alias}{%
96     \signdraw@setupside@pgfcoordinate@real}%
97 }

Define important coordinates (for both sides).
98 \signdraw@appto@setupside{\side\space t}%
99 \signdraw@appto@setupside{\side\space f}%
100 \signdraw@appto@setupside{\side\space e}%
101 \signdraw@appto@setupside{\side\space n}%
102 \signdraw@appto@setupside{\side\space m}%
103 \signdraw@appto@setupside{\side\space h}%
104 \signdraw@appto@setupside{\side\space s}%
105 \signdraw@appto@setupside{\side\space c}%

```

```

106 \signdraw@appto@setupside{\side\space b}%
107 \signdraw@appto@setupside{\side\space temple}%
108 \signdraw@appto@setupside{\side\space eye}%
109 \signdraw@appto@setupside{\side\space ear}%
110 \signdraw@appto@setupside{\side\space cheek}%
111 \signdraw@appto@setupside{mouth\space\side}%
112 \signdraw@appto@setupside{\side\space shoulder}%
113 \signdraw@appto@setupside{chest\space \side}%
114 \signdraw@appto@setupside{belly\space \side}%
115 \signdraw@appto@setupside{\side\space g}%

```

Define the main UI - the signdraw picture environment.

```

116 \tikzset{
117   signdraw/.pic={
118     \signdrawparams{#1}%
119     \signdraw@adjustsizes
120     \begin{scope}[
121       x=\signdraw@x, y=\signdraw@x,
122       >=stealth,
123       local bounding box/.expanded=%
124         \csname pgfk@/tikz/name prefix\endcsname
125         \csname pgfk@/tikz/name suffix\endcsname
126     ]
127     \begin{scope}[line cap=round]
128       \path
129         (-\signdraw@outerxoffset,0.5*\signdraw@headxradius) coordinate (right f)
130         (-\signdraw@outerxoffset,0) coordinate (right e)
131         (-\signdraw@outerxoffset,-6) coordinate (right m)
132         (-\signdraw@outerxoffset,\signdraw@bodyyoffset) coordinate (right s)
133         (-\signdraw@outerxoffset,\signdraw@noseyoffset) coordinate (right n)
134         (-\signdraw@outerxoffset,-16) coordinate (right c)
135         (-\signdraw@outerxoffset,-22) coordinate (right b)
136       %
137         (\signdraw@outerxoffset,0.5*\signdraw@headxradius) coordinate (left f)
138         (\signdraw@outerxoffset,0) coordinate (left e)
139         (\signdraw@outerxoffset,-6) coordinate (left m)
140         (\signdraw@outerxoffset,\signdraw@noseyoffset) coordinate (left n)
141         (\signdraw@outerxoffset,\signdraw@bodyyoffset) coordinate (left s)
142         (\signdraw@outerxoffset,-16) coordinate (left c)
143         (\signdraw@outerxoffset,-22) coordinate (left b)
144     ;
145     \signdrawset{\signdraw@head}
146     \path
147       let \p0 = (head top) in
148       (-\signdraw@outerxoffset,\y0) coordinate(right t)
149       (\signdraw@outerxoffset,\y0) coordinate(left t)
150     ;
151     \path
152       let \p0 = (chin) in
153       (-\signdraw@outerxoffset,\y0) coordinate(right h)
154       (\signdraw@outerxoffset,\y0) coordinate(left h)
155     ;
156     \end{scope}
157     \begin{pgfinterruptboundingbox}
158       \path
159         (-\signdraw@outerxoffset,-28) coordinate (right g)
160         (0,-28) coordinate (center g)
161         (\signdraw@outerxoffset,-28) coordinate (left g)
162       ;
163     \end{pgfinterruptboundingbox}
164     \signdrawset{common}%

```

```

165     \let\hand\signdraw@lasthand
166     \signdraw@extra
167   \end{scope}
168 }
169 }

```

Helpers to deal with sides.

```

170 \signdrawset{
171   flip/.code={
172     \begin{scope}[xscale=-1]
173       \pgfkeysalso{#1}%
174     \end{scope}
175   },
176   shift to right/.code={
177     \begin{scope}[xshift=-7]
178       \pgfkeysalso{#1}%
179     \end{scope}
180   },
181   symmetric/.style={
182     #1=left,
183     flip={{\if#1=right}}},
184 }
185 }

```

6 Shapes

Picture parameters.

```

186 \signdrawset{% parameters -- bomo videli, kaj od tega dejansko obdržimo
187   head x radius/.store in=\signdraw@headxradius, head x radius=7,
188   head y radius/.store in=\signdraw@headyradius, head y radius=13,
189   hair y radius/.store in=\signdraw@hairyradius, hair y radius=7,
190   forehead y offset/.store in=\signdraw@foreheadyoffset, forehead y offset=3,
191   nose y offset/.store in=\signdraw@noseyoffset, nose y offset=-3.2,
192   mouth y offset/.store in=\signdraw@mouthyoffset, mouth y offset=-6,
193   cheek x offset/.store in=\signdraw@cheekxoffset, cheek x offset=3.5,
194   eye x offset/.store in=\signdraw@eyexoffset, eye x offset=3,
195   brow y offset/.store in=\signdraw@browyoffset, brow y offset=1.2,
196   gloss y offset/.store in=\signdraw@glossyoffset, gloss y offset=-25,
197   ear top factor/.store in=\signdraw@eartopfactor, ear top factor=0.013,
198   ear factor/.store in=\signdraw@earfactor, ear factor=0.08,
199   ear bottom factor/.store in=\signdraw@earbottomfactor, ear bottom factor=0.148,
200   body y offset/.store in=\signdraw@bodyyoffset, body y offset=-12,
201   hairstyle/.store in=\signdraw@hairstyle,
202   outer x offset/.store in=\signdraw@outerxoffset, outer x offset=12,
203   elbow/.store in=\signdraw@elbow, elbow=(b),
204 }

```

Side-independent drawing code and helpers.

```

205 \signdrawset{% shapes
206   grid/.code={
207     \ifsigndraw@grid
208       \draw[step=10,gray,very thin] (-19,-29) grid (19,9);
209     \fi
210   },
211   body/.code={
212     \draw[signdraw/line width=6,rounded corners]
213       (0,\signdraw@bodyyoffset) coordinate(neck)
214       + (-\signdraw@headxradius-2,-2) -- + (-\signdraw@headxradius,0) --
215       + (\signdraw@headxradius,0) -- + (\signdraw@headxradius+2,-2);
216     \path

```



```

217 (-\signdraw@headxradius + 1,\signdraw@bodyyoffset) coordinate(right shoulder)
218 (\signdraw@headxradius - 1,\signdraw@bodyyoffset) coordinate(left shoulder)
219 (0,-16) coordinate(chest center)
220 (-\signdraw@headxradius + 1,-16) coordinate(chest right)
221 (+\signdraw@headxradius - 1,-16) coordinate(chest left)
222 (-\signdraw@headxradius + 1,-22) coordinate(belly right)
223 (+\signdraw@headxradius - 1,-22) coordinate(belly left)
224 (0,-22) coordinate (belly center)
225 ;
226 },
227 setup coordinates/.code={
228 \path
229 coordinate (between eyes)
230 (8:\signdraw@headxradius) coordinate (left temple)
231 (0,\signdraw@foreheadyoffset) coordinate (forehead)
232 (0,0.5*\signdraw@headxradius) coordinate (front)
233 (0,\signdraw@noseyoffset) coordinate (nose)
234 (0,\signdraw@mouthyoffset) coordinate (mouth center)
235 (\signdraw@cheekxoffset,\signdraw@mouthyoffset) coordinate (left@cheek)
236 (-\signdraw@cheekxoffset,\signdraw@mouthyoffset) coordinate (right@cheek)
237 (-\signdraw@eyexoffset,0) coordinate (right@eye)
238 (\signdraw@eyexoffset,0) coordinate (left@eye)
239 ;
240 \path
241 (nose) --
242 node[pos=0.5,shape=coordinate] (between@nose@and@mouth){}
243 (mouth center)
244 ;
245 },
246 central/define coordinates/.code={
247 \path
248 (between@nose@and@mouth -| left@eye@outer) coordinate(left cheek)
249 (between@nose@and@mouth -| right@eye@outer) coordinate(right cheek)
250 ;
251 },
252 hairstyle/snake/.style={
253 draw,
254 black!50,
255 signdraw/line width=1,
256 decorate,
257 decoration={snake,segment length=0.5625\signdraw@x,amplitude=0.75\signdraw@x}
258 },
259 hairstyle/draft/.style={
260 draw,
261 black!20,
262 signdraw/line width=40,
263 },
264 }
265
266 \signdrawset{
267 common/.style={
268 body,
269 grid,
270 gloss
271 }
272 }

```

Glosses.

```

273 \signdrawparams{
274 gloss'/.code={%
275 \ifsigndraw@insentence

```

```

276 \xappto\signdraw@sentence@glosses{%
277 \noexpand\node
278 (\csname pgfk@/tikz/name prefix\endcsname gloss\csname pgfk@/tikz/name suffix\endcsname)
279 at (\csname pgfk@/tikz/name prefix\endcsname gloss\csname pgfk@/tikz/name suffix\endcsname)
280 [%
281 yshift={-\noexpand\signdraw@mmm@maxlevel*\noexpand\signdraw@mmm@levelgap},
282 /signdraw/align@gloss@\signdraw@gloss@alignment@method=\the\signdraw@currentsign,
283 inner xsep=0,
284 \expandonce{\signdraw@glossoptions}%
285 ]
286 {\unexpanded{#1}};
287 }%
288 \fi
289 \def\signdraw@gloss{#1}%
290 },
291 gloss/.style={gloss'=\textsc{#1}},
292 gloss options/.code={\appto\signdraw@glossoptions{,#1}},
293 }
294 \signdrawset{
295 gloss/.code={%
296 \ifsigndraw@insentence
297 \coordinate (gloss) at (0,\signdraw@glossyffset);
298 \else
299 \ifdefempty\signdraw@gloss{%
300 \coordinate (gloss) at (0,\signdraw@glossyffset);
301 }{%
302 \node (gloss) at (0,\signdraw@glossyffset) {\signdraw@gloss};
303 }%
304 \fi
305 },
306 gloss alignment/.store in=\signdraw@gloss@alignment@method,
307 gloss alignment=auto,
308 align@gloss@auto/.code={%
309 \ifnum\signdraw@currentsign>1
310 \ifnum#1=1
311 \pgfkeysalso{anchor=west}%
312 \else
313 \ifnum#1=\signdraw@currentsign
314 \pgfkeysalso{anchor=east}%
315 \fi
316 \fi
317 \fi
318 },
319 align@gloss@center/.style={anchor=center},
320 align@gloss@left/.style={anchor=west},
321 align@gloss@right/.style={anchor=east},
322 }
323 \def\signdraw@fix@gloss@coordinates@center{}
324 \def\signdraw@fix@gloss@coordinates@auto{%
325 \ifnum\signdraw@currentsign>1
326 \signdraw@fix@gloss@coordinates@do{1}{south west}%
327 \expandafter\signdraw@fix@gloss@coordinates@do\expandafter{\the\signdraw@currentsign}{south east}%
328 \fi
329 }
330 \def\signdraw@fix@gloss@coordinates@left{%
331 \foreach \n in {1,...,\the\signdraw@currentsign} {%
332 \expandafter\signdraw@fix@gloss@coordinates@do\expandafter{\n}{south west}%
333 }
334 }
335 \def\signdraw@fix@gloss@coordinates@right{%
336 \foreach \n in {1,...,\the\signdraw@currentsign} {%

```

```

337 \expandafter\signdraw@fix@gloss@coordinates@do\expandafter{\n}{south east}%
338 }
339 }
340 \def\signdraw@fix@gloss@coordinates@do#1#2{%
341 \path
342 let \p0 = (#1-.#2), \p1 = (#1-gloss) in
343 coordinate (#1-gloss) at (\x0, \y1)
344 ;
345 }

Central head and common.

346 \signdrawset{
347 central/.code={
348 \begin{scope}[yshift=(\signdraw@mouthyoffset-0.7)*\signdraw@x]
349 \begin{scope}[rotate=\signdraw@tilt]
350 \begin{scope}[yshift=-(\signdraw@mouthyoffset-0.7)*\signdraw@x]
351 \pgfkeysalso{
352 setup coordinates,
353 central/hair/.expand once=\signdraw@hairstyle,
354 central/face,
355 central/nose,
356 symmetric/.list={
357 central/ear,
358 central/eye,
359 central/brow,
360 central/cheek
361 },
362 central/forehead/\signdraw@forehead,
363 central/mouth/\signdraw@mouth,
364 central/define coordinates,
365 }%
366 \end{scope}
367 \end{scope}
368 \end{scope}
369 },
370 central/setup coordinates/.style={/signdraw/setup coordinates},
371 central/hair/.code={% #1 = path options
372 \path[/signdraw/hairstyle/#1]
373 (left temple)
374 arc [start angle=-10, end angle=190,
375 x radius=\signdraw@headxradius, y radius=\signdraw@hairyradius]
376 node (head top) [shape=coordinate, pos=0.5] {}
377 ;
378 },
379 central/nose/.code={
380 \draw [signdraw/line width=4]
381 (nose) + (-1.2,0.2)
382 arc (170:390:1.25 and 0.7)
383 ;
384 },
385 central/face/.code={
386 \draw[signdraw/line width=5]
387 (left temple)
388 arc [start angle=352, end angle=188,
389 x radius=\signdraw@headxradius, y radius=\signdraw@headyradius]
390 node (chin) [shape=coordinate, pos=0.5] {}
391 node (left@ear@top) [shape=coordinate, pos=\signdraw@eartopfactor,
392 xshift=3\signdraw@lw] {}
393 node (left ear) [shape=coordinate, pos=\signdraw@earfactor, xshift=3\signdraw@lw] {}
394 node (left@ear@bottom) [shape=coordinate, pos=\signdraw@earbottomfactor,
395 xshift=3\signdraw@lw] {}

```

```

396     node (right@ear@top) [shape=coordinate, pos=1-\signdraw@eartopfactor,
397         xshift=-3\signdraw@lw] {}
398     node (right ear) [shape=coordinate, pos=1-\signdraw@earfactor,
399         xshift=3\signdraw@lw] {}
400     node (right@ear@bottom) [shape=coordinate, pos=1-\signdraw@earbottomfactor,
401         xshift=-3\signdraw@lw] {}
402     coordinate (right temple)
403 ;
404 },
405 central/ear/.code={% #1 = left/right
406     \draw[signdraw/line width=5]
407         (#1@ear@top) to[out=0,in=60]
408         %node (#1 ear) [shape=coordinate, pos=0.5] {}
409         (#1@ear@bottom);
410 },
411 central/eye/.style={central/eye/\signdraw@eyes=#1},
412 central/eye/neutral/.style={
413     iris={#1}{circle (0.6)},
414     eyeball={#1}{0.35},
415     central/eyelids={#1}{50}{50}{0}{0}
416 },
417 central/eye/wide/.style={
418     iris={#1}{circle (0.6)},
419     eyeball={#1}{0.15},
420     central/eyelids={#1}{80}{70}{0}{0}
421 },
422 central/eye/wh/.style={
423     iris={#1}{circle (0.6)},
424     eyeball={#1}{0.35},
425     central/eyelids={#1}{50}{50}{0}{0}
426 },
427 central/eye/squinted/.style={
428     % no iris
429     eyeball={#1}{0.35},
430     central/eyelids={#1}{50}{0}{-0.3}{-0.4}
431 },
432 iris/.code 2 args={% #1 = left/right
433     \draw[signdraw/line width=1,black!75,fill=black!50]
434         (#1@eye) #2;
435 },
436 eyeball/.code 2 args={% #1 = left/right
437     \draw[fill=black] (#1@eye) circle (#2);
438 },
439 central/eyelids/.code n args=5{% #1 = left/right
440     \draw[signdraw/line width=3]
441         (#1@eye) + (-1.5,#4) to[bend left=#2] + (1.5,#4);
442     \draw[signdraw/line width=2]
443         (#1@eye) + (-1.5,#5) to[bend right=#3]
444         node(#1 eye)[pos=0.5]{}
445         + (1.5,#5)
446         coordinate(#1@eye@outer)
447     ;
448 },
449 central/brow/.style={central/brow/\signdraw@brows=#1},
450 central/brow/neutral/.code={% #1 = left/right
451     \draw[signdraw/line width=5,black!75]
452         (#1@eye) + (-1.6,\signdraw@browyoffset)
453         to[out=30,in=170]
454         + (1.6,\signdraw@browyoffset+0.1)
455     ;
456 },

```

```

457 central/brow/raised/.code={% #1 = left/right
458   \draw[signdraw/line width=5,black!75]
459     (#1@eye) + (1.6,2.5) to[bend right=60] + (-1.7,2.5);
460 },
461 central/brow/furrowed/.code={% #1 = left/right
462   \draw[signdraw/line width=5,black!75]
463     (#1@eye) + (-1.6,1.2) to[out=330,in=170] + (1.7,1.3);
464   \draw[signdraw/line width=4,black!75]
465     (#1@eye) + (-1.6,1.2) to[bend left] + (-1.8,2.2);
466 },
467 central/brow/lowered/.code={% #1 = left/right
468   \draw[signdraw/line width=5,black!75]
469     (#1@eye) + (1,0.9) -- + (-1.5,0.7);
470 },
471 central/forehead/neutral/.code={},
472 central/forehead/raised/.code={
473   \draw[signdraw/line width=2]
474     (-2,5) to[bend left=7] (2,5);
475   \draw[signdraw/line width=2]
476     (-2.5,4.5) to[bend left=7] (2.5,4.5);
477 },
478 central/forehead/furrowed/.code={
479   \draw[signdraw/line width=3,black!75]
480     (right@eye) + (1.8,0.7) to[bend right] + (2.5,2);
481   \draw[signdraw/line width=3,black!75]
482     (left@eye) + (-2,0.7) to[bend left] + (-2.7,2);
483 },
484 central/forehead/lowered/.code={
485   \draw[signdraw/line width=4]
486     (between eyes) -- + (0,1);
487 },
488 central/mouth/neutral/.code={
489   \draw[signdraw/line width=4,rounded corners]
490     (mouth center) + (-2,0) coordinate(mouth right) to[bend right=7] + (2,0)
491     coordinate(mouth left);
492   \draw[signdraw/line width=4]
493     (mouth center) + (-1,-0.7) -- + (0.5,-0.7);
494 },
495 central/mouth/open/.code={
496   \draw[signdraw/line width=4,rounded corners,fill=black]
497     (mouth center) + (-1,-0.5) coordinate(mouth right) to[bend left=45] + (1,-0.5)
498     coordinate(mouth left);
499   \draw[signdraw/line width=4,rounded corners,fill=black]
500     (mouth center) + (-1,-0.5) to[bend right=30] + (1,-0.5);
501   \draw[signdraw/line width=3,rounded corners]
502     (mouth center) + (-0.6,-1.5) to[bend right=30] + (0.6,-1.5);
503 },
504 central/mouth/sucked/.code={
505   \draw[signdraw/line width=4,rounded corners]
506     (mouth center) + (-1,-0.5) coordinate(mouth right) to[bend left=90] + (1,-0.5)
507     coordinate(mouth left);
508   \draw[signdraw/line width=4,rounded corners]
509     (mouth center) + (-1,-0.5) to[bend left=15] + (1,-0.5);
510   \draw[signdraw/line width=4,rounded corners]
511     (mouth center) + (-0.7,-0.5) to[bend right=90] + (0.7,-0.5);
512 },
513 central/mouth/OPEN/.code={
514   \draw[fill=black]
515     (mouth center) + (0,-0.5) ellipse (1 and 1.2);
516   \path (mouth center) ++ (0,-0.5)
517     + (-1,0) coordinate(mouth right)

```

```

518     + (1,0) coordinate(mouth left)
519     ;
520     \draw[signdraw/line width=3]
521     (mouth center) + (-0.5,-2) to[bend right=30] + (0.5,-2);
522 },
523 central/mouth/split/.code={
524     \draw[signdraw/line width=4,rounded corners]
525     (mouth center) + (-2,0) coordinate(mouth right) to[bend left=7] + (2,0)
526     coordinate(mouth left);
527     \draw[signdraw/line width=4,rounded corners]
528     (mouth center) + (-2,0) to[bend right=7] + (2,0);
529     \draw[signdraw/line width=4]
530     (mouth center) + (-1,-0.7) -- + (0.5,-0.7);
531 },
532 central/mouth/tongue/.code={
533     \draw[signdraw/line width=4,rounded corners]
534     (mouth center) + (-2,0) coordinate(mouth right) to[bend left=10] + (2,0)
535     coordinate(mouth left);
536     \draw[signdraw/line width=4,rounded corners]
537     (mouth center) + (-2,0) to[bend right=20] + (2,0);
538     \draw[signdraw/line width=3,rounded corners,fill=white]
539     (mouth center) + (-1.3,0) to[bend right=60] + (1.3,0);
540 },
541 central/mouth/puffed/.code={
542     \draw[signdraw/line width=4]
543     % ne vem zakaj mi ravna črta s štirimi specificiranimi točkami in ukazom
544     % "rounded corners" da čuden rezultat? Sem naredil z arcom namesto tega
545     (mouth center) + (-2.2,-0.4) arc (180:90:0.4) --
546     (mouth center) + (-2,0) coordinate(mouth right) --
547     + (2,0) coordinate(mouth left) arc (90:0:0.4);
548     \draw[signdraw/line width=4]
549     (mouth center) + (-1,-0.7) -- + (0.5,-0.7);
550 },
551 central/cheek/.style={central/cheek/\signdraw@cheeks=#1},
552 central/cheek/neutral/.code={},
553 central/cheek/puffed/.code={% #1 = left/right
554     \draw[signdraw/line width=4] (#1@cheek) + (0,2) to[bend right=-60] + (0,-1.5);
555 },
556 central/cheek/sucked/.code={% #1 = left/right
557     \draw[signdraw/line width=4] (#1@cheek) + (0,1) to[bend right=30] + (0,-1);
558 },
559 }

```

Left head.

```

560 \signdrawset{
561 left/.style={
562     left/setup coordinates,
563     %setup coordinates,
564     left/hair/.expand once=\signdraw@hairstyle,
565     left/face,
566     left/nose,
567     left/ear,
568     left/eye/.expanded=\signdraw@head,
569     shift to right={left/eye/.expanded=\signdraw@head@other},
570     symmetric/.list={
571         central/brow,
572         %left/cheek
573     },
574     left/@temple/.expanded=\signdraw@head@other,
575     %left/forehead/\signdraw@forehead,
576     left/mouth/\signdraw@mouth,

```

```

577 left/define coordinates,
578 },
579 left/setup coordinates/.code={
580 \path
581 coordinate (between eyes)
582 + (6.5,5.5) coordinate (\signdraw@head\space temple)
583 + (3.5,0) coordinate (between eyes)
584 ;
585 \path (between eyes)
586 + (0,0.5*\signdraw@headxradius) coordinate (front)
587 + (3,0) coordinate (\signdraw@head @eye)
588 + (-3,0) coordinate (\signdraw@head@other @eye)
589 + (0,3) coordinate (forehead)
590 + (0,-6) coordinate (mouth center)
591 + (-1,-6.7) coordinate (ustnica)
592 + (3.5,-6) coordinate (\signdraw@head @cheek)
593 + (-3.5,-6) coordinate (\signdraw@head@other @cheek)
594 + (-1.2,-3) coordinate (@nose)
595 ;
596 },
597 left/define coordinates/.code={
598 %
599 },
600 left/hair/.code={
601 \path[/signdraw/hairstyle/#1]
602 (\signdraw@head\space temple) arc (30:194.6:7)
603 node(head top)[shape=coordinate,pos=0.36]{}
604 ;
605 },
606 left/face/.code={
607 \draw[signdraw/line width=5]
608 (\signdraw@head\space temple)
609 to[bend left=20]
610 node[pos=0.72,shape=coordinate](\signdraw@head\space cheek){}
611 + (-1.5,-14) to[bend left=40]
612 node(chin)[shape=coordinate,pos=0.8]{}
613 + (-1.5,-1) arc (270:195:9)
614 coordinate(face@\signdraw@head@other)
615 to[bend left=10] (-5,-10)
616 coordinate(neck)
617 ;
618 \path (\signdraw@head\space cheek) + (-7.5,0)
619 coordinate(\signdraw@head@other\space cheek);
620 },
621 left/nose/.code={% todo: stik z obrvjo, še posebej pri head=right
622 \draw [signdraw/line width=4]
623 (@nose) arc (170:390:1.25 and 0.7)
624 coordinate(nose)
625 % Lahko je tudi brez nosnega loka, kar pomeni, da gre naslednja vrstica ven
626 to [bend left=60] ($(\signdraw@head @eye) + (-1.6,1.2)$)
627 ;
628 },
629 left/ear/.code={
630 \path (face@\signdraw@head@other)
631 + (-0.3,2.35) coordinate(ear@top)
632 + (0.2,-0.65) coordinate(ear@bottom)
633 (ear@top) --
634 node(\signdraw@head@other\space ear)[shape=coordinate,pos=0.6]{}
635 (ear@bottom)
636 ;
637 \draw[signdraw/line width=5]

```

```

638     (ear@top) arc (0:180:1.1)
639     to[bend right=45]
640     (ear@bottom)
641     ;
642   },
643   left/eye/.style={left/eye/\signdraw@eyes=#1},
644   left/eye/neutral/.style={
645     iris=#1{ellipse (0.4 and 0.6)},
646     eyeball=#1{0.15},
647     left/eyelids=#1,
648   },
649   left/eyelids/.code={
650     \draw[signdraw/line width=3]
651       (#1@eye) + (0,0.6) arc (90:270:1.5 and 0.6);
652     \draw[signdraw/line width=3]
653       (#1@eye) + (0,0.6) arc (90:270:1.5 and 0.6)
654       node[#1 eye][pos=0.9]{}
655     ;
656   },
657   left/mouth/neutral/.code={
658     \draw[signdraw/line width=4,rounded corners]
659       (mouth center) + (-2,0) coordinate(mouth \signdraw@head@other)
660       to[bend right=7] + (1,0) coordinate(mouth \signdraw@head) ;
661     \draw[signdraw/line width=4]
662       (mouth center) + (-1,-0.7) -- + (0.5,-0.7);
663   },
664   left/@temple/.code={
665     \path (\signdraw@otherside{#1} temple -| #1@eye)
666       + (-1.6,0)
667       coordinate(#1 temple);
668   },
669 }

```

Right head is simply left head flipped.

```

670 \signdrawset{
671   right/.style={flip=left},
672 }

```

7 Handshapes

Input the handshape definitions.

```
673 \input handshape.def
```

Define a user-friendly interface for selecting a handshape.

```

674 \def\signdraw@hand@shape{\signdraw@hand@handshape-\signdraw@hand@view}
675 \def\signdraw@hand@handshape{\signdraw@hand@fingers@number\signdraw@hand@fingers@spread
676   \signdraw@hand@fingers@shape\signdraw@hand@thumb@touch t\signdraw@hand@thumb@shape}
677 %\def\signdraw@hand@fingers@number{}
678 %\def\signdraw@hand@fingers@spread{}
679 \def\signdraw@hand@fingers@shape{}
680 \def\signdraw@hand@thumb@shape{e}
681 \def\signdraw@hand@thumb@touch{-}
682 \def\signdraw@hand@view{}
683
684 \signdrawset{dominant hand/.store in=\signdraw@hand@side}
685 \def\signdraw@hand@side{right}
686 \def\signdraw@hand@n{0}
687 \def\signdraw@hand@rotate{0}
688
689 \def\signdraw@LEFT{left}

```



```

690 %\def\signdraw@RIGHT{right}
691 \def\signdraw@hand@sideswitch#1#2{%
692   \ifx\signdraw@hand@side\signdraw@LEFT #1\else#2\fi
693 }
694 \newif\ifsigndraw@hand@point
695 \signdrawset{hands/.cd,
696   hand/.code={%
697     \edef\signdraw@hand@n{\the\numexpr\signdraw@hand@n+1}%
698     \beginpgfgroup
699       \def\signdraw@hand@tikzkeys{%
700         \def\signdraw@hand@path##1{\path ##1;}%
701         \pgfqkeys{/signdraw/hands}{#1}%
702         \signdraw@setupside{\signdraw@hand@side}%
703         \ifsigndraw@hand@point
704           \path \signdraw@elbow -- \signdraw@hand@pointto
705             node[coordinate,pos=0,name=signdraw@temp@a]{}
706             node[coordinate,pos=1,name=signdraw@temp@b]{}
707           ;
708           \letcs\signdraw@pointerangle{\signdraw@\signdraw@hand@shape @pa}%
709           \signdraw@hand@sideswitch{%
710             \pgfmathadd{180}{-\signdraw@pointerangle}\let\signdraw@pointerangle\pgfmathresult
711           }{%
712             \pgfpointdiff{\pgfpointanchor{\tikz@pp@name{\signdraw@temp@a}}{center}}{
713               \pgfpointanchor{\tikz@pp@name{\signdraw@temp@b}}{center}}%
714             \pgfmathatan2{\pgf@y}{\pgf@x}%
715             \pgfmathadd{\pgfmathresult}{-\signdraw@pointerangle}%
716             \let\signdraw@hand@rotate\pgfmathresult
717             \def\signdraw@hand@path##1{\path (signdraw@temp@a) -- (signdraw@temp@b) ##1;}%
718           \fi
719           \edef\signdraw@hand@node{%
720             node[
721               name=hand \signdraw@hand@n,
722               alias=hand,
723               shape=\signdraw@hand@shape,
724               signdraw/line width=\signdraw@hand@linewidth,
725               draw,
726               fill=white,
727               scale=\signdraw@hand@scale,
728               rotate=\signdraw@hand@rotate,
729               \signdraw@hand@sideswitch{xscale=-1}{},
730               \expandonce{\signdraw@hand@tikzkeys}
731             ]{%
732               %\signdraw@hand@shape,
733             }
734           }%
735           \expandafter\signdraw@hand@path\expandafter{\signdraw@hand@node}%
736         \endpgfgroup
737       },
738       .unknown/.code={%
739         \eappto\signdraw@hand@tikzkeys{\pgfkeyscurrentname={\unexpanded{#1}},}%
740       },
741       other/.code={%
742         \edef\signdraw@hand@side{\signdraw@otherside{\signdraw@hand@side}}%
743       },
744       fingers/.code={\pgfqkeys{/signdraw/hands/fingers}{#1}},
745       fingers/0/.code={\def\signdraw@hand@fingers@number{0}\def\signdraw@hand@fingers@spread{}%
746         \def\signdraw@hand@fingers@shape{}},
747       fingers/1/.code={\def\signdraw@hand@fingers@number{1}\def\signdraw@hand@fingers@spread{}},
748       fingers/2/.code={\def\signdraw@hand@fingers@number{2}\def\signdraw@hand@fingers@spread{n}},
749       fingers/3/.code={\def\signdraw@hand@fingers@number{3}\def\signdraw@hand@fingers@spread{n}},
750       fingers/4/.code={\def\signdraw@hand@fingers@number{4}\def\signdraw@hand@fingers@spread{n}},

```

```

751 0/.style={fingers={0,#1}},
752 1/.style={fingers={1,#1}},
753 2/.style={fingers={2,#1}},
754 3/.style={fingers={3,#1}},
755 4/.style={fingers={4,#1}},
756 fingers/spread/.code={\def\signdraw@hand@fingers@spread{s}},
757 fingers/extended/.code={\def\signdraw@hand@fingers@shape{e}},
758 fingers/bent/.code={\def\signdraw@hand@fingers@shape{b}},
759 fingers/flattened/.code={\def\signdraw@hand@fingers@shape{f}},
760 fingers/curved/.code={\def\signdraw@hand@fingers@shape{c}},
761 thumb/.code={\pgfqkeys{/signdraw/hands/thumb}{#1}},
762 thumb/extended/.code={\def\signdraw@hand@thumb@shape{e}},
763 thumb/bent/.code={\def\signdraw@hand@thumb@shape{b}},
764 thumb/flattened/.code={\def\signdraw@hand@thumb@shape{f}},
765 thumb/curved/.code={\def\signdraw@hand@thumb@shape{c}},
766 thumb/parallel/.code={\def\signdraw@hand@thumb@shape{p}},
767 thumb/touch/.code={\def\signdraw@hand@thumb@touch{+}},
768 side/.is choice,
769 side/front/.code={\def\signdraw@hand@view{f}},
770 side/back/.code={\def\signdraw@hand@view{b}},
771 side/top/.code={\def\signdraw@hand@view{t}},
772 side/pinky/.code={\def\signdraw@hand@view{sp}},
773 side/thumb/.code={\def\signdraw@hand@view{st}},
774 handshape/.code={\def\signdraw@hand@handshape{#1}},
775 shape/.code={\def\signdraw@hand@shape{#1}},
776 touch/.code={%
777   \signdraw@hand@pointtrue
778   \def\signdraw@hand@pointto{#1}%
779   \pgfkeysalso{anchor=pointer,at=(signdraw@temp@b)}%
780 },
781 point/.code={%
782   \signdraw@hand@pointtrue
783   \def\signdraw@hand@pointto{#1}%
784   \pgfkeysalso{anchor=wrist,at=(signdraw@temp@a)}%
785 },
786 }

```

Define macros which allow drawing a standalone handshape.

```

787 \def\hand#1{%
788   \begingroup
789   \def\signdraw@hand@tikzkeys{%
790     \pgfkeys{signdraw/params/x=0.1\ht\strutbox}%
791     \pgfqkeys{/signdraw/hands}{#1}%
792     \signdraw@adjustsizes
793   \edef\signdraw@marshal{%
794     \noexpand\begin{tikzpicture}[x=\signdraw@x,y=\signdraw@x]
795       \noexpand\node[%
796         shape={\signdraw@hand@shape},%
797         signdraw/line width=\signdraw@hand@linewidth,
798         scale=\signdraw@hand@scale,
799         rotate=\signdraw@hand@rotate,
800         \signdraw@hand@sideswitch{xscale=-1}{},
801         \expandonce{\signdraw@hand@tikzkeys}%
802       ]{};
803     \noexpand\end{tikzpicture}%
804   }\signdraw@marshal
805   \endgroup
806 }
807 \def\signdraw@lasthand#1{hand \the\numexpr\signdraw@hand@n-#1\relax}

```

8 Sentences

The interface for writing sign language sentences with glosses and non-manual markings.

```

808 \newif\ifsigndraw@insentence
809 \newcommand\signdrawsentence[1]{%
810   \begin{tikzpicture}
811     \signdraw@insentencetrue
812     \gdef\signdraw@sentence@glosses{}%
813     \def\signdraw@sentence@nmm{}%
814     \def\signdraw@nmm@maxlevel{0}%
815     \signdraw@currentsign=0
816     \path (0,0) coordinate(current sign);
817     \pgfpointanchor{current sign}{center}%
818     \pgfgetlastxy\signdraw@sentence@currentsign@x\signdraw@sentence@currentsign@y
819     \pgfqkeys{/signdraw/sentence}{#1}%
820     \csname signdraw@fix@gloss@coordinates@\signdraw@gloss@alignment@method\endcsname
821     \signdraw@sentence@glosses
822     \signdraw@sentence@nmm
823   \end{tikzpicture}%
824 }
825 \newcount\signdraw@currentsign
826 \pgfqkeys{/signdraw/sentence}{
827   sign/.code={%
828     \advance\signdraw@currentsign 1
829     \pgfkeysactivatefamily{/signdraw/params/process@before@drawing}%
830     \pgfkeysinstallkeyfilter{/pgf/key filters/active families}{}%
831     \pgfkeysinstallkeyfilterhandler{/pgf/key filter handlers/append filtered to}{\signdraw@remaining@params}%
832     \def\signdraw@remaining@params{}%
833     \pgfqkeysfiltered{/signdraw/params}{#1}%
834     \pic(\the\signdraw@currentsign-) at (current sign) {%
835       signdraw/.expand once=\expandafter{\signdraw@remaining@params}};
836     \signdraw@sentence@shiftcurrentsign{(3,0)}%
837   },
838   nmm/.style={/signdraw/params/nmm={#1}},
839 }
840 \signdrawparams{
841   xshift/.style={shift={(#1,0)}},
842   yshift/.style={shift={(0,#1)}},
843   shift/.code={\signdraw@sentence@shiftcurrentsign{#1}},
844   nmm/.code={%
845     \pgfkeysinterruptkeyfilter
846     \def\signdraw@nmm@level{1}%
847     \edef\signdraw@nmm@from{\the\signdraw@currentsign}%
848     \edef\signdraw@nmm@to{\the\signdraw@currentsign}%
849     \def\signdraw@nmm@lineoptions{}%
850     \def\signdraw@nmm@nodeoptions{inner xsep=0, inner ysep=0.4ex,font=\footnotesize}%
851     \pgfqkeys{/signdraw/nmm}{right,content=#1}%
852     \ifnum\signdraw@nmm@from>\signdraw@nmm@to
853       \PackageError{signdraw}{nmm "from" (\signdraw@nmm@from) > "to" (\signdraw@nmm@to)}{}%
854     \fi
855     \ifnum\signdraw@nmm@maxlevel<\signdraw@nmm@level
856       \edef\signdraw@nmm@maxlevel{\signdraw@nmm@level}%
857     \fi
858     \eappto\signdraw@sentence@nmm{%
859       \noexpand\signdraw@nmm
860         {\expandonce\signdraw@nmm@level}%
861         {\expandonce\signdraw@nmm@from}%
862         {\expandonce\signdraw@nmm@to}%
863         {\expandonce\signdraw@nmm@lineoptions}%
864         {\expandonce\signdraw@nmm@nodeoptions}%

```

```

865     {\expandonce{\signdraw@nmm@content}}}%
866   }%
867   \endpgfkeysinterruptkeyfilter
868 },
869 process@before@drawing/.is family,
870 xshift/.belongs to family=/signdraw/params/process@before@drawing,
871 yshift/.belongs to family=/signdraw/params/process@before@drawing,
872 shift/.belongs to family=/signdraw/params/process@before@drawing,
873 nmm/.belongs to family=/signdraw/params/process@before@drawing,
874 }
875 \def\signdraw@sentence@shiftcurrentsign#1{%
876   \pgfkeysinterruptkeyfilter
877   \path
878     (current sign) + #1 coordinate (current sign);
879   \pgfpointanchor{current sign}{center}%
880   \pgfgetlastxy\signdraw@sentence@currentsign@x\signdraw@sentence@currentsign@y
881   \endpgfkeysinterruptkeyfilter
882 }
883 \pgfqkeys{/signdraw/nmm}{
884   level/.store in=\signdraw@nmm@level,
885   1/.style={level=1},
886   2/.style={level=2},
887   3/.style={level=3},
888   4/.style={level=4},
889   5/.style={level=5},
890   6/.style={level=6},
891   7/.style={level=7},
892   8/.style={level=8},
893   9/.style={level=9},
894   from/.code={\signdraw@nmm@fromto\signdraw@nmm@from#1:},
895   to/.code={\signdraw@nmm@fromto\signdraw@nmm@to#1:},
896   .unknown/.code={% implicit from-to
897     \expandafter\signdraw@nmm@fromto@parse\pgfkeyscurrentname:,%
898   },
899   left/.style={node options={at={(\nmm@from)}, anchor=south west}},
900   right/.style={node options={at={(\nmm@to)}, anchor=south east}},
901   center/.style={node options={at={(\nmm@from)! .5!(\nmm@to)}, anchor=south}},
902   node options/.code={\appto\signdraw@nmm@nodeoptions{,#1}},
903   content/.store in=\signdraw@nmm@content,
904 }
905 \def\signdraw@nmm@fromto#1#2: {%
906   \ifx:#2:%
907     \expandafter\signdraw@nmm@fromto@empty
908   \else
909     \expandafter\signdraw@nmm@fromto@notempty
910   \fi
911   #1#2:%
912 }
913 \def\signdraw@nmm@fromto@empty#1#2: {%
914   \edef#1{\the\signdraw@currentsign}%
915 }
916 \def\signdraw@nmm@fromto@notempty#1#2#3: {%
917   \ifx+#2%
918     \expandafter\signdraw@nmm@fromto@plus
919   \else
920     \ifx-#2%
921       \expandafter\expandafter\expandafter\signdraw@nmm@fromto@minus
922     \else
923       \expandafter\expandafter\expandafter\signdraw@nmm@fromto@absolute
924     \fi
925   \fi

```

```

926 #1#20#3:%
927 }
928 \def\signdraw@nmm@fromto@plus#1#2: {%
929 \edef#1{\the\numexpr\signdraw@currentsign#2}%
930 \ifnum#1=\signdraw@currentsign
931 \def#1{\the\signdraw@currentsign}% last sign number: def, not edef!
932 \fi
933 }
934 \def\signdraw@nmm@fromto@minus#1#2: {%
935 \edef#1{\the\numexpr\signdraw@currentsign#2}%
936 \ifnum#1=\signdraw@currentsign
937 \def#1{1}%
938 \fi
939 }
940 \def\signdraw@nmm@fromto@absolute#1#20#3: {%
941 \edef#1{#2#3}%
942 }
943 \def\signdraw@nmm@fromto@parse#1:#2, {%
944 \ifx,#2,%
945 \appto\signdraw@nmm@lineoptions{,#1}%
946 \else
947 \signdraw@nmm@fromto@parse@#1:#2%
948 \fi
949 }
950 \def\signdraw@nmm@fromto@parse@#1:#2: {%
951 \signdraw@nmm@fromto\signdraw@nmm@from#1:%
952 \signdraw@nmm@fromto\signdraw@nmm@to#2:%
953 }
954 \def\signdraw@nmm@levelgap{3ex}
955 \def\signdraw@nmm#1#2#3#4#5#6 {%
956 % #1 = level, #2 = from, #3 = to
957 % #4 = line options, #5 = node options
958 % #6 = nmm text
959 \draw[#4]
960 ([yshift={({#1-1} * \signdraw@nmm@levelgap})#2-gloss.north west) coordinate (nmm@from)
961 --
962 ([yshift={({#1-1} * \signdraw@nmm@levelgap})#3-gloss.north east) coordinate (nmm@to)
963 ;
964 \node[#5]{#6};
965 }

```

Handshapes

Handshapes were converted from SVG to TikZ format using `svg2tikz` plus a specially developed utility `pgf2shape`, written in Python, which transforms the `pgfpicture` code into a PGF shape code. Section 9 shows the code of `pgf2shape`; section 10 lists all defined handshapes and their names.

9 `pgf2shape.py`

```

#!/usr/bin/python

import argparse, collections, fileinput, os.path, sys, math

parser = argparse.ArgumentParser()
parser.add_argument('svg_filename')
parser.add_argument('bb_filename')
parser.add_argument('pointer_filename')

```

```

commandline_args = parser.parse_args()
shape_name = os.path.basename(commandline_args.svg_filename).rpartition('-')[0]

pgfparams = collections.namedtuple('pgfparams', 'line_width, miter_limit')

stack = [
    pgfparams(line_width = 0.4, miter_limit = 10.0)
] # a list of (linewidth, miterlimit) pairs

def parse_tex_command(string, letters = '@'):
    assert string[0] == '\\
    i = 1
    while i < len(string) and (string[i].isalpha() or string[i] in letters):
        i += 1
    command = string[1:i]
    while i < len(string) and string[i].isspace():
        i += 1
    depth = 0
    args = []
    while i < len(string):
        if string[i] == '{':
            if depth == 0:
                start = i
                depth += 1
            elif string[i] == '}':
                depth -= 1
                if depth == 0:
                    args.append(string[start+1:i])
            elif depth == 0:
                args.append(string[i])
        i += 1
    return command, args

def pt_to_float(pt):
    assert pt.endswith('pt')
    return float(pt[0:-2])

backgroundpath = collections.defaultdict(lambda: [])
beforebackgroundpath = collections.defaultdict(lambda: [])
path = []

n = 0
with fileinput.input(files=(commandline_args.svg_filename,)) as f:
    for line in f:
        command, args = parse_tex_command(line.strip())
        #print(command, args)
        if command == 'begin' and args == ['pgfscope']:
            stack.append(stack[-1])
        elif command == 'end' and args == ['pgfscope']:
            del stack[-1]
        elif command == 'pgfsetlinewidth':
            assert len(args) == 1
            stack[-1] = stack[-1]._replace(line_width = pt_to_float(args[0]))
        elif command == 'pgfsetmiterlimit':
            assert len(args) == 1
            assert float(args[0]) == 10.0
            #stack[-1] = stack[-1]._replace(miter_limit = float(args[0]))
        elif command == 'pgfusepath':
            assert len(args) == 1
            if 'fill' in args[0]:
                backgroundpath[stack[-1]].extend(path)

```

```

        path = []
    elif 'stroke' in args[0]:
        beforebackgroundpath[stack[-1]].extend(path)
        path = []
    else:
        assert n == 0
        n = 0
    else:
        path.append((command, args))
        n += 1
assert not(path)

#max_line_width = max(
#    max((param[0] for param in backgroundpath.keys()), default = 0.0),
#    max((param[0] for param in beforebackgroundpath.keys()), default = 0.0))
min_line_width = min(
    (param[0] for param in list(backgroundpath.keys()) + list(beforebackgroundpath.keys())),
    default = 1.0
)
#for path in backgroundpath.values():
#    if path[-1][0] != 'pgfpathclose':
#        path.append(('pgfpathclose', []))

with open(commandline_args.bb_filename) as f:
    bb = [pt_to_float(p) for p in f.read().strip().split(',') ]

pointer = None
try:
    with open(commandline_args.pointer_filename) as f:
        first = True
        for line in f:
            if first:
                first = False
            else:
                pointer = [float(p) for p in line.strip().split()[1:-1].split(',') ]
                pointer = 0.8*pointer[0], -0.8*pointer[1]
except:
    pass

side = shape_name.rpartition('-')[2]
if side.endswith('(o)'):
    side = side[0:-3]
if side == 'f': # front
    anchors = 'wrist', 'wrist_thumb', 'thumb', 'top_thumb', 'top', 'top_pinky', 'pinky', 'wrist_pinky'
elif side == 'b': # back
    anchors = 'wrist', 'wrist_pinky', 'pinky', 'top_pinky', 'top', 'top_thumb', 'thumb', 'wrist_thumb'
elif side == 'sp': # pinky
    anchors = 'wrist', 'wrist_front', 'front', 'top_front', 'top', 'top_back', 'back', 'wrist_back'
elif side == 'st': # thumb
    anchors = 'wrist', 'wrist_back', 'back', 'top_back', 'top', 'top_front', 'front', 'wrist_front'
elif side == 't': # top
    anchors = 'front', 'front_thumb', 'thumb', 'top_thumb', 'top', 'top_pinky', 'pinky', 'front_pinky'
else:
    raise RuntimeError(f"Unknown side_{side} in shape_{shape_name}")

print(rf"\pgfdeclareshape_{shape_name}")
for path, pathname, usepath in (
    (backgroundpath, 'backgroundpath', ''),
    (beforebackgroundpath, 'beforebackgroundpath', r'\pgfusepath_{stroke}')):
    print(rf"\_{pathname}")
    for params, actions in path.items():

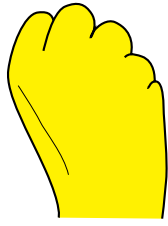
```

```

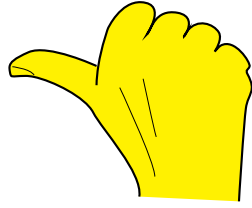
if params.line_width != min_line_width and pathname != 'backgroundpath':
    print(r"\begin{pgfscope}")
    lw = params.line_width / min_line_width
    print(rf"\pgfsetlinewidth{{lw}}\pgflinewidth")
    #print(rf"\pgfsetmiterlimit {{params.miter_limit}}")
    for action in actions:
        command, args = action
        print(
            f"\{command}" +
            ".join(f\"{{arg}}\" for arg in args)
        )
    if usepath:
        print("\usepath")
    if params.line_width != min_line_width and pathname != 'backgroundpath':
        print(r"\end{pgfscope}")
print(r"}")
southwest = min(bb[0],bb[2]), min(-bb[1],-bb[3])
northeast = max(bb[0],bb[2]), max(-bb[1],-bb[3])
south = (southwest[0] + northeast[0]) / 2, southwest[1]
if pointer:
    angle = math.degrees(math.atan2(pointer[1] - south[1], pointer[0] - south[0]))
else:
    angle = 90
print(fr"\savedanchor\southwest{{\pgfqpoint{{southwest[0]}pt}{{southwest[1]}pt}}}\
\savedanchor\northeast{{\pgfqpoint{{northeast[0]}pt}{{northeast[1]}pt}}}"")
#print(fr"\savedanchor\southwest{{\pgfqpoint{{min(bb[0],bb[2])}pt}{{min(-bb[1],-bb[3])}pt}}}\
# \savedanchor\northeast{{\pgfqpoint{{max(bb[0],bb[2])}pt}{{max(-bb[1],-bb[3])}pt}}}"")
if pointer:
    print(fr"\savedanchor\pointer{{\pgfqpoint{{pointer[0]}pt}{{pointer[1]}pt}}}"")
for compass_anchor in (
    'south', 'southeast', 'east', 'northeast', 'north', 'northwest', 'west', 'southwest',
    'center',
):
    print(rf"\inheritanchor[from=rectangle]{{compass_anchor}}")
print(rf"\inheritanchorborder[from=rectangle]") # include?
for handshape_anchor, compass_anchor in zip(
    anchors,
    ('south', 'southeast', 'east', 'northeast', 'north', 'northwest', 'west', 'southwest')):
    print(rf"\anchor{{handshape_anchor}}{\pgf@sh@reanchor{{rectangle}}{{compass_anchor}}}")
if side != 't':
    print(rf"\anchor{{text}}{\pgf@sh@reanchor{{shape_name}}{{wrist}}}")
else:
    print(rf"\anchor{{text}}{\pgf@sh@reanchor{{shape_name}}{{front}}}")
if pointer:
    print(rf"\anchor{{pointer}}{\pointer}")
else:
    print(rf"\anchor{{pointer}}{\pgf@sh@reanchor{{shape_name}}{{top}}}")
print(r}")
print(rf"\expandafter\def\csname\signdraw@{shape_name}@pa\endcsname{{angle}}")

```


10 List of handshapes



0-tb-b



0-te-b



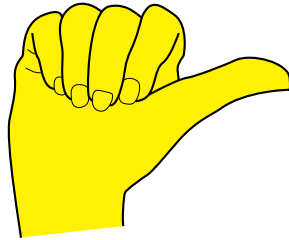
0-tf-b



1b-tb-b



0-tb-f



0-te-f



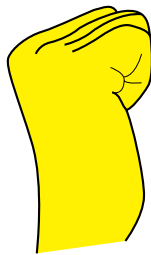
0-tf-f



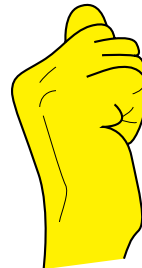
1b-tb-f



0-tb-sp



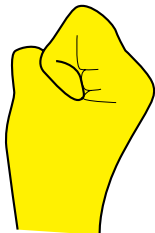
0-te-sp



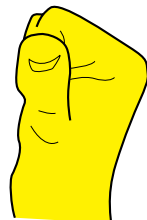
0-tf-sp



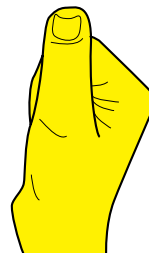
1b-tb-sp



0-tb-st



0-te-st



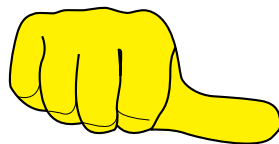
0-tf-st



1b-tb-st



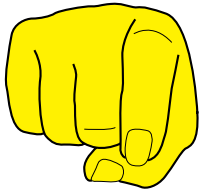
0-tb-t



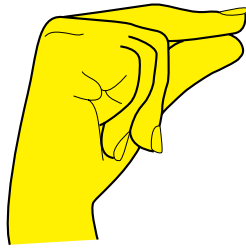
0-te-t



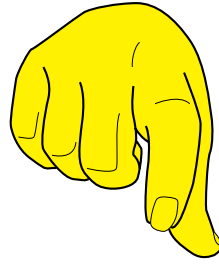
0-tf-t



1b-tb-t



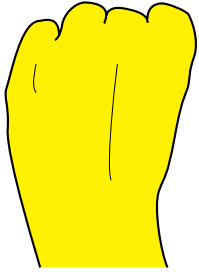
1b+tp-sp



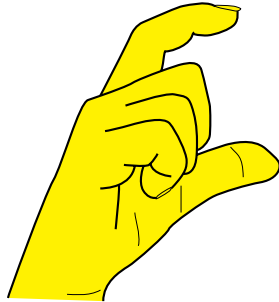
1b-tp-t



1-tb-st



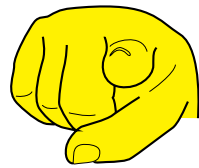
1b+tp-b



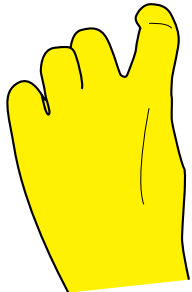
1b-tp-sp



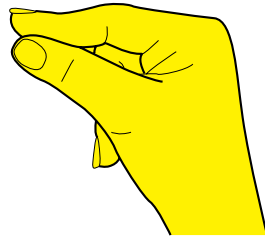
1-tb-b



1-tb-t



1b-tp-b



1b+tp-st



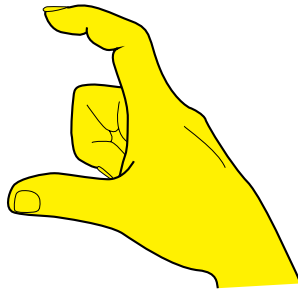
1-tb-f



1-te-b



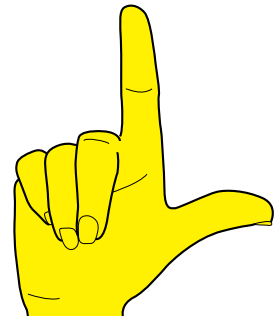
1b+tp-f



1b-tp-st



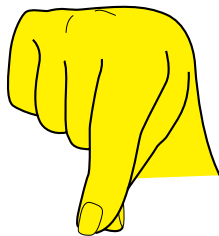
1-tb-sp



1-te-f



1b-tp-f



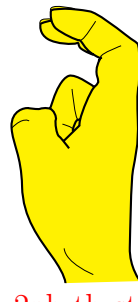
1b+tp-t



1-te-sp



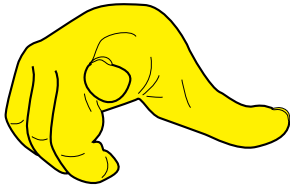
1-tf-sp



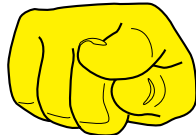
2nb-tb-st



2n-tb-sp



1-te-t



1-tf-t



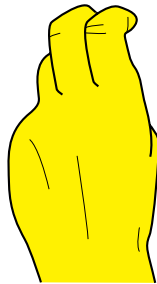
2nb-tb-t



2n-tb-st



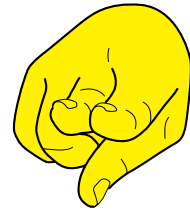
1-tf-b=1-tb-b



2nb-tb-b



2n-tb-b



2n-tb-t



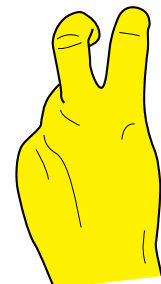
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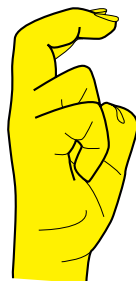
2nb-tb-f



2n-tb-f



2sb-tb-b



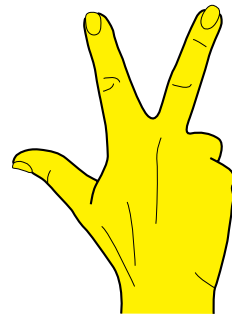
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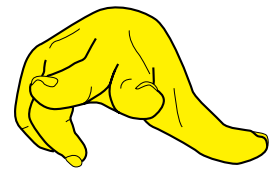
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2s-tb-f



2s-te-b



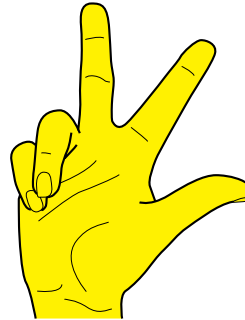
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2sb-tb-sp



2s-tb-sp



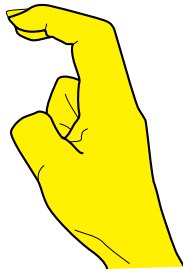
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4nb-tf-b=0-tf-b



4nb-tf-f



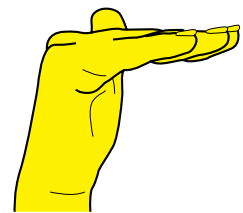
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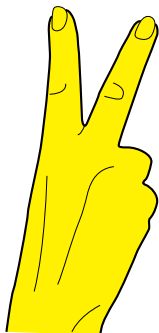
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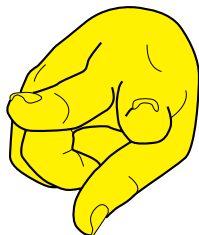
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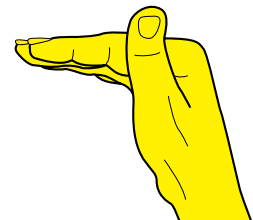
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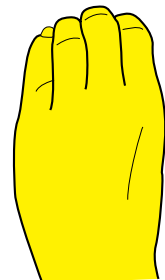
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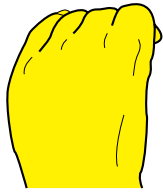
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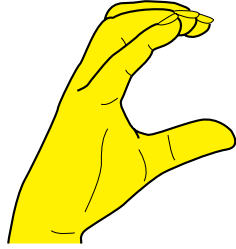
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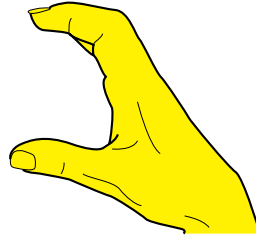
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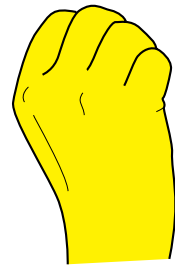
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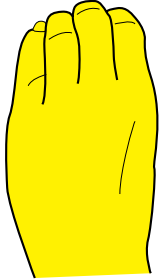
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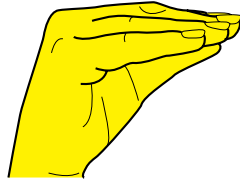
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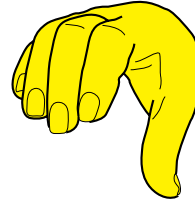
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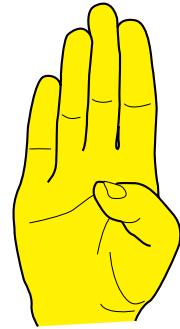
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4nb+tp-sp



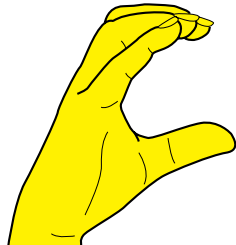
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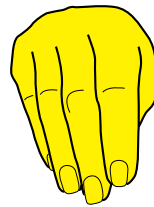
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4nb-tp-f



4nb-tp-sp



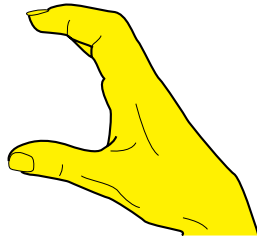
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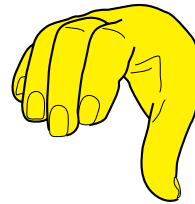
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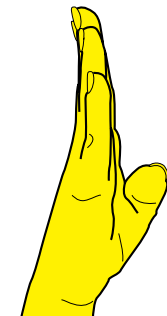
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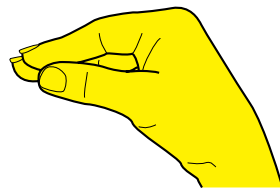
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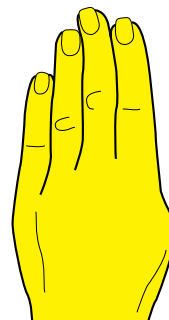
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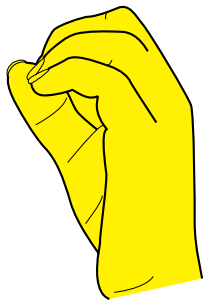
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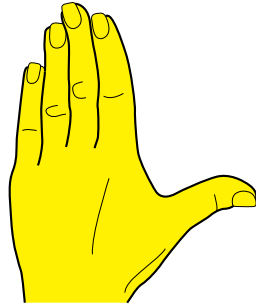
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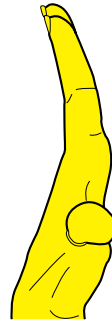
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4n+tb-sp(o)



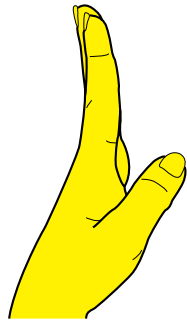
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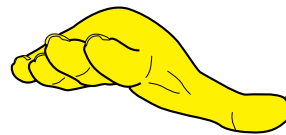
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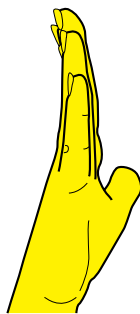
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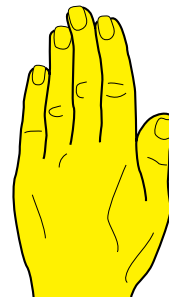
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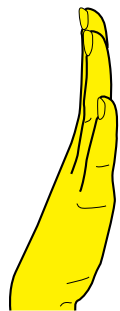
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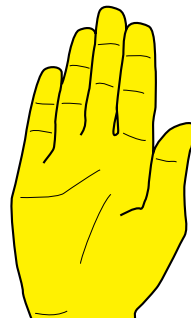
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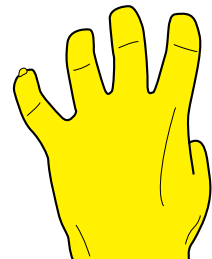
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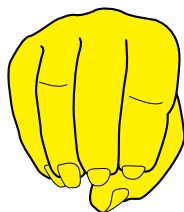
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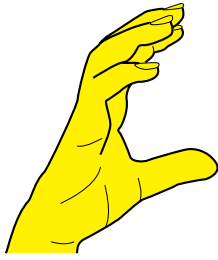
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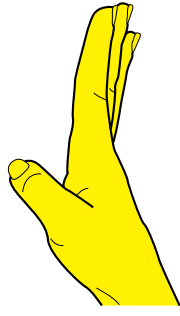
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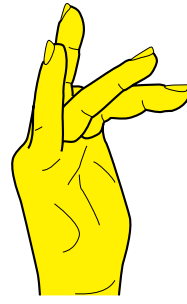
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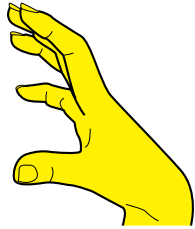
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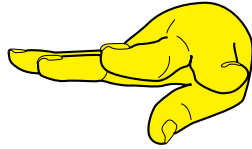
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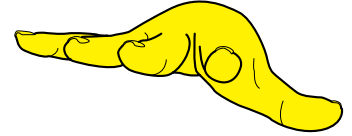
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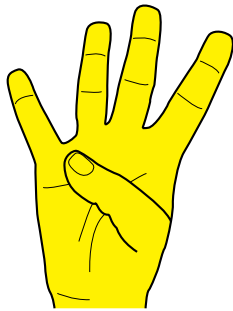
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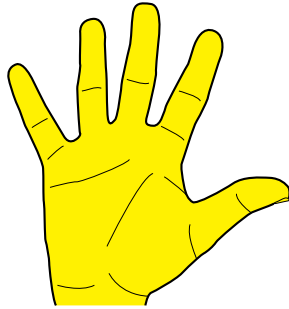
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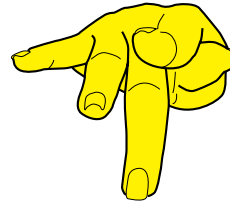
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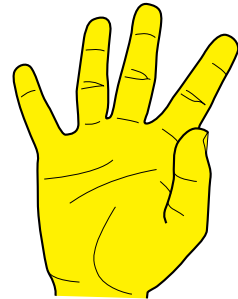
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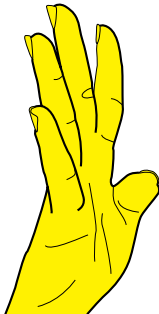
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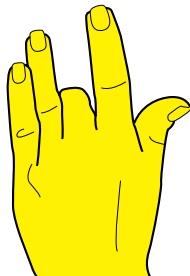
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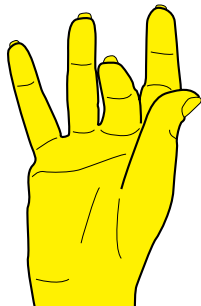
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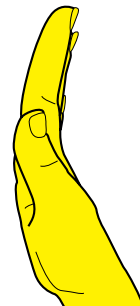
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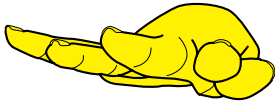
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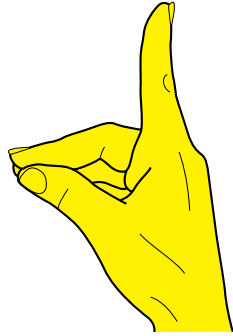
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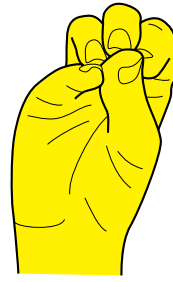
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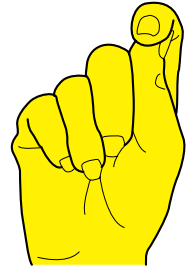
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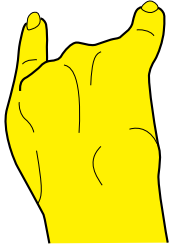
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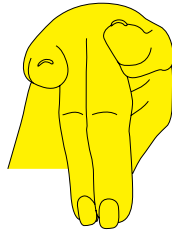
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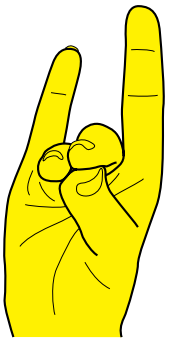
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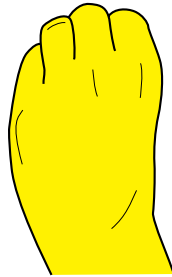
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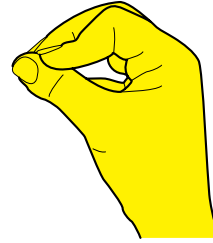
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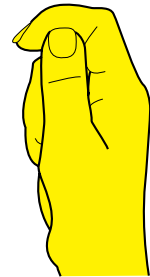
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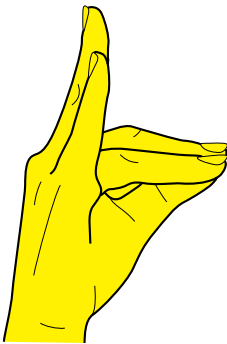
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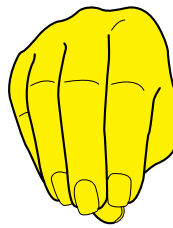
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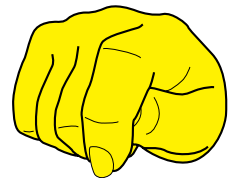
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animal-sp



pinch-t



tool-t

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- [1] Till Tantau. *TikZ & PGF, Manual for Version 3.0.0*. 2013. URL: <http://sourceforge.net/projects/pgf>.

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