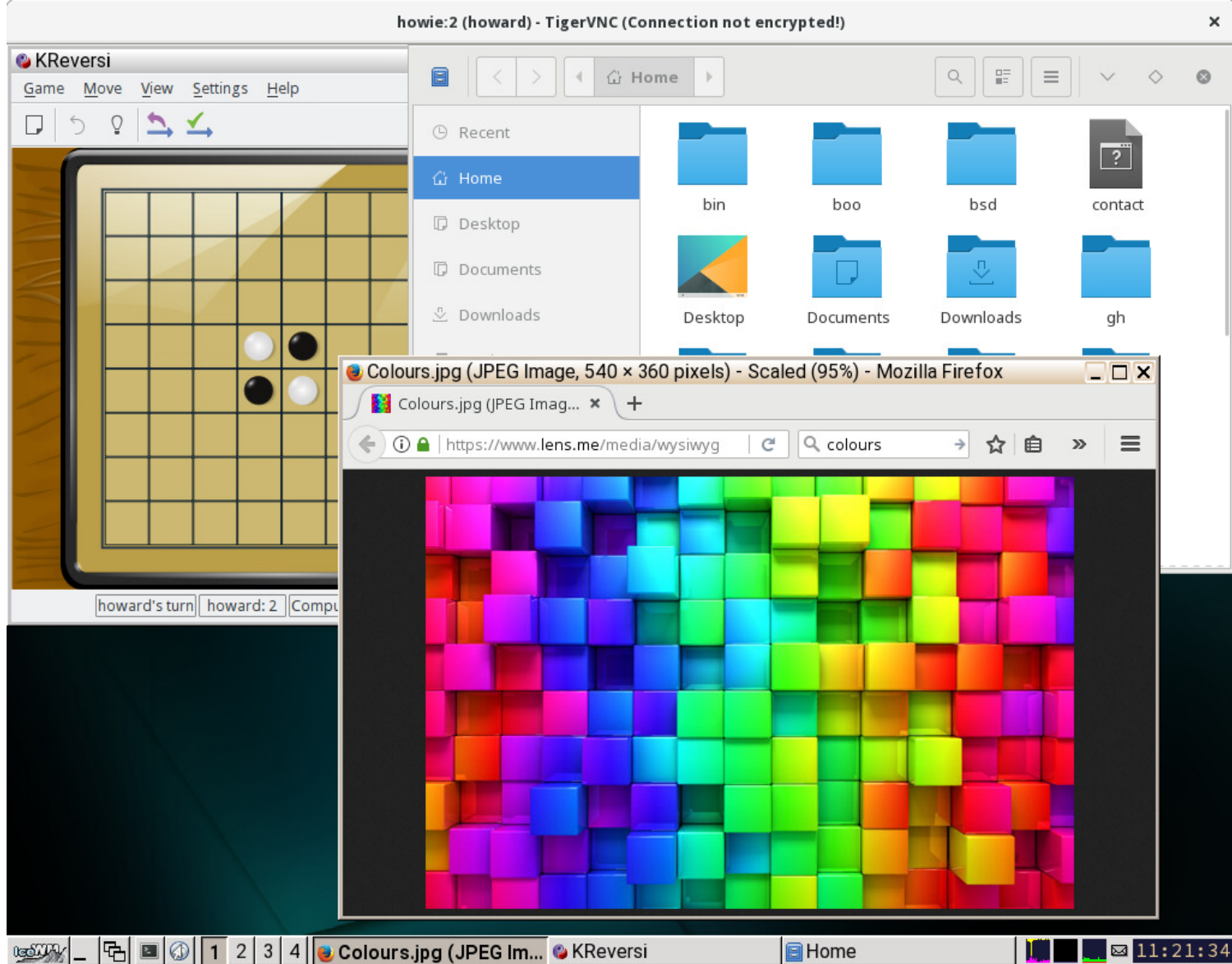# Making a practical VNC client for character terminals

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Virtual Network Computing

- Much like "Remote Desktop Service" of Microsoft Windows

- Simple tasks: move mouse, type keys, see the screen

- Cross-platform

  - Linux

  - Unix/macOS

  - Microsoft Windows

howie:2 (howard) - TigerVNC (Connection not encrypted!)

KReversi
Game Move View Settings Help

Recent
Home
Desktop
Documents
Downloads

bin   boo   bsd   contact
Desktop   Documents   Downloads   gh

Home

howard's turn   howard: 2   Compu

Colours.jpg (JPEG Image, 540 × 360 pixels) - Scaled (95%) - Mozilla Firefox

Colours.jpg (JPEG Imag...

https://www.lens.me/media/wysiwyg

colours

1 2 3 4   Colours.jpg (JPEG Im...   KReversi   Home   11:21:34

Linux Terminal

- One of the first features of Linux kernel

- Powerful and efficient

- Text-oriented interface loved by geeks

- Unfortunately powerless in graphical tasks

tmux /home/howard

```
1 [|||                    5.9%]   Mem[|||||            3.07G/47.1G]
2 [|                      1.0%]   Swp[                    0K/2.01G]
3 [                      0.0%]   Tas[|||||||||||||||||||||||1/1225]
4 [                      0.0%]   Loa[|||             1.11/1.35/1.17]
5 [|||||                 12.7%]  Uptime: 00:20:46
6 [|                     2.0%]
7 [|||                   5.0%]
8 [||                    5.8%]
```

```
  PID S USER      PRI  NI CPU%   RES   TIME+  Command
 6780 S howard     20   0 15.8  447M 15:03.25 /usr/lib64/libreoffice/program/soffice.
 4718 S root       20   0  4.0 20380  0:42.23 /usr/bin/python /usr/sbin/iotop
 2405 S howard     20   0  3.0  281M  0:46.15 /usr/bin/gnome-shell
 2298 S howard     20   0  2.0  112M  0:19.82 /usr/bin/X vt2 -displayfd 3 -auth /run/
 4701 S root       20   0  2.0  4372  0:13.48 htop
 2419 S howard      9 -11  2.0 21996  0:11.20 /usr/bin/pulseaudio --start --log-targe
16761 R root       20   0  1.0  4332  0:02.31 htop -d 10
 2650 S howard     20   0  1.0  260M  0:37.27 /opt/google/chrome/chrome
 4618 S howard     20   0  1.0  6220  0:00.91 tmux
 2495 S root       20   0  0.0  8488  0:00.26 /usr/lib/udisks2/udisksd --no-debug
17385 S root       20   0  0.0  8488  0:00.07 /usr/lib/udisks2/udisksd --no-debug
 5134 S howard     20   0  0.0  260M  0:03.49 /opt/google/chrome/chrome
 2407 S howard     20   0  0.0  281M  0:02.32 /usr/bin/gnome-shell
 6994 S howard     20   0  0.0 71424  0:09.87 /usr/bin/Xvnc :2 -auth /run/user/1000/g
 1266 S messagebu  20   0  0.0  6580  0:10.35 /bin/dbus-daemon --system --address=sys
  476 S root       20   0  0.0  4792  0:00.46 /usr/sbin/haveged -w 1024 -v 0 -F
 2420 S howard     -6   0  0.0 21996  0:06.05 /usr/bin/pulseaudio --start --log-targe
 6452 S howard     20   0  0.0  215M  0:09.31 /opt/google/chrome/chrome --type=render
 2307 S howard     20   0  0.0  112M  0:02.35 /usr/bin/X vt2 -displayfd 3 -auth /run/
F1Help  F2Setup F3Search F4Filter F5Tree  F6SortBuF7Nice -F8Nice +F9Kill  F10Quit
```

Date: Tue, 23 May 2017 10:12:40 +0200
From: Howard Guo <hguo@suse.com>
To: talk@suse.de
Subject: [talk] Another chance for you to taste surströmming
Parts/Attachments:
   1 Shown   8 lines Text
   2   3.1 MB   Image, " "

Hello dear colleagues.

Last night 10 of us successfully overcome the odour of the traditional Swedish
cusine and tasted the famous fish. In the end most of us reached to a conclusion
that its taste is not as foul as the odour.

Therefore, I will open another can on tomorrow afternoon at 5PM. If you missed
yesterday's occasion or wishes to taste more of the famous fish, drop me an
Email and let's meet again tomorrow.

Kind regards,
Howard

     [Part 2, " " Image/JPEG (Name: "20170522_161531.jpg") 3.1 MB.]
     [Cannot display this part. Press "V" then "S" to save in a file.]

```
? Help      < MsgIndex    P PrevMsg     - PrevPage  D Delete     R Reply
O OTHER CMDS > ViewAttch   N NextMsg     Spc NextPage U Undelete   F Forward
```

```
2017-05-23 17:04 HouzuoGuo o [master] {origin/master} {origin/HEAD} fix malfunctioned
2017-05-23 16:58 HouzuoGuo o avoid smtpd panic when public ip cannot be determined
2017-05-12 16:51 HouzuoGuo o do not rely on public ip on travis; start daemons in arb
2017-05-20 17:35 HouzuoGuo o introduce mail processor check to health checks; rename
2017-05-12 16:28 HouzuoGuo o avoid producing dynamically linked executable in beansta
2017-05-11 09:08 HouzuoGuo o introduce random delay in sockd failure handling
2017-05-07 16:19 HouzuoGuo o hook mailp integration test with wolframalpha; improve t
2017-05-07 15:31 HouzuoGuo o do not double print log message timestamp
2017-05-03 09:39 HouzuoGuo o refine usage of colours and gopher on poster picture
2017-05-03 08:58 HouzuoGuo o create a script for deploying zip bundle to /root/; litt
2017-05-02 10:23 HouzuoGuo o prevent concurrent access to port check result map
2017-04-28 09:29 HouzuoGuo o cap log message length to 1kB; get rid of imap disconnec
2017-04-24 16:41 HouzuoGuo o consider mail without from/to addr to be malformed; fix
2017-04-23 14:52 HouzuoGuo o enrich environment information report with system memory
2017-04-21 11:18 HouzuoGuo o remember to call initialise function on telegrambot in t
2017-04-21 11:14 HouzuoGuo o remember to call initialise function on telegrambot
2017-04-21 09:34 HouzuoGuo o improve make bundle with phantomjs executable and permis
2017-04-21 09:15 HouzuoGuo o remove unfinished test code
2017-04-21 09:04 HouzuoGuo o rename several browser related structs; fix segfault in
2017-04-20 21:32 HouzuoGuo o move logger initialisation from config to individual dae
2017-04-20 17:01 HouzuoGuo o (broken) wip browser server instance lifecycle managemen
2017-04-20 10:04 HouzuoGuo o fix misplaced configFile parameter check; do not proceed
2017-04-18 10:26 HouzuoGuo o test is broken: wip browser process management
2017-04-17 16:47 HouzuoGuo o wip phantomjs server management
2017-04-17 13:04 HouzuoGuo o Complete all fmt.Errorf messages with type and function
2017-04-16 18:12 HouzuoGuo o wip browser in browser
2017-04-16 15:51 HouzuoGuo o property set no-cache header for all http api responses
2017-04-15 11:51 HouzuoGuo o remove typo comma from command form
2017-04-14 12:34 HouzuoGuo o fix malformed tcp dns reply that accidentally sent query
[main] d89020f2688425babf7c519ae1591c6d29106859 - commit 6 of 192        15%
```

```
May 24 11:26:51 howie sudo[17141]: pam_systemd(sudo:session): Cannot create session:
Already running in a session
May 24 11:27:01 howie sudo[17195]:    howard : TTY=pts/20 ; PWD=/home/howard ; USER=r
oot ; COMMAND=/usr/bin/zypper in tig
May 24 11:27:01 howie sudo[17195]: pam_unix(sudo:session): session opened for user r
oot by (uid=0)
May 24 11:27:01 howie sudo[17195]: pam_systemd(sudo:session): Cannot create session:
Already running in a session
May 24 11:27:04 howie dbus[1266]: [system] Activating service name='org.opensuse.Sna
pper' (using servicehelper)
May 24 11:27:04 howie dbus[1266]: [system] Successfully activated service 'org.opens
use.Snapper'
May 24 11:27:05 howie [RPM][17247]: Transaction ID 592551e9 started
May 24 11:27:05 howie [RPM][17247]: install tig-2.2.1-3.1.x86_64: success
May 24 11:27:05 howie [RPM][17247]: install tig-2.2.1-3.1.x86_64: success
May 24 11:27:05 howie [RPM][17247]: Transaction ID 592551e9 finished: 0
May 24 11:27:06 howie sudo[17195]: pam_unix(sudo:session): session closed for user r
oot
May 24 11:27:48 howie dbus[1266]: [system] Activating via systemd: service name='org
.freedesktop.hostname1' unit='dbus-org.freedesktop.hostname1.service'
May 24 11:27:48 howie systemd[1]: plymouth-read-write.service: Cannot add dependency
 job, ignoring: Unit plymouth-read-write.service is masked.
May 24 11:27:48 howie systemd[1]: plymouth-start.service: Cannot add dependency job,
 ignoring: Unit plymouth-start.service is masked.
May 24 11:27:48 howie systemd[1]: systemd-firstboot.service: Cannot add dependency j
ob, ignoring: Unit systemd-firstboot.service is masked.
May 24 11:27:48 howie systemd[1]: Starting Hostname Service...
May 24 11:27:48 howie dbus[1266]: [system] Successfully activated service 'org.freed
esktop.hostname1'
May 24 11:27:48 howie systemd[1]: Started Hostname Service.
```

```
[2]                                 0:tig*                    "tig  /home/howard/gop" 11:27 24-May-17
```
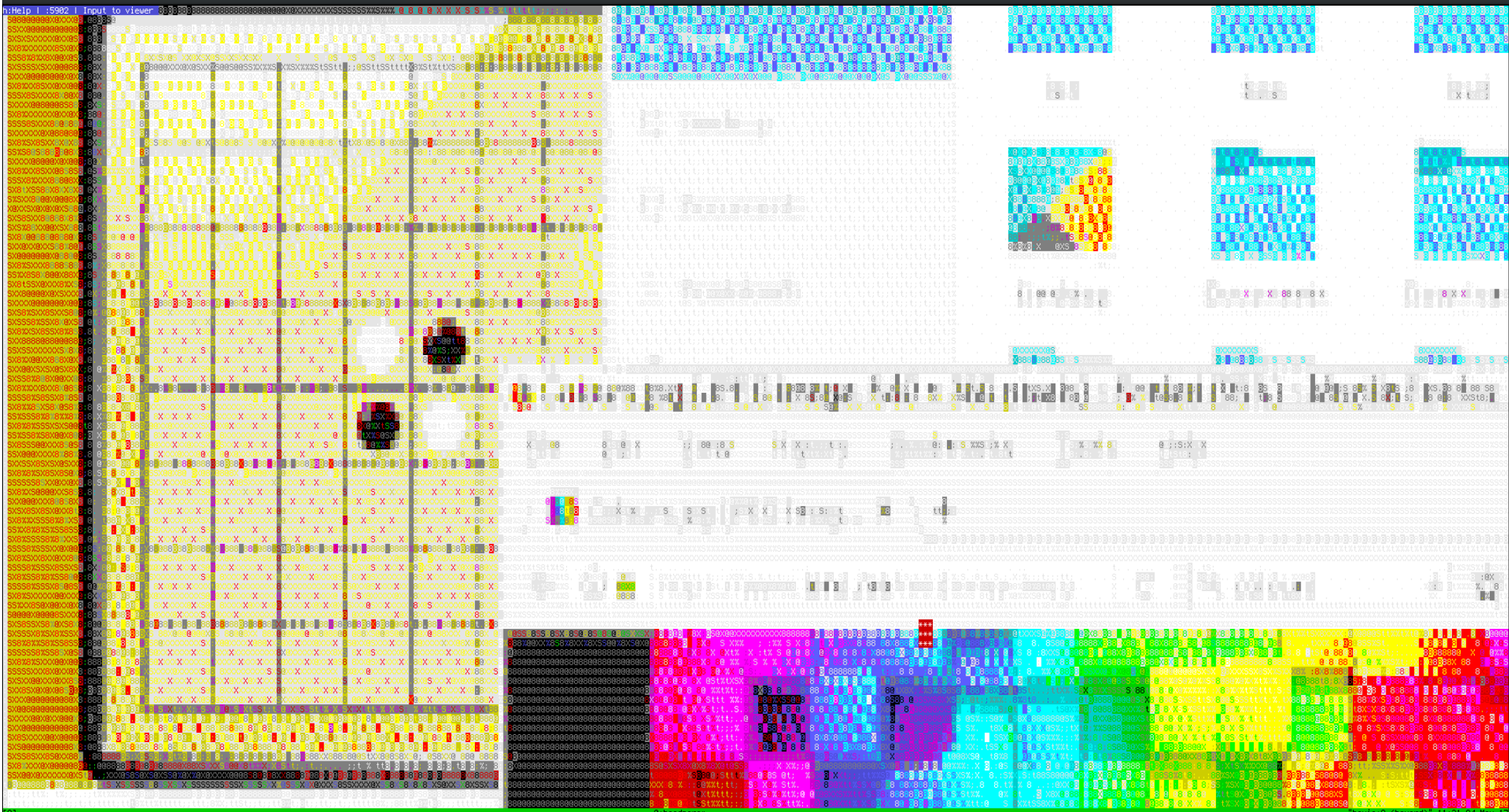
headmore – VNC client for terminal

- Zoom in/out and pan around

- Move mouse cursor, click buttons, and keyboard input.

- Good enough for editing images, watching YouTube, etc

- https://github.com/HouzuoGuo/headmore

- zypper install headmore (Tumbleweed, PackageHub)

"what drug are you having there, I want some of that 😆"

Programming

- UTF-8 text and emojis ☺
- Rich set of colours
- Ordinary keys – letters, numbers, enter
- Special keys – modifiers, arrows, escape , F1-12
- Programming libraries
  - Primitive - ncurses
  - Feature rich - libcaca

Sample Code

How to draw an owl
1.
2.

```
caca_display_t *dp = caca_create_display(NULL);
caca_canvas_t *cv = caca_get_canvas(dp);
caca_set_color_ansi(cv, CACA_BLACK, CACA_WHITE);
while (1) {
    caca_event_t ev;
    caca_get_event(dp, CACA_EVENT_KEY_PRESS, &ev, -1);
    caca_printf(cv, 0, 0, "That key was %c", caca_get_event_key_ch(&ev));
    caca_refresh_display(dp);
}
caca_free_display(dp);
```

Quirks

- Alt+Key emits two key codes – escape+key

- Ctrl+Key emits one key code

- Shift+Key emits one key code
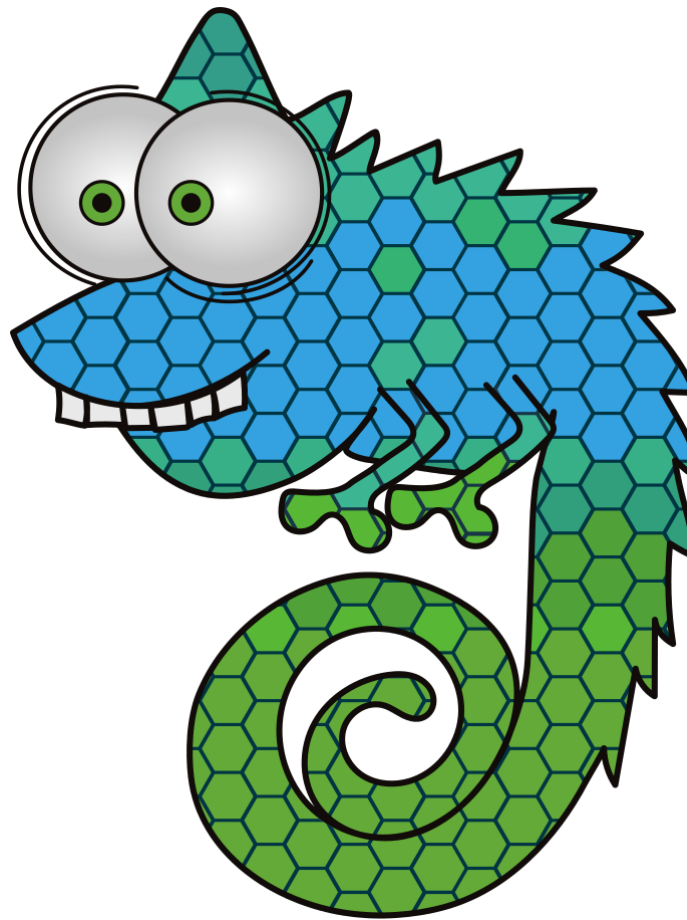
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