» The Monty Pythons, were they TEX users,
could have written the chickenize macro.«
Paul Isambert

chickenize

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This is the package `chickenize`. It allows you to substitute or change the contents of a LuaTEX document,[1] but is actually just for fun. Please *never* use any of the functionality of this package for a production document. The following table informs you shortly about some of your possibilities and provides links to the Lua functions. The TEX interface is presented below.

function/command	effect
chickenize	replaces every word with “chicken”
colorstretch	shows grey boxes that depict the badness and font expansion of each line
leetspeak	translates the (latin-based) input into 1337 5p34k
randomuclc	changes randomly between uppercase and lowercase
randomfonts	changes the font randomly between every letter
randomchars	randomizes the whole input
randomcolor	prints every letter in a random color
rainbowcolor	changes the color of letters slowly according to a rainbow
uppercasecolor	makes every uppercase letter colored

If you have any suggestions or comments, just drop me a mail, I’ll be happy to get any response!

[1] The code is based on pure LuaTEX features, so don't even try to use it with any other TEX flavour. The package is tested under LuaLATEX, and should be working fine with plainLuaTEX. If you tried it with ConTEXt, please share your experience!

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1 How It Works

We make use of LuaTEXs callbacks, especially the `pre_linebreak_filter` and the `post_linebreak_filter`. Hooking a function into these, we can nearly arbitrarily change the contents of the document. If the changes should be on the input-side (replacing with `chicken`), one can use the `pre_linebreak_filter`. Hower, changes like inserting color are best made after the linebreak is finalized, so `post_linebreak_filter` is used for such things.

All functions traverse the node list of a paragraph and manipulate the nodes' properties (like `.font` or `.char`) or insert nodes (like color push/pop nodes) and return this changed node list.

2 Commands – How You Can Use It

There are several ways to make use of this package – you can either stay on the TEX side or use the Lua functions directly. In fact, the TEX macros are simple wrappers around the functions.

2.1 TEX Commands – Document Wide

You have a number of commands at your hand, each of which does some manipulation of the input or output. In fact, the code is easy and straightforward, but be careful, especially when combining things. Apply features step by step so your brain won't be damaged …

The effect of the commands can be influenced, not with arguments, but only via the `\chickenizesetup` described below.

`\chickenize` Replaces every word of the input with the word "chicken". Maybe sometime the replaced word can be changed, but up to now, it's only chicken. To be a bit less static, about every 10^{th} chicken is uppercase. However, the beginning of a sentence is not recognized automatically.[2]

`\uppercasecolor` Makes every uppercase character in the input colored. At the moment, the color is randomized over the full rgb scale, but that will be adjustable once options are well implemented.

`\randomuclc` Changes every character of the input into its uppercase or lowercase variant. Well, guess what the "random" means …

[2] If you have a nice implementation idea, I'd love to include this!

`\randomfonts` Changes the font randomly for every character. If no parameters are given, all fonts that have been loaded are used, especially including math fonts.

`\randomcolor` Does what it's name says.

`\rainbowcolor` Instead of random colors, this command causes the text color to change slowly according to the colors of a rainbow. Do not mix this with `randomcolor`, as that doesn't make any sense.

`\pancakenize` This is a dummy so far, as I have no idea what it should do. If you have suggestions, please tell me.

`\nyanize` A synonym for `rainbowcolor`.

`\leetspeak` Translates the input into 1337 speak. If you don't understand that, lern it, n00b.

`\colorstretch` Inspired by Paul Isambert's code, this command prints boxes instead of lines. The greyness of the first (left-hand) box corresponds to the badness of the line, i. e. it is a measure for how much the space between words has been extended to get proper paragraph justification. The second box on the right-hand side shows the amount of stretching/shrinking when font expansion is used. Together the box greyness give you information about how well the overall greyness of the typeset page is.

This functionality is actually the only really usefull implementation of this package …

2.2 How to Deactivate It

Every command has a `\un`-version that deactivetes it's functionality. So once you used `\chickenize`, it will chickenize the whole document up to `\unchickenize`. However, the paragraph in which `\unchickenize` appears, will *not* be chickenized. The same is true for all other manipulations. Take care that you don't `\un`-anything bevor activating it, as this will result in an error.[3]

If you want to manipulate only a part of a paragraph, you have use the `\text`-version of the function, see below. However, feel free to set and unset every function at will at any place in your document.

2.3 `\text`-Versions

The functions of this package might be much more useful if applied only to a short sequence of words or single words instead of the whole document or paragraph. Therefore,

[3] Which is so far not catchable due to missing functionality in luatexbase.

most of the above-mentioned commands have[4] a `\text`-version that takes an argument. `\textrandomcolor{foo}` results in a colored `foo` while the rest of the document keeps its color. However, to achieve this effect, still the whole node list has to be traversed, so it may slow down your document, even if you use `\textrandomcolor` only once. Fortunately, the effect is very small and mostly negligible.[5]

Please don't fool around by mixing a `\text`-version with the non-`\text`-version. If you feel like and are not please with the result, it is up to *you* to provide a stable and working solution.

2.4 Lua functions

As all features are implemented on the Lua side, you can use these functions on their own. If you do so, please consult the corresponding subsections in the implementation part, because there are some variables that can be adapted to your need.

You can use the following code inside a `\directlua` statement or in a `luacode` environment (or the corresponding thing in your format):

```
luatexbase.add_to_callback("pre_linebreak_filter",chickenize,"chickenize")
```

Replace `pre` by `post` to register into the post linebreak filter. The second argument gives the function name; find a list of available functions below. You can give a label as you like in the third argument, and the last argument gives the order in which the functions in the callback are used. If you have no fancy stuff going on, you can safely use `1`.

3 Options – How to Adjust It

There are several ways to change the behaviour of `chickenize` and its macros. Most of the options are Lua variables and can be set using `\chickenizesetup`. But be *careful!* The argument of `\chickenizesetup` is parsed directly to Lua, therefore you are *not* using a comma-separated key-value list, but uncorrelated Lua commands. The argument must have the syntax `{randomfontslower = 1 randomfontsupper = 0}` instead of `{randomfontslower = 1, randomfontsupper = 0}`. Alright?

However, `\chickenizesetup` is a macro on the TEX side meaning that you can use *only* `%` as comment string. If you use `--`, all of the argument will be ignored as TEX does not pass an eol to `\directlua`. If you don't understand that, just ignore it and go on as usual.

The following list tries to keep kind of track to the options and variables. There is no guarantee for this list, and if you find something that is missing or doesn't work as described here, please inform me!

[4] If they don't have, I did miss that, sorry. Please inform me about such cases.

[5] On a 500 pages text-only LATEX document the dilation is on the order of 10% with `textrandomcolor`, but other manipulations can take much more time. However, you are not supposed to make such long documents with `chickenize`!

randomfontslower, **randomfontsupper** = <int> These two integer variables determine the span of fonts used for the font randomization. Just play with them a bit to find out what they are doing.

chickenstring = <table> The string that is printed when using `\chickenize`. In fact, `chickenstring` is a table which allows for some more random action. To specify the default string, say `chickenstring[1] = 'chicken'`. For more than one animal, just step the index: `chickenstring[2] = 'rabbit'`. All existing table entries will be used randomly. Remember that we are dealing with Lua strings here, so use `' '` to mark them. (`" "` can cause problems with `babel`.)

chickenizefraction = <float> `1` Gives the fraction of words that get replaced by the `chickenstring`. The default means that every word is substituted. However, with a value of, say, `0.0001`, only one word in ten thousand will be `chickenstring`. `chickenizefraction` must be specified *after* `\begin{document}`. No idea, why …

colorstretchnumbers = <true> If true, the amount of stretching or shrinking of each line is printed into the margin as a green, red or black number.

leettable = <table> From this table, the substitution for 1337 is taken. If you want to add or change an entry, you have to provide the unicode numbers of the characters, e. g. `leettable[101] = 50` replaces every `e` (`101`) with the number 3 (`50`).

uclcratio = <float> `0.5` Gives the fraction of uppercases to lowercases in the `\randomuclc` mode. A higher number (up to 1) gives more uppercase letters. Guess what a lower number does.

randomcolor_grey = <bool> `false` For a printer-friendly version, this offers a grey scale instead of an rgb value for `\randomcolor`.

rainbow_step = <float> `0.005` This indicates the relative change of color using the rainbow functionality. A value of `1` changes the color in one step from red to yellow, while a value of `0.005` takes 200 lettrs for this change. Useful values are below `0.05`, but it depends on the amount of text. The longer the text and the lower the `step`, the nicer your rainbow will be.

Rgb_lower, **rGb_upper** = <int> To specify the color space that is used for `\randomcolor`, you can specify six values, the upper and lower value for each color. The uppercase letter in the variable denotes the color, so `rGb_upper` gives the upper value for green etc. Possible values are between `1` and `254`. If you enter anything outside this, your pdf will become invalid and break. For grey scale, use `grey_lower` and `grey_upper`, with values between `0` (black) and `1000` (white), included. Default is `0` to `900` to prevent white letters.

keeptext = <bool> **false** This is for the \colorstretch command. If set to true, the text of your document will be kept. This way, it is easier to identify bad lines and the reason for the badness.

colorexpansion = <bool> **true** If true, two bars are shown of which the second one denotes the font expansion. Only usefull if font expansion is used. (You *do* use font expansion, do you?)

Part II
Implementation

4 TEX file

```
\input{luatexbase.sty}
% read the Lua code first
\directlua{dofile("chickenize.lua")}
% then define the global macros. These affect the whole document and will stay active until the fu
\def\chickenize{
  \directlua{luatexbase.add_to_callback("pre_linebreak_filter",chickenize,"chickenize")
    luatexbase.add_to_callback("start_page_number",
    function() texio.write("["..status.total_pages) end ,"cstartpage")
    luatexbase.add_to_callback("stop_page_number",
    function() texio.write(" chickens]") end,"cstoppage")

    luatexbase.add_to_callback("stop_run",nicetext,"a nice text")
  }
}
\def\unchickenize{
  \directlua{luatexbase.remove_from_callback("pre_linebreak_filter","chickenize")
    luatexbase.remove_from_callback("start_page_number","cstarttpage")
    luatexbase.remove_from_callback("stop_page_number","cstoppage")}}

\def\colorstretch{
  \directlua{luatexbase.add_to_callback("post_linebreak_filter",colorstretch,"stretch_expansion")}
\def\uncolorstretch{
  \directlua{luatexbase.remove_from_callback("post_linebreak_filter","stretch_expansion")}}

\def\leetspeak{
  \directlua{luatexbase.add_to_callback("post_linebreak_filter",leet,"1337")}}
\def\unleetspeak{
  \directlua{luatexbase.remove_from_callback("post_linebreak_filter","1337")}}

\def\rainbowcolor{
```

```
  \directlua{luatexbase.add_to_callback("post_linebreak_filter",randomcolor,"rainbowcolor")
             rainbowcolor = true}}
\def\unrainbowcolor{
  \directlua{luatexbase.remove_from_callback("post_linebreak_filter","rainbowcolor")
             rainbowcolor = false}}
\let\nyanize\rainbowcolor
\let\unnyanize\unrainbowcolor

\def\pancakenize{
  \directlua{}}
\def\unpancakenize{
  \directlua{}}

\def\coffeestainize{
  \directlua{}}
\def\uncoffeestainize{
  \directlua{}}

\def\randomcolor{
  \directlua{luatexbase.add_to_callback("post_linebreak_filter",randomcolor,"randomcolor")}}
\def\unrandomcolor{
  \directlua{luatexbase.remove_from_callback("post_linebreak_filter","randomcolor")}}

\def\randomfonts{
  \directlua{luatexbase.add_to_callback("post_linebreak_filter",randomfonts,"randomfonts")}}
\def\unrandomfonts{
  \directlua{luatexbase.remove_from_callback("post_linebreak_filter","randomfonts")}}

\def\randomuclc{
  \directlua{luatexbase.add_to_callback("pre_linebreak_filter",randomuclc,"randomuclc")}}
\def\unrandomuclc{
  \directlua{luatexbase.remove_from_callback("pre_linebreak_filter","randomuclc")}}

\def\uppercasecolor{
  \directlua{luatexbase.add_to_callback("post_linebreak_filter",uppercasecolor,"uppercasecolor")}
\def\ununppercasecolor{
  \directlua{luatexbase.remove_from_callback("post_linebreak_filter","uppercasecolor")}}
```

Now the setup for the `\text`-versions. We utilize LuaTEXs attributes to mark all nodes that should be manipulated. The macros should be `\long` to allow arbitrary input.

```
\newluatexattribute\leetattr
\newluatexattribute\randcolorattr
\newluatexattribute\randfontsattr
\newluatexattribute\randuclcattr

\long\def\textleetspeak#1%
```

```
  {\setluatexattribute\leetattr{42}#1\unsetluatexattribute\leetattr}
\long\def\textrandomcolor#1%
  {\setluatexattribute\randcolorattr{42}#1\unsetluatexattribute\randcolorattr}
\long\def\textrandomfonts#1%
  {\setluatexattribute\randfontsattr{42}#1\unsetluatexattribute\randfontsattr}
\long\def\textrandomfonts#1%
  {\setluatexattribute\randfontsattr{42}#1\unsetluatexattribute\randfontsattr}
\long\def\textrandomuclc#1%
  {\setluatexattribute\randuclcattr{42}#1\unsetluatexattribute\randuclcattr}
```

Finally, a macro to control the setup. So far, it's only a wrapper that allows TEX-style comments to make the user feel more at home.

```
\def\chickenizesetup#1{\directlua{#1}}
\long\def\luadraw#1#2{%
  \vbox to #1bp{%
    \vfil
    \luatexlatelua{pdf_print("q") #2 pdf_print("Q")}%
  }%
}
\long\def\drawchicken{
\luadraw{90}{
kopf = {200,50} % Kopfmitte
kopf_rad = 20

d = {215,35} % Halsansatz
e = {230,10} %

korper = {260,-10}
korper_rad = 40

bein11 = {260,-50}
bein12 = {250,-70}
bein13 = {235,-70}

bein21 = {270,-50}
bein22 = {260,-75}
bein23 = {245,-75}

schnabel_oben = {185,55}
schnabel_vorne = {165,45}
schnabel_unten = {185,35}

flugel_vorne = {260,-10}
flugel_unten = {280,-40}
flugel_hinten = {275,-15}

```

```
sloppycircle(kopf,kopf_rad)
sloppyline(d,e)
sloppycircle(korper,korper_rad)
sloppyline(bein11,bein12) sloppyline(bein12,bein13)
sloppyline(bein21,bein22) sloppyline(bein22,bein23)
sloppyline(schnabel_vorne,schnabel_oben) sloppyline(schnabel_vorne,schnabel_unten)
sloppyline(flugel_vorne,flugel_unten) sloppyline(flugel_hinten,flugel_unten)

}
}
```

5 LaTeX package

I have decided to keep the LaTeX-part of this package as small as possible. So far, it does … nothing usefull, but it provides a `chickenize.sty` that loads `chickenize.tex`. Some code might be implemented to manipulate figures for full chickenization. However, I will *not* load any packages at this place, as loading of expl3 or TikZ or whatever takes too much time for such a tiny package like this one. If you want to use anything of the features presented here, you have to load the packages on your own. Maybe this will change.

```
\input{chickenize}
```

5.1 Definition of User-Level Macros

```
  %% We want to "chickenize" figures, too. So …
\iffalse
  \DeclareDocumentCommand\includegraphics{O{}m}{
     \fbox{Chicken}  %% actually, I'd love to draw a mp graph showing a chicken …
  }
%%%% specials: the balmerpeak. A tribute to http://xkcd.com/323/.
%% So far, you have to load pgfplots yourself.
%% As it is a mighty package, I don't want the user to force loading it.
\NewDocumentCommand\balmerpeak{G{}O{-4cm}}{
  \begin{tikzpicture}
  \hspace*{#2}  %% anyhow necessary to fix centering … strange :(
  \begin{axis}
  [width=10cm,height=7cm,
   xmin=-0.005,xmax=0.28,ymin=-0.05,ymax=1,
   xtick={0,0.02,...,0.27},ytick=\empty,
   /pgf/number format/precision=3,/pgf/number format/fixed,
   tick label style={font=\small},
   label style = {font=\Large},
   xlabel = \fontspec{Punk Nova} BLOOD ALCOHOL CONCENTRATION (\%),
   ylabel = \fontspec{Punk Nova} \rotatebox{-90}{\parbox{3cm}{\center programming\\ skills}}]
    \addplot
      [domain=-0.01:0.27,color=red,samples=250]
```

```
      {0.8*exp(-0.5*((x-0.1335)^2)/.00002)+
       0.5*exp(-0.5*((x+0.015)^2)/0.01)
      };
  \end{axis}
  \end{tikzpicture}
}
\fi
```

6 Lua Module

This file contains all the necessary functions, sorted alphabetically, not by sense.

First, we set up some constants. These are made global so the code can be manipulated on document level, too.

```
Hhead = node.id("hhead")
RULE = node.id("rule")
GLUE = node.id("glue")
WHAT = node.id("whatsit")
COL = node.subtype("pdf_colorstack")
GLYPH = node.id("glyph")
```

Now we set up the nodes used for all color things. The nodes are whatsits of subtype `pdf_colorstack`.

```
color_push = node.new(WHAT,COL)
color_pop = node.new(WHAT,COL)
color_push.stack = 0
color_pop.stack = 0
color_push.cmd = 1
color_pop.cmd = 2
```

6.1 chickenize

The infamous `\chickenize` macro. Substitutes every word of the input with the given string. This can be elaborated arbitrarily, and whenever I feel like, I might add functionality. So far, only the string replaces the word, and even hyphenation is not possible.

```
chicken_pagenumbers = true

chickenstring = {}
chickenstring[1] = "Chicken" -- chickenstring is a table, please remeber this!

chickenizefraction = 0.5
-- set this to a small value to fool somebody, or to see if your text has been read carefully. Th

local tbl = font.getfont(font.current())
local space = tbl.parameters.space
local shrink = tbl.parameters.space_shrink
```

```
local stretch = tbl.parameters.space_stretch
local match = unicode.utf8.match
chickenize_ignore_word = false

chickenize_real_stuff = function(i,head)
    while ((i.next.id == 37) or (i.next.id == 11) or (i.next.id == 7) or (i.next.id == 0)) do  --
      i.next = i.next.next
    end

    chicken = {}  -- constructing the node list.

-- Should this be done only once? No, then we loose the freedom to change the string in-document.
--but it could be done only once each paragraph as in-paragraph changes are not possible!

    chickenstring_tmp = chickenstring[math.random(1,#chickenstring)]
    chicken[0] = node.new(37,1)  -- only a dummy for the loop
    for i = 1,string.len(chickenstring_tmp) do
      chicken[i] = node.new(37,1)
      chicken[i].font = font.current()
      chicken[i-1].next = chicken[i]
    end

    j = 1
    for s in string.utfvalues(chickenstring_tmp) do
      local char = unicode.utf8.char(s)
      chicken[j].char = s
      if match(char,"%s") then
        chicken[j] = node.new(10)
        chicken[j].spec = node.new(47)
        chicken[j].spec.width = space
        chicken[j].spec.shrink = shrink
        chicken[j].spec.stretch = stretch
      end
      j = j+1
    end

    node.slide(chicken[1])
    lang.hyphenate(chicken[1])
    chicken[1] = node.kerning(chicken[1])    -- FIXME: does not work
    chicken[1] = node.ligaturing(chicken[1]) -- dito

    node.insert_before(head,i,chicken[1])
    chicken[1].next = chicken[2] -- seems to be necessary … to be fixed
    chicken[string.len(chickenstring_tmp)].next = i.next
  return head
end
```

```
226
227 chickenize = function(head)
228   for i in node.traverse_id(37,head) do  --find start of a word
229     if (chickenize_ignore_word == false) then  -- normal case: at the beginning of a word, we jump
230       head = chickenize_real_stuff(i,head)
231     end
232
233 -- At the end of the word, the ignoring is reset. New chance for everyone.
234     if not((i.next.id == 37) or (i.next.id == 7) or (i.next.id == 22) or (i.next.id == 11)) then
235       chickenize_ignore_word = false
236     end
237
238 -- and the random determination of the chickenization of the next word:
239     if math.random() > chickenizefraction then
240       chickenize_ignore_word = true
241     end
242   end
243   return head
244 end
245
246 nicetext = function()
247   texio.write_nl("Output written on "..tex.jobname..".pdf ("..status.total_pages.." chicken,".." e
248   texio.write_nl(" ")
249   texio.write_nl("----------------------------")
250   texio.write_nl("Hello my dear user,")
251   texio.write_nl("good job, now go outside and enjoy the world!")
252   texio.write_nl(" ")
253   texio.write_nl("And don't forget to feet your chicken!")
254   texio.write_nl("----------------------------")
255 end
```

6.2 leetspeak

The `leettable` is the substitution scheme. Just add items if you feel to. Maybe we will differ between a light-weight version and a hardcore 1337.

```
256 leet_onlytext = false
257 leettable = {
258   [101] = 51, -- E
259   [105] = 49, -- I
260   [108] = 49, -- L
261   [111] = 48, -- O
262   [115] = 53, -- S
263   [116] = 55, -- T
264
265   [101-32] = 51, -- e
```

```
  [105-32] = 49, -- i
  [108-32] = 49, -- l
  [111-32] = 48, -- o
  [115-32] = 53, -- s
  [116-32] = 55, -- t
}
```

And here the function itself. So simple that I will not write any

```
leet = function(head)
  for line in node.traverse_id(Hhead,head) do
    for i in node.traverse_id(GLYPH,line.head) do
      if not(leetspeak_onlytext) or
         node.has_attribute(i,luatexbase.attributes.leetattr)
      then
        if leettable[i.char] then
          i.char = leettable[i.char]
        end
      end
    end
  end
  return head
end
```

6.3 pancakenize

Not yet completely decided what this should do, but it might come down to inserting a cooking receipe for a … well, guess what. Possible implementations are: Substitute a whole sentence, from full-stop to full-stop. OR: Substitute word-by-word at a random place. OR (expert-freak-1337-level): Substitute the n-th word of each page to a word of the receipe. That would be totally awesome!!

6.4 randomfonts

Traverses the output and substitutes fonts randomly. A check is done so that the font number is existing. One day, the fonts should be easily given explicitely in terms of `\bf` etc.

```
randomfontslower = 1
randomfontsupper = 0
%
randomfonts = function(head)
  if (randomfontsupper > 0) then  -- fixme: this should be done only once, no? Or at every paragra
    rfub = randomfontsupper  -- user-specified value
  else
    rfub = font.max()        -- or just take all fonts
  end
  for line in node.traverse_id(Hhead,head) do
```

```
    for i in node.traverse_id(GLYPH,line.head) do
      if not(randomfonts_onlytext) or node.has_attribute(i,luatexbase.attributes.randfontsattr) th
        i.font = math.random(randomfontslower,rfub)
      end
    end
  end
  return head
end
```

6.5 randomuclc

Traverses the input list and changes lowercase/uppercase codes.

```
uclcratio = 0.5 -- ratio between uppercase and lower case
randomuclc = function(head)
  for i in node.traverse_id(37,head) do
    if not(randomuclc_onlytext) or node.has_attribute(i,luatexbase.attributes.randuclcattr) then
      if math.random() < uclcratio then
        i.char = tex.uccode[i.char]
      else
        i.char = tex.lccode[i.char]
      end
    end
  end
  return head
end
```

6.6 randomchars

```
randomchars = function(head)
  for line in node.traverse_id(Hhead,head) do
    for i in node.traverse_id(GLYPH,line.head) do
      i.char = math.floor(math.random()*512)
    end
  end
  return head
end
```

6.7 randomcolor and rainbowcolor

Setup of the boolean for grey/color or rainbowcolor, and boundaries for the colors. rgb space is fully used, but greyscale is only used in a visible range, i. e. to 90% instead of 100% white.

```
randomcolor_grey = false
randomcolor_onlytext = false --switch between local and global colorization
rainbowcolor = false

```

```
grey_lower = 0
grey_upper = 900

Rgb_lower = 1
rGb_lower = 1
rgB_lower = 1
Rgb_upper = 254
rGb_upper = 254
rgB_upper = 254
```

Variables for the rainbow. 1/rainbow_step*5 is the number of letters used for one cycle, the color changes from red to yellow to green to blue to purple.

```
rainbow_step = 0.005
rainbow_Rgb = 1-rainbow_step -- we start in the red phase
rainbow_rGb = rainbow_step   -- values x must always be 0 < x < 1
rainbow_rgB = rainbow_step
rainind = 1          -- 1:red,2:yellow,3:green,4:blue,5:purple
```

This function produces the string needed for the pdf color stack. We need values 0]..[1 for the colors.

```
randomcolorstring = function()
  if randomcolor_grey then
    return (0.001*math.random(grey_lower,grey_upper))..." g"
  elseif rainbowcolor then
    if rainind == 1 then -- red
      rainbow_rGb = rainbow_rGb + rainbow_step
      if rainbow_rGb >= 1-rainbow_step then rainind = 2 end
    elseif rainind == 2 then -- yellow
      rainbow_Rgb = rainbow_Rgb - rainbow_step
      if rainbow_Rgb <= rainbow_step then rainind = 3 end
    elseif rainind == 3 then -- green
      rainbow_rgB = rainbow_rgB + rainbow_step
      rainbow_rGb = rainbow_rGb - rainbow_step
      if rainbow_rGb <= rainbow_step then rainind = 4 end
    elseif rainind == 4 then -- blue
      rainbow_Rgb = rainbow_Rgb + rainbow_step
      if rainbow_Rgb >= 1-rainbow_step then rainind = 5 end
    else -- purple
      rainbow_rgB = rainbow_rgB - rainbow_step
      if rainbow_rgB <= rainbow_step then rainind = 1 end
    end
    return rainbow_Rgb.." "..rainbow_rGb.." "..rainbow_rgB.." rg"
  else
    Rgb = math.random(Rgb_lower,Rgb_upper)/255
    rGb = math.random(rGb_lower,rGb_upper)/255
    rgB = math.random(rgB_lower,rgB_upper)/255
    return Rgb.." "..rGb.." "..rgB.." ".." rg"
```

```
  end
end
```

The function that does all the colorizing action. It goes through the whole paragraph and looks at every glyph. If the boolean `randomcolor_onlytext` is set, only glyphs with the set attribute will be colored. Elsewise, all glyphs are taken.

```
randomcolor = function(head)
  for line in node.traverse_id(0,head) do
    for i in node.traverse_id(37,line.head) do
      if not(randomcolor_onlytext) or
         (node.has_attribute(i,luatexbase.attributes.randcolorattr))
      then
        color_push.data = randomcolorstring()  -- color or grey string
        line.head = node.insert_before(line.head,i,node.copy(color_push))
        node.insert_after(line.head,i,node.copy(color_pop))
      end
    end
  end
  return head
end
```

6.8 rickroll

Another tribute to pop culture. Either: substitute word-by-word as in pancake. OR: substitute each link to a youtube-rickroll …

6.9 uppercasecolor

Loop through all the nodes and checking whether it is uppercase. If so (and also for small caps), color it.

```
uppercasecolor = function (head)
  for line in node.traverse_id(Hhead,head) do
    for upper in node.traverse_id(GLYPH,line.head) do
      if (((upper.char > 64) and (upper.char < 91)) or
          ((upper.char > 57424) and (upper.char < 57451)))  then  -- for small caps! nice
        color_push.data = randomcolorstring()  -- color or grey string
        line.head = node.insert_before(line.head,upper,node.copy(color_push))
        node.insert_after(line.head,upper,node.copy(color_pop))
      end
    end
  end
  return head
end
```

6.10 colorstretch

This function displays the amount of stretching that has been done for each line of an arbitrary document. A well-typeset document should be equally grey over all lines, which is not always possible.

In fact, two boxes are drawn: The first (left) box shows the badness, i. e. the amount of stretching the spaces between words. Too much space results in ligth gray, whereas a too dense line is indicated by a dark grey box.

The second box is only usefull if microtypographic extensions are used, e. g. with the `microtype` package under LaTeX. The box color then corresponds to the amount of font expansion in the line. This can be greatly used to show the positive effect of font expansion on the badness of a line!

The base structure of the following code is written by Paul Isambert. Thanks for the code and support, Paul!

Two booleans, `keeptext`, and `colorexpansion`, are used to control the behaviour of the function.

```
399 keeptext = true
400 colorexpansion = true
401
402 colorstretch_coloroffset = 0.5
403 colorstretch_colorrange = 0.5
404
405 colorstretchnumbers = true
406 drawstretchthreshold = 0.1
407 drawexpansionthreshold = 0.9
```

After setting the constants, the function starts. It receives the vertical list of the typeset paragraph as `head`, and loops through all horizontal lists.

If font expansion should be shown (`colorexpansion == true`), then the first glyph node is determined and its width compared with the width of the unexpanded glyph. This gives a measure for the expansion factor and is translated into a grey scale.

```
408 colorstretch = function (head)
409
410   local f = font.getfont(font.current()).characters
411   for line in node.traverse_id(Hhead,head) do
412     local rule_bad = node.new(RULE)
413
414 if colorexpansion then  -- if also the font expansion should be shown
415       local g = line.head
416         while not(g.id == 37) do
417          g = g.next
418         end
419       exp_factor = g.width / f[g.char].width
420       exp_color = colorstretch_coloroffset + (1-exp_factor)*10 .. " g"
```

```
421       rule_bad.width = 0.5*line.width  -- we need two rules on each line!
422     else
423       rule_bad.width = line.width  -- only the space expansion should be shown, only one rule
424     end
```

Height and depth of the rules are adapted to print a closed grey pattern, so no white interspace is left.

The glue order and sign can be obtained directly and are translated into a grey scale.

```
425     rule_bad.height = tex.baselineskip.width*4/5  -- this should give a better output
426     rule_bad.depth = tex.baselineskip.width*1/5
427
428     local glue_ratio = 0
429     if line.glue_order == 0 then
430       if line.glue_sign == 1 then
431         glue_ratio = colorstretch_colorrange * math.min(line.glue_set,1)
432       else
433         glue_ratio = -colorstretch_colorrange * math.min(line.glue_set,1)
434       end
435     end
436     color_push.data = colorstretch_coloroffset + glue_ratio .. " g"
437
```

Now, we throw everything together in a way that works. Somehow …

```
438 -- set up output
439     local p = line.head
440
441   -- a rule to immitate kerning all the way back
442     local kern_back = node.new(RULE)
443     kern_back.width = -line.width
444
445   -- if the text should still be displayed, the color and box nodes are inserted additionally
446   -- and the head is set to the color node
447     if keeptext then
448       line.head = node.insert_before(line.head,line.head,node.copy(color_push))
449     else
450       node.flush_list(p)
451       line.head = node.copy(color_push)
452     end
453     node.insert_after(line.head,line.head,rule_bad)  -- then the rule
454     node.insert_after(line.head,line.head.next,node.copy(color_pop)) -- and then pop!
455     tmpnode =  node.insert_after(line.head,line.head.next.next,kern_back)
456
457     -- then a rule with the expansion color
458     if colorexpansion then  -- if also the stretch/shrink of letters should be shown
459       color_push.data = exp_color
460       node.insert_after(line.head,tmpnode,node.copy(color_push))
461       node.insert_after(line.head,tmpnode.next,node.copy(rule_bad))
```

```
462       node.insert_after(line.head,tmpnode.next.next,node.copy(color_pop))
463     end
```

Now we are ready with the boxes and stuff and everything. However, a very useful information might be the amount of stretching, not encoded as color, but the real value. In concreto, I mean: narrow boxes get one color, loose boxes get another one, but only if the badness is above a certain amount. This information is printed into the right-hand margin. The threshold is user-adjustable.

```
464     if colorstretchnumbers then
465       j = 1
466       glue_ratio_output = {}
467       for s in string.utfvalues(math.abs(glue_ratio)) do -- using math.abs here gets us rid of the
468         local char = unicode.utf8.char(s)
469         glue_ratio_output[j] = node.new(37,1)
470         glue_ratio_output[j].font = font.current()
471         glue_ratio_output[j].char = s
472         j = j+1
473       end
474       if math.abs(glue_ratio) > drawstretchthreshold then
475         if glue_ratio < 0 then color_push.data = "0.99 0 0 rg"
476         else color_push.data = "0 0.99 0 rg" end
477       else color_push.data = "0 0 0 rg"
478       end
479
480       node.insert_after(line.head,node.tail(line.head),node.copy(color_push))
481       for i = 1,math.min(j-1,7) do
482         node.insert_after(line.head,node.tail(line.head),glue_ratio_output[i])
483       end
484       node.insert_after(line.head,node.tail(line.head),node.copy(color_pop))
485     end -- end of stretch number insertion
486   end
487   return head
488 end
```

And that's it! 

6.11 draw a chicken

A *very* first, experimental implementation of a drawing of a chicken. The parameters should be consistent, easy to change and that monster should look more like a cute chicken. However, it is chicken, it is Lua, so it belongs into this package. So far, all numbers and positions are hard coded, this will of course change!

```
--
function pdf_print (...)
  for _, str in ipairs({...}) do
    pdf.print(str .. " ")
  end
  pdf.print("\string\n")
end

function move (p)
  pdf_print(p[1],p[2],"m")
end

function line (p)
  pdf_print(p[1],p[2],"l")
end

function curve(p1,p2,p3)
  pdf_print(p1[1], p1[2],
            p2[1], p2[2],
            p3[1], p3[2], "c")
end

function close ()
  pdf_print("h")
end

function linewidth (w)
  pdf_print(w,"w")
end

function stroke ()
  pdf_print("S")
end
--

function strictcircle(center,radius)
  local left = {center[1] - radius, center[2]}
  local lefttop = {left[1], left[2] + 1.45*radius}
  local leftbot = {left[1], left[2] - 1.45*radius}
  local right = {center[1] + radius, center[2]}
```

```
  local righttop = {right[1], right[2] + 1.45*radius}
  local rightbot = {right[1], right[2] - 1.45*radius}

  move (left)
  curve (lefttop, righttop, right)
  curve (rightbot, leftbot, left)
stroke()
end

function disturb_point(point)
  return {point[1] + math.random()*5 - 2.5,
          point[2] + math.random()*5 - 2.5}
end

function sloppycircle(center,radius)
  local left = disturb_point({center[1] - radius, center[2]})
  local lefttop = disturb_point({left[1], left[2] + 1.45*radius})
  local leftbot = {lefttop[1], lefttop[2] - 2.9*radius}
  local right = disturb_point({center[1] + radius, center[2]})
  local righttop = disturb_point({right[1], right[2] + 1.45*radius})
  local rightbot = disturb_point({right[1], right[2] - 1.45*radius})

  local right_end = disturb_point(right)

  move (right)
  curve (rightbot, leftbot, left)
  curve (lefttop, righttop, right_end)
  linewidth(math.random()+0.5)
  stroke()
end

function sloppyline(start,stop)
  local start_line = disturb_point(start)
  local stop_line = disturb_point(stop)
  start = disturb_point(start)
  stop = disturb_point(stop)
  move(start) curve(start_line,stop_line,stop)
  linewidth(math.random()+0.5)
  stroke()
end
```

7 Known Bugs

The behaviour of the `\chickenize` macro is under construction and everything it does so far is considered a feature.

babel Using `chickenize` with `babel` leads to a problem with the " character, as it is made active: When using `\chickenizesetup` *after* `\begin{document}`, you can *not* use " for strings, but you have to use '. No problem really, but take care of this.

8 To Dos

Some things that should be implemented but aren't so far or are very poor at the moment:

rainbowcolor should be more flexible – the angle of the rainbow should be easily adjustable.

pancakenize should do something funny.

chickenize should differ between character and punctuation.

swing swing dancing apes!

chickenmath chickenization of math mode