

# Maximiser votre productivité en rendant votre clavier programmable ergonomique

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Typematrix (2009-2018)



Keyboardio Model 01 (depuis 2019)



**Devoxx France**

#DevoxxFR

# Introduction

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De la machine à écrire au clavier

Caractéristiques d'un clavier ergonomique

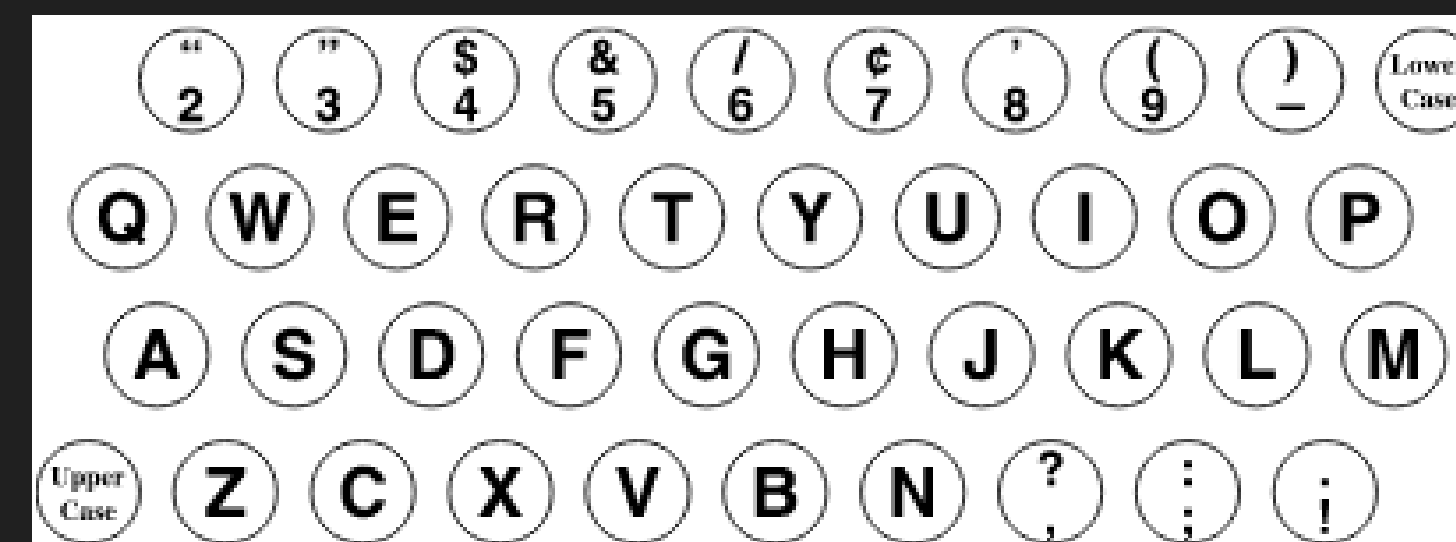
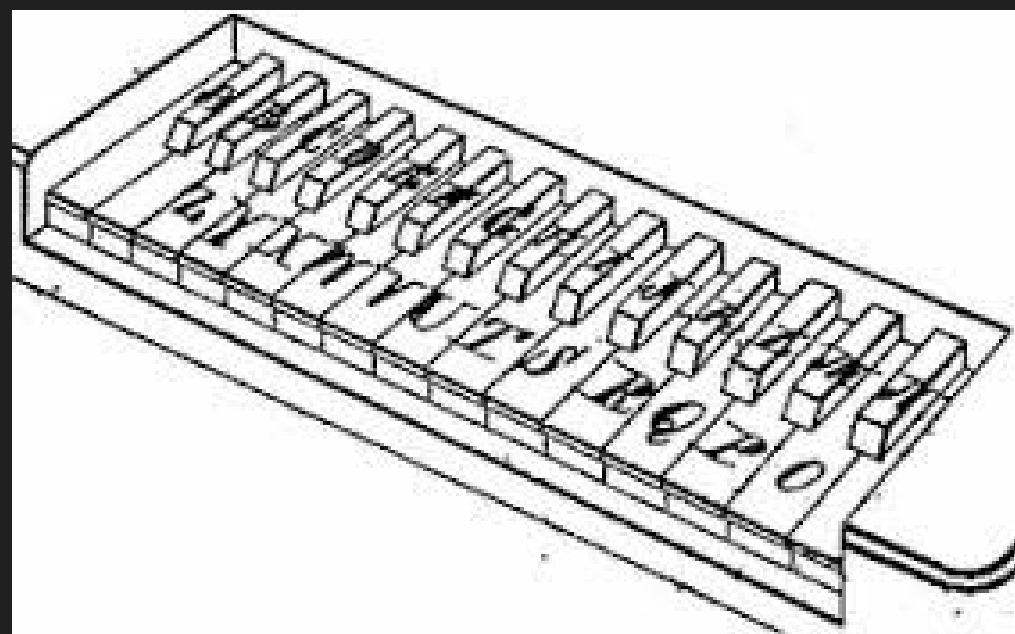
Rendre votre clavier ergonomique en le programmant

# Machines à écrire Sholes et Glidden

1870



1873-74





# Pourquoi le Qwerty ?

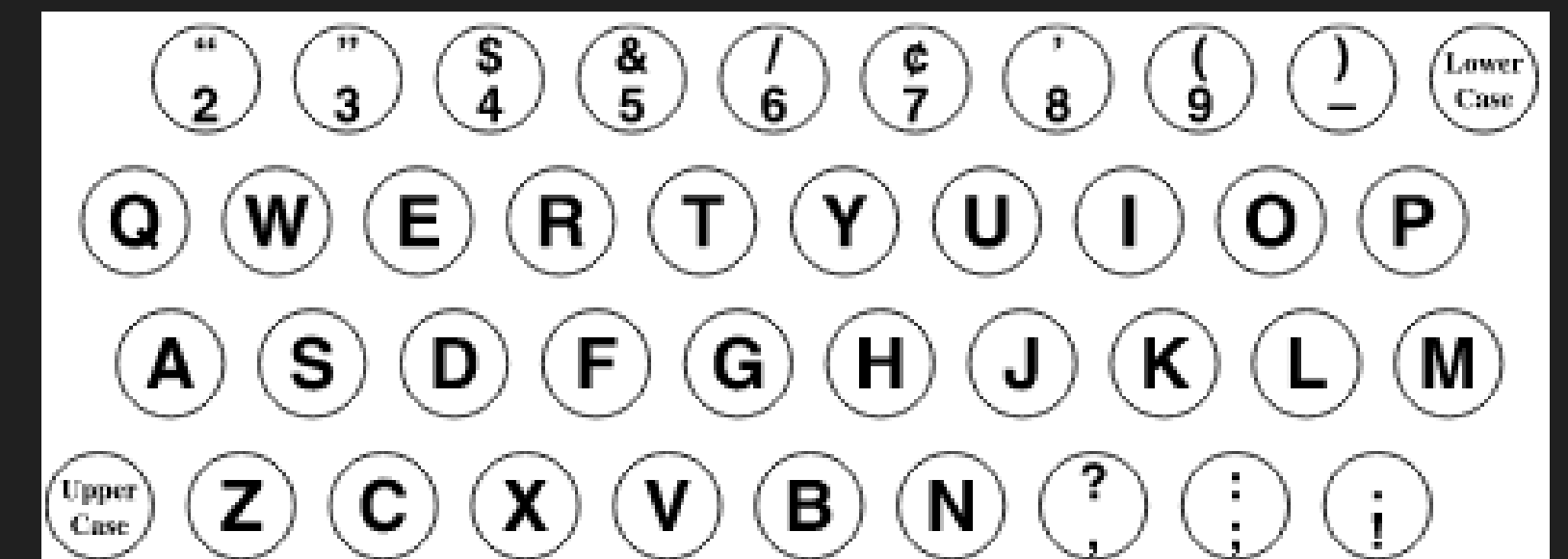
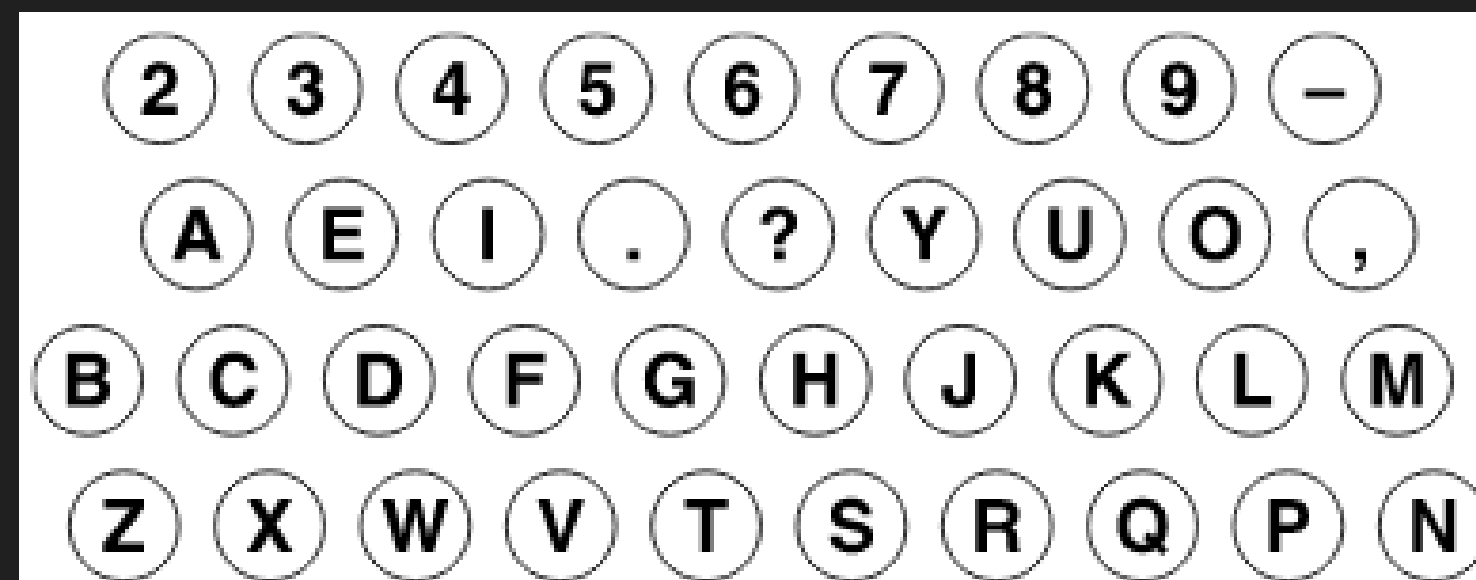
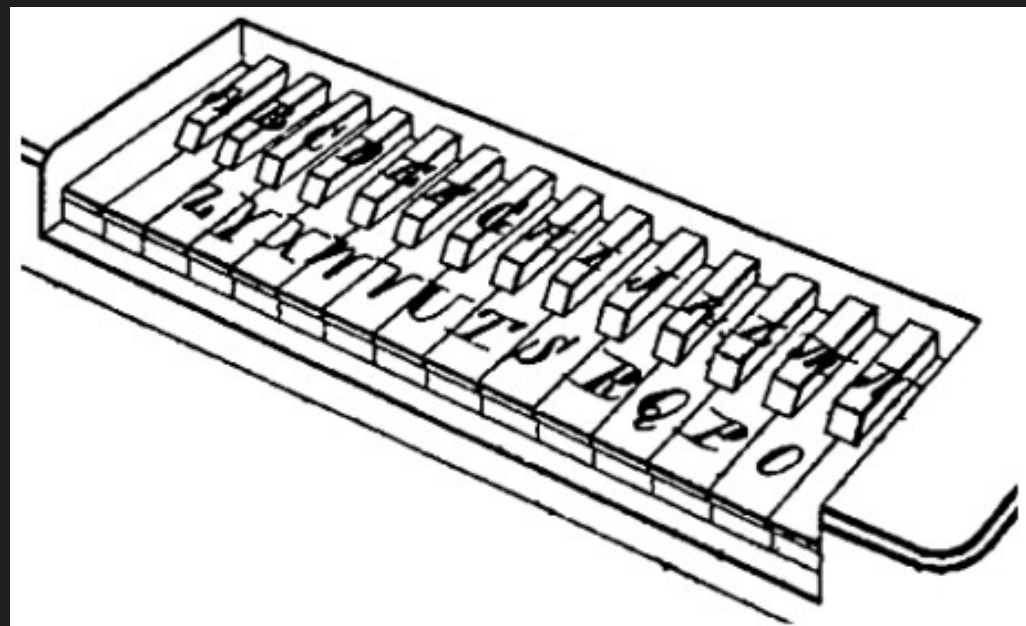
Début 1870



Avril 1870



Mars 1873



# De la machine à écrire vers le clavier

- Disposition des touches en Qwerty
- Alignement décalé des Q → A → Z
- Les rangées de touches sur un plan différent



1874



1984



# Caractéristiques d'un clavier ergonomique

- Disposition physique des touches
- Disposition des lettres
- Customisation des touches annexes ou séquences



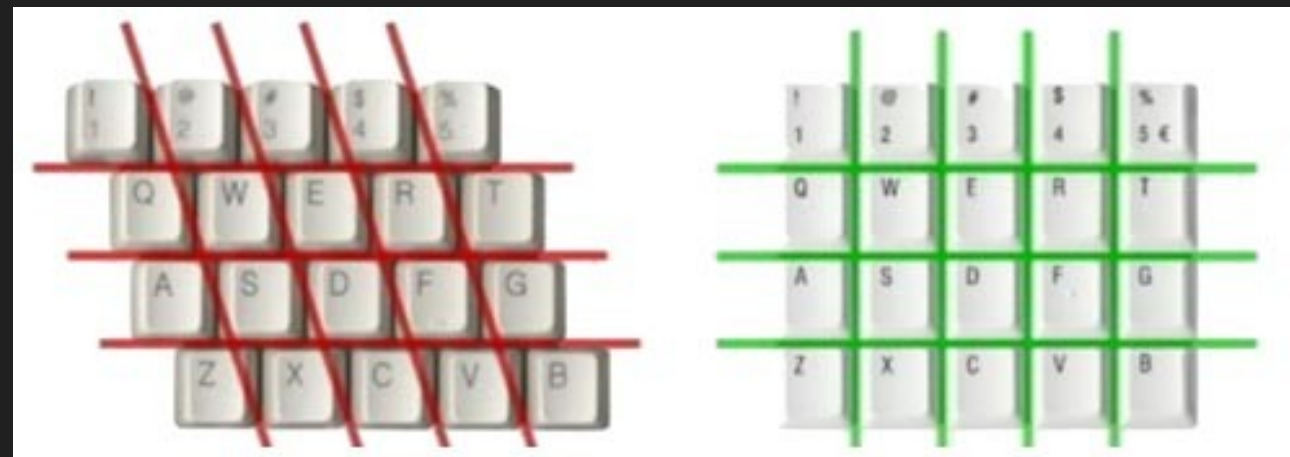
Plus Rapide



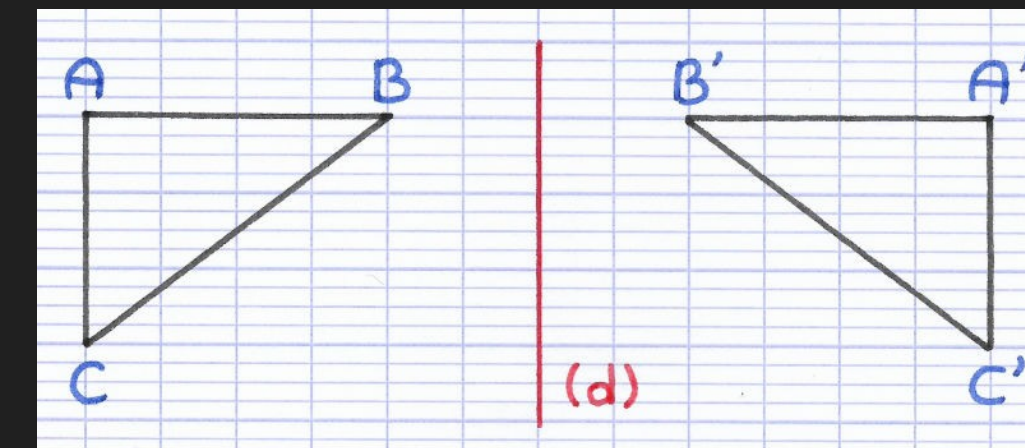
Plus confortable

# Caractéristiques d'un clavier ergonomique

- Disposition physique des touches



Orthogonal



Symétrique



Plat



Accessible



# Quelques claviers ergonomiques



Keyboardio Model 01 (2015-2018)



Ergodox EZ (2015)



# Disposition Ergonomique des lettres

- Touches les + utilisées sur la home row
- Doigts différents pour di/trigrammes fréquents
- Alternance main gauche / droite



Azerty

VS

Bépo

|      | 58,6 %                   | 41,4 % |
|------|--------------------------|--------|
| 5 %  | & é " ' ( - è _ ç à ) =  |        |
| 56 % | a z e r t y u i o p ^ \$ |        |
| 23 % | q s d f g h j k l m ù *  |        |
| 16 % | < w x c v b n , ; : !    |        |

|      | 49,5 %                  | 50,5 % |
|------|-------------------------|--------|
| 1 %  | " « » ( ) @ + - / * = % |        |
| 22 % | b é p o è ^ v d l j z w |        |
| 69 % | a u i e , c t s r n m ç |        |
| 7 %  | ê à y x . k ' q g h f   |        |

# Quelques dispositions

Dvorak (1936)

|           |         |     |   |    |   |   |   |   |        |         |       |       |                |
|-----------|---------|-----|---|----|---|---|---|---|--------|---------|-------|-------|----------------|
| ~         | !       | @   | # | \$ | % | ^ | & | * | (      | )       | {     | }     | ←<br>Backspace |
| Tab       | "       | <   | > | P  | Y | F | G | C | R      | L       | ?     | +     |                |
| Caps Lock | A       | O   | E | U  | I | D | H | T | N      | S       | -     | Enter |                |
| Shift     | :       | Q   | J | K  | X | B | M | W | V      | Z       | Shift |       |                |
| Ctrl      | Win Key | Alt |   |    |   |   |   |   | Alt Gr | Win Key | Menu  | Ctrl  |                |

Bépo (2005)

|              |       |     |                         |     |     |     |     |   |           |       |      |      |     |
|--------------|-------|-----|-------------------------|-----|-----|-----|-----|---|-----------|-------|------|------|-----|
| #            | 1     | 2   | 3                       | 4   | 5   | 6   | 7   | 8 | 9         | 0     | °    | `    | ⌫   |
| \$ -         | " -   | « < | » >                     | ( [ | ) ] | @ ^ | + - | / | *         | =     | %    |      |     |
| ⌘            | B     | É   | P                       | O   | È   | !   | V   | D | L         | J     | Z    | W    |     |
| VERR.<br>MAJ | A     | U   | I                       | E   | ;   | ,   | C   | T | S         | R     | N    | M    | Ç   |
| MAJ          | È     | /   | \                       | Y   | X   | :   | K   | ? | Q         | G     | H    | F    | MAJ |
| CTRL         | SUPER | ALT | [espace insécable fine] |     |     |     |     |   | ALT<br>GR | SUPER | MENU | CTRL |     |
|              |       |     | [ESPACE]                |     |     |     |     |   |           |       |      |      |     |

Colemak (2006)

|                |         |     |   |    |   |   |   |   |        |         |       |       |                |
|----------------|---------|-----|---|----|---|---|---|---|--------|---------|-------|-------|----------------|
| ~              | !       | @   | # | \$ | % | ^ | & | * | (      | )       | -     | +     | ←<br>Backspace |
| Tab            | Q       | W   | F | P  | G | J | L | U | Y      | :       | {     | }     |                |
| ←<br>Backspace | A       | R   | S | T  | D | H | N | E | I      | O       | "     | Enter |                |
| Shift          | Z       | X   | C | V  | B | K | M | < | >      | ?       | Shift |       |                |
| Ctrl           | Win Key | Alt |   |    |   |   |   |   | Alt Gr | Win Key | Menu  | Ctrl  |                |



# Introduction aux claviers programmables

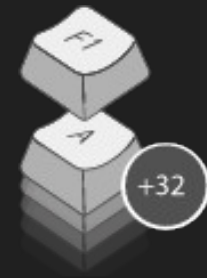
Premier Ergodox (2011) à monter soi-même

Microcontrôleur programmable

Code C à compiler / Outil Graphique



# Features d'un clavier programmable



Layers



Macro



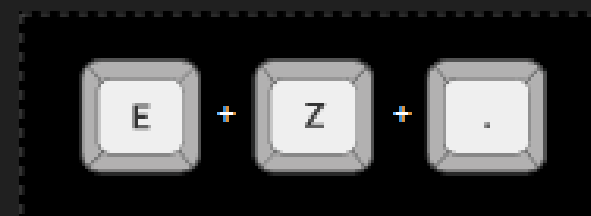
Qukeys



One Shot



Leader



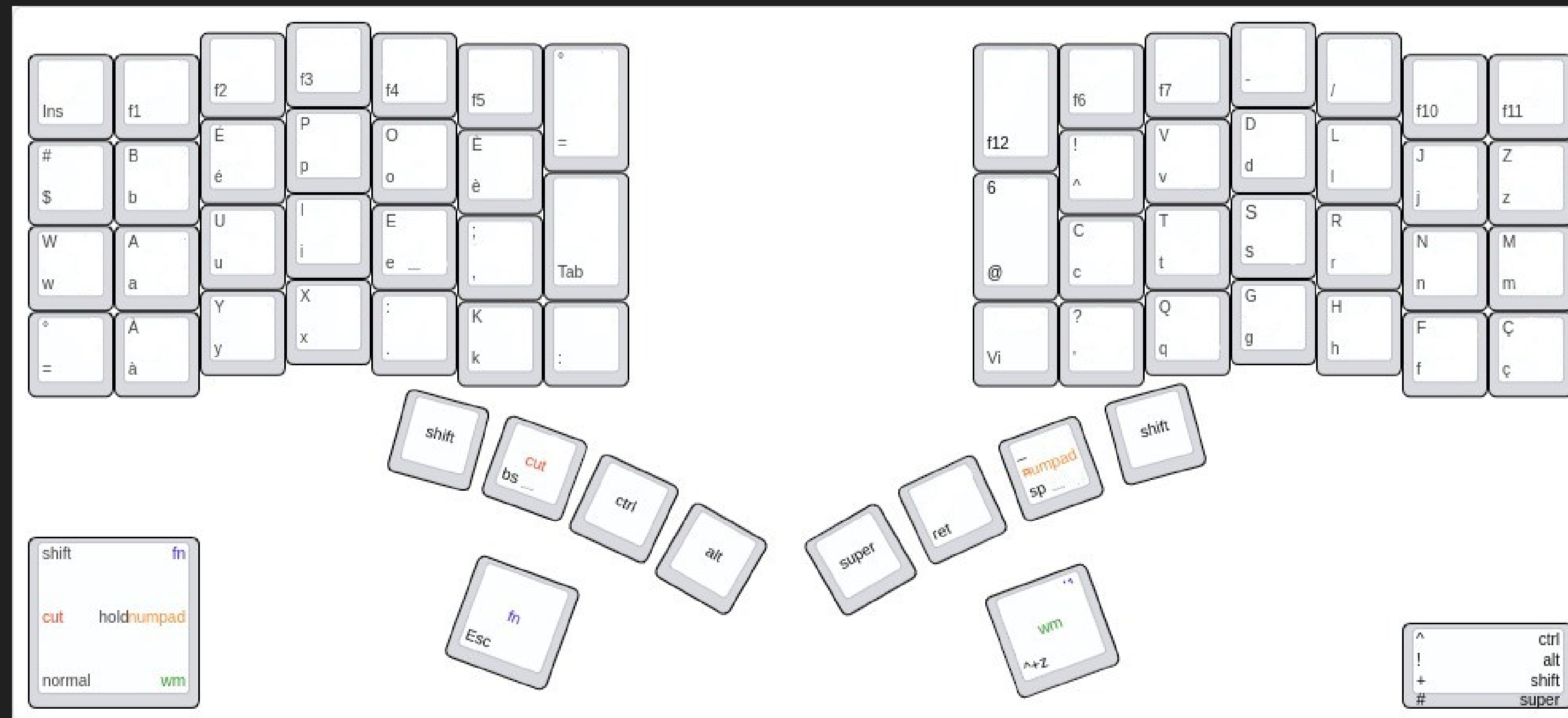
Combos



Tap Dance



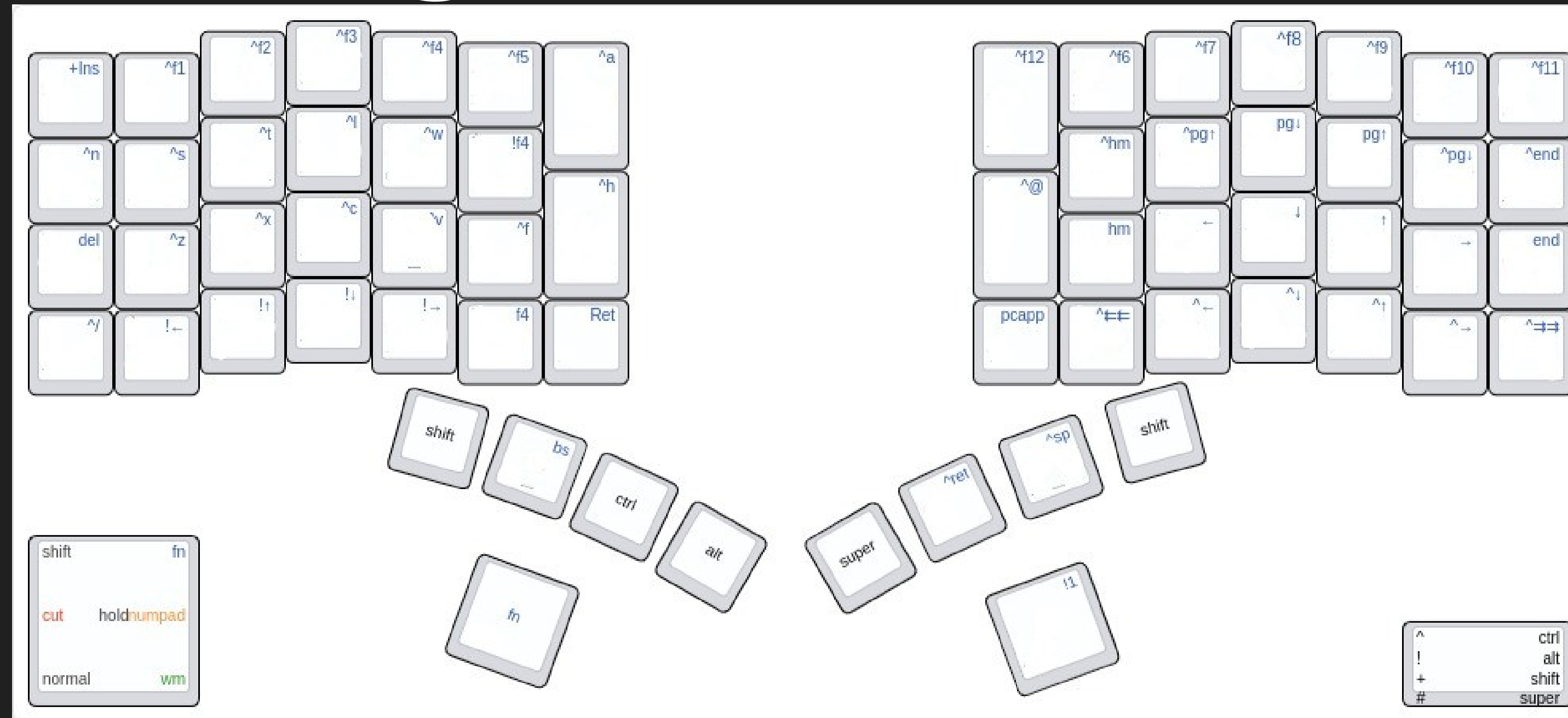
# Layer principal



Pouces (Shift / Modifieur / Backspace / Entrée)

Layers (Paume / Pouce)

# Layer Fn (paume gauche maintenue)

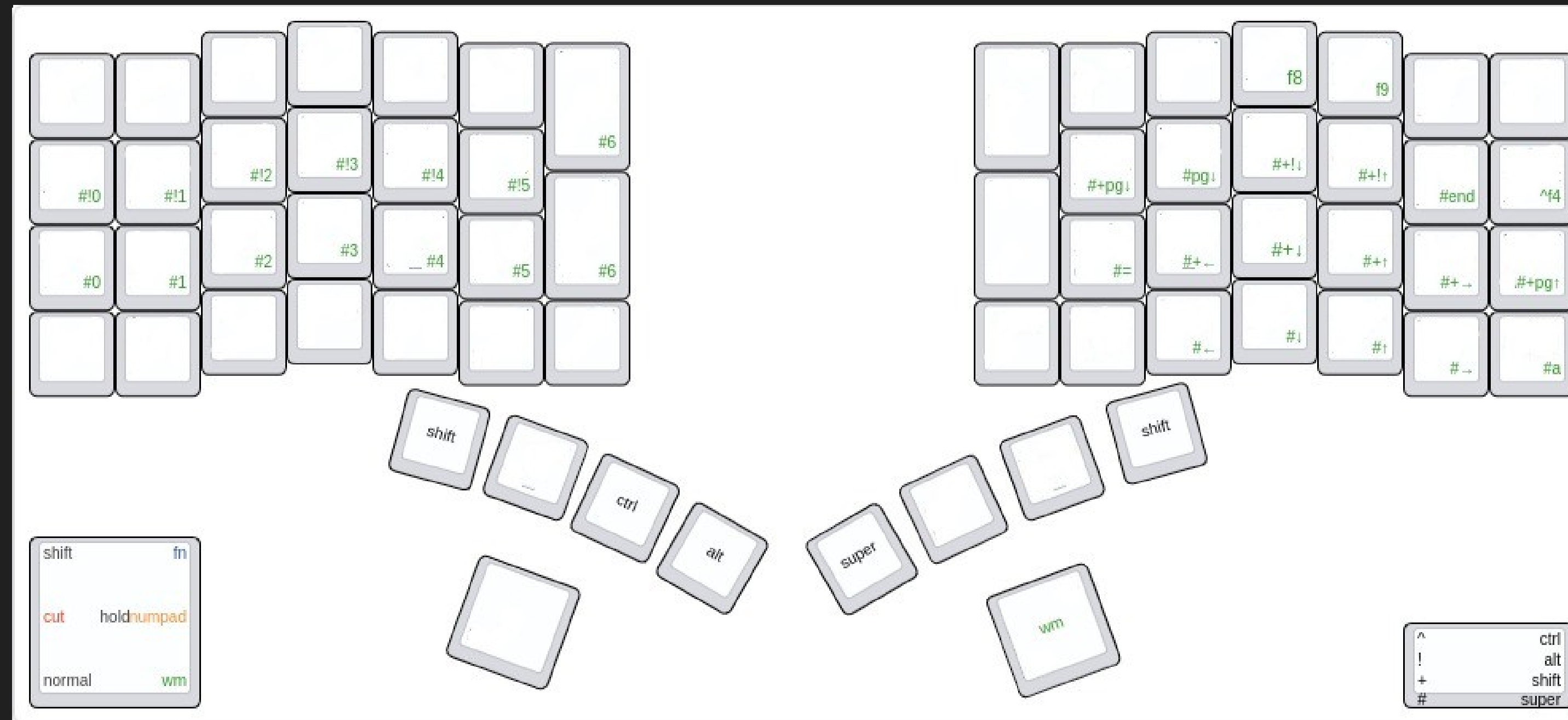


Shortcuts File / Edit

Edition de fichier



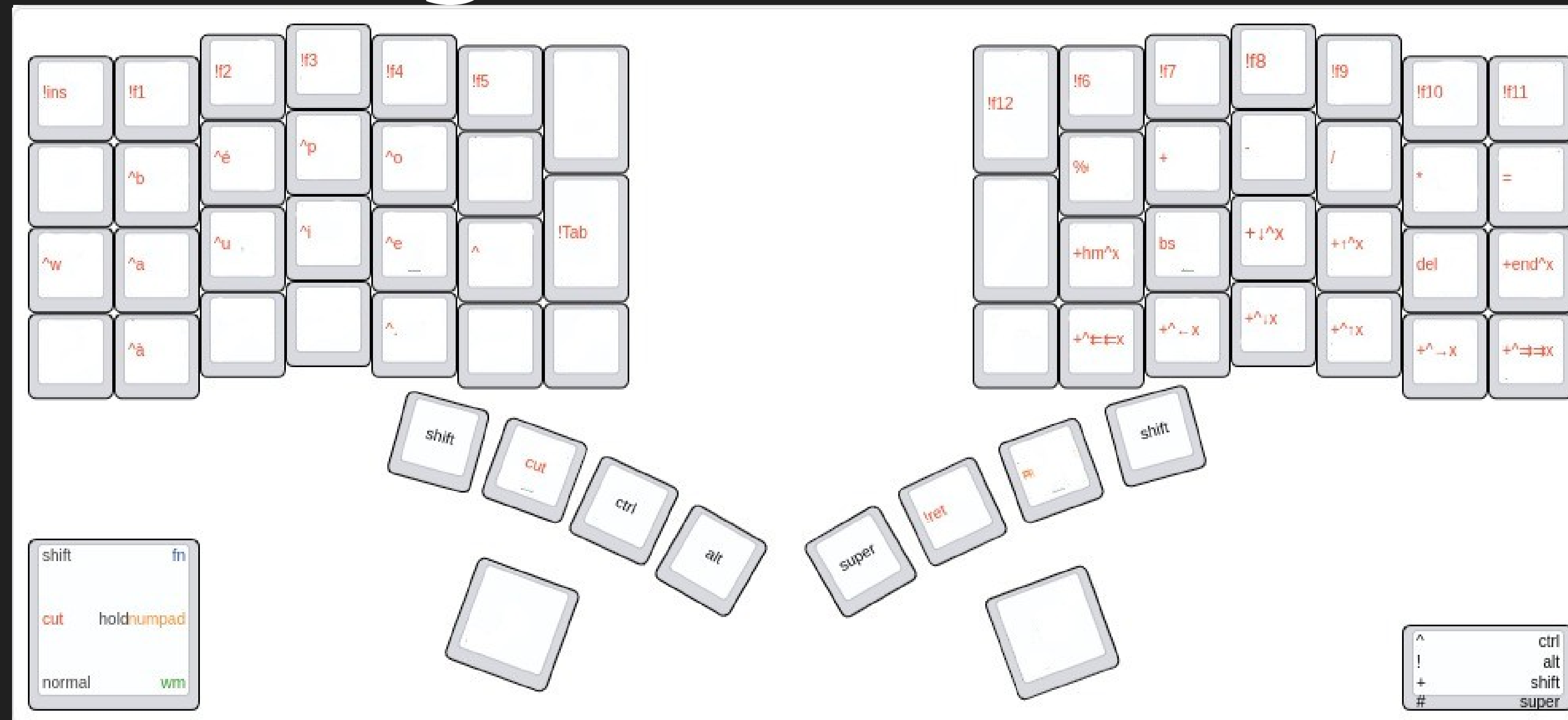
# Layer Window Manager (paume droite maintenue)



Shortcuts Workspace

Shortcuts Windows

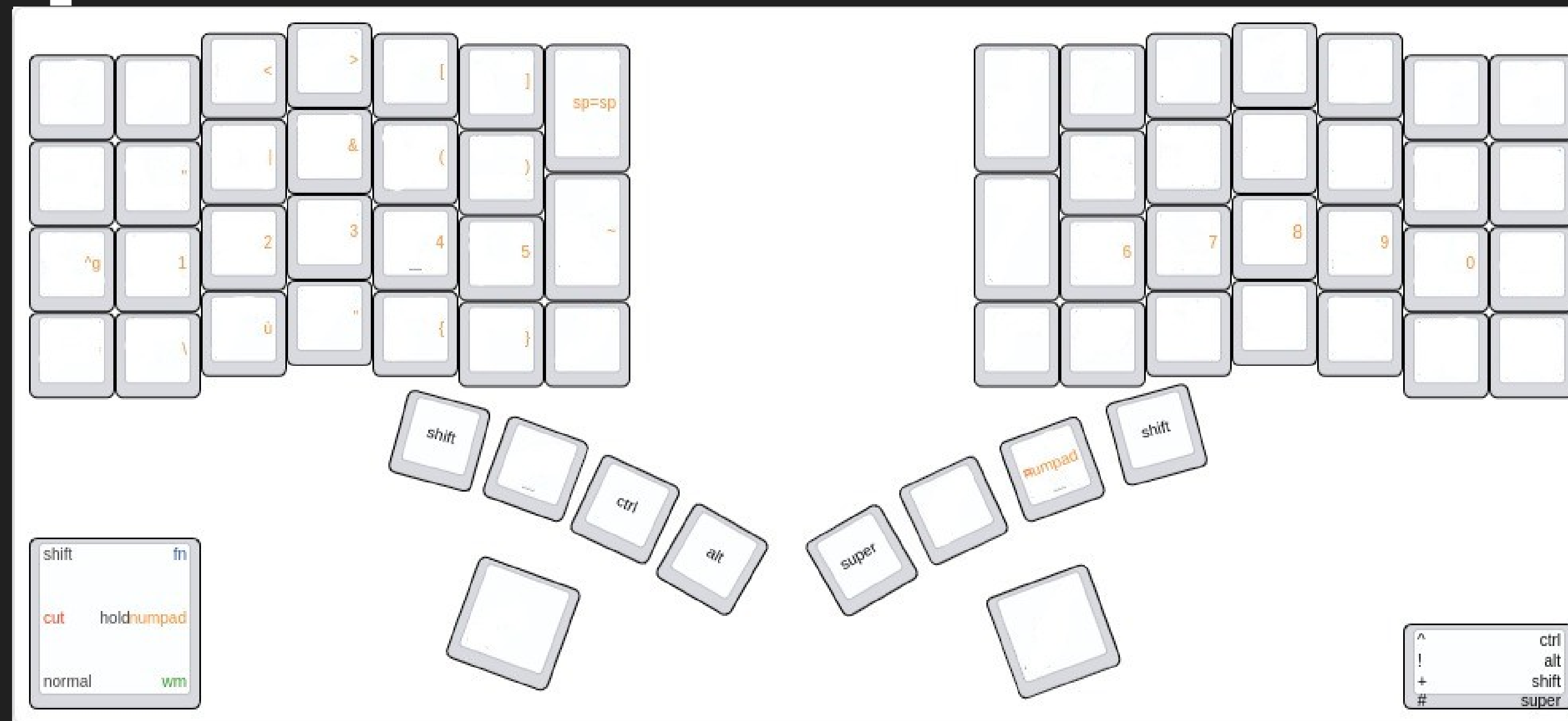
# Layer Cut (pouce gauche maintenu)



Shortcuts Cut



# Layer Numpad (pouce droit maintenu)



Numpad Homerow

# Sample Configuration

```
#elif defined (PRIMARY_KEYMAP_CUSTOM)
// Edit this keymap to make a custom layout
[PRIMARY] = KEYMAP_STACKED
(Key_Insert,           Key_F1,           Key_F2,           Key_F3,           Key_F4,           Key_F5,           Key_Enter,
Key_Backtick,         Key_Q,           Key_W,           Key_E,           Key_R,           Key_T,           Key_Tab,
Key_RightBracket,     Key_A,           Key_S,           Key_D,           Key_F,           Key_G,           Key_6,
Key_Minus,            Key_Z,           Key_X,           Key_C,           Key_V,           Key_B,           Key_Escape,
OSM(LeftShift),       Key_Backspace,  OSM(LeftControl),
LEAD(0),

Key_F12,              Key_F6,          Key_F7,          Key_8,           Key_9,           Key_F10,         Key_F11,
Key_6,                Key_Y,           Key_U,           Key_I,           Key_O,           Key_P,           Key_LeftBracket,
|                    Key_H,           Key_J,           Key_K,           Key_L,           Key_Semicolon,   Key_Quote,
M(MACRO_ALT_SPACE),  Key_N,           Key_M,           Key_Comma,       Key_Period,      Key_Slash,       Key_Backslash,
OSM(LeftGui),        Key_Enter,       M(MACRO_SPACE),  OSM(LeftShift),
M(MACRO_SHIFT_SUPER_Z)),

#else

#endif
[FUNCTION] = KEYMAP_STACKED
(M(MACRO_CTRL_INSERT), M(MACRO_CTRL_F1), M(MACRO_CTRL_F2), M(MACRO_CTRL_F3), M(MACRO_CTRL_F4), M(MACRO_CTRL_F5), M(MACRO_CTRL_A),
M(MACRO_CTRL_S),      M(MACRO_CTRL_N), M(MACRO_CTRL_T), M(MACRO_CTRL_L), M(MACRO_CTRL_W), M(MACRO_CTRL_F4), M(MACRO_CTRL_H),
Key_Delete,            M(MACRO_CTRL_Z), M(MACRO_CTRL_X), M(MACRO_CTRL_C), M(MACRO_CTRL_V), M(MACRO_CTRL_F), M(MACRO_CTRL_F7),
M(MACRO_CTRL_DIVIDE), M(MACRO_ALT_LEFT), M(MACRO_ALT_DOWN), M(MACRO_ALT_UP), M(MACRO_ALT_RIGHT), M(MACRO_ALT_F7),
Key_LeftShift,         Key_Backspace,   Key_LeftControl,  Key_LeftAlt,
---,

M(MACRO_CTRL_F12),     M(MACRO_CTRL_F6), M(MACRO_CTRL_F7), M(MACRO_CTRL_F8), M(MACRO_CTRL_F9), M(MACRO_CTRL_F10), M(MACRO_CTRL_F11),
M(MACRO_CTRL_AT),      M(MACRO_CTRL_HOME), M(MACRO_CTRL_PAGE_UP), M(MACRO_CTRL_PAGE_DOWN), M(MACRO_CTRL_PAGE_DOWN), M(MACRO_CTRL_PAGE_DOWN), M(MACRO_CTRL_END),
|                    Key_Home,         Key_LeftArrow,   Key_PageDown,     Key_PageUp,       Key_RightArrow,   Key_End,
Key_PcApplication,    M(MACRO_CTRL_LEFT_LEFT_LEFT_LEFT), M(MACRO_CTRL_LEFT), M(MACRO_CTRL_DOWN), M(MACRO_CTRL_UP), M(MACRO_CTRL_RIGHT), M(MACRO_CTRL_RIGHT_RIGHT_RIGHT_RIGHT),
---,
M(MACRO_ALT_1)),
---
```

```
case MACRO_CTRL_SHIFT_SPACE:
    return MACRODOWN(D(LeftControl), D(LeftShift), T(Space), U(LeftShift), U(LeftControl));
    break;

case MACRO_CTRL_SPACE:
    return MACRODOWN(D(LeftControl), T(Space), U(LeftControl));
    break;
```

```
//Qukeys
QUKEYS(
    kaleidoscope::plugin::Qukey(0, KeyAddr(1, 7), ShiftToLayer(NUMPAD)),
    kaleidoscope::plugin::Qukey(0, KeyAddr(1, 8), ShiftToLayer(ALTGR)),
    kaleidoscope::plugin::Qukey(0, KeyAddr(3, 6), ShiftToLayer(FUNCTION)),
    kaleidoscope::plugin::Qukey(0, KeyAddr(3, 9), ShiftToLayer(WM))
)
```

# Conseil général : Apprendre à taper

Avec vos 10 doigts

- 1 touche = 1 doigt
- doigts toujours placés sur la rangée du milieu au repos





# Conseil 1 : Apprendre à taper en masquant les touches

- Coller des autocollants pour cacher les touches



# Conseil 2 : Apprendre à taper en changeant de clavier

Acheter un clavier ergonomique

- blank
- programmable (type ergodox)



Keyboardio Model 01 (2015-2018)



Ergodox EZ (2015)

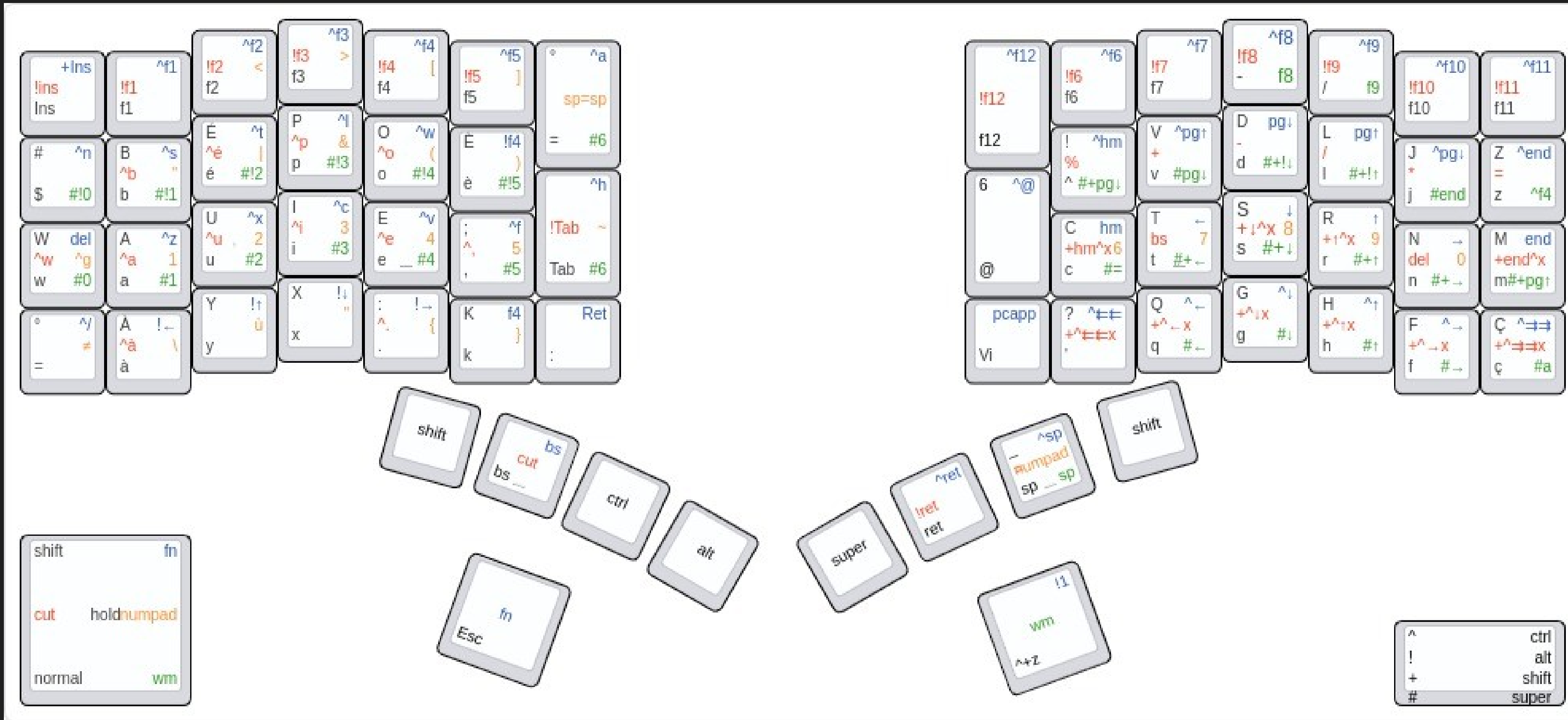
# Conseil 3 : Apprendre à taper en changeant de disposition

- En français et en anglais : BvoFRak / Bépo
- Uniquement en anglais : MTGAP 2.0 / Dvorak
- En anglais avec lettres accentuées : Colemak

| Disposition | Score patorjk Anglais | Score patorjk Français |
|-------------|-----------------------|------------------------|
| MTGAP       | 69                    |                        |
| Dvorak      | 65                    |                        |
| Colemak     | 65                    |                        |
| Qwerty      | 53                    |                        |
| BvoFrak     | 65                    | 67                     |
| Bépo        | 60                    | 65                     |
| Azerty      | 48                    | 49                     |



# Annexe : ma disposition

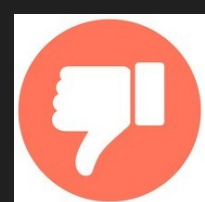
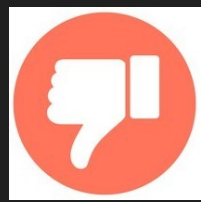




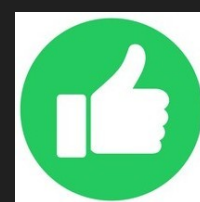
# Annexe : Quelques claviers



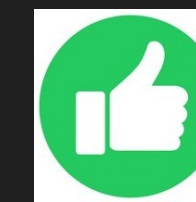
Hp (201x)



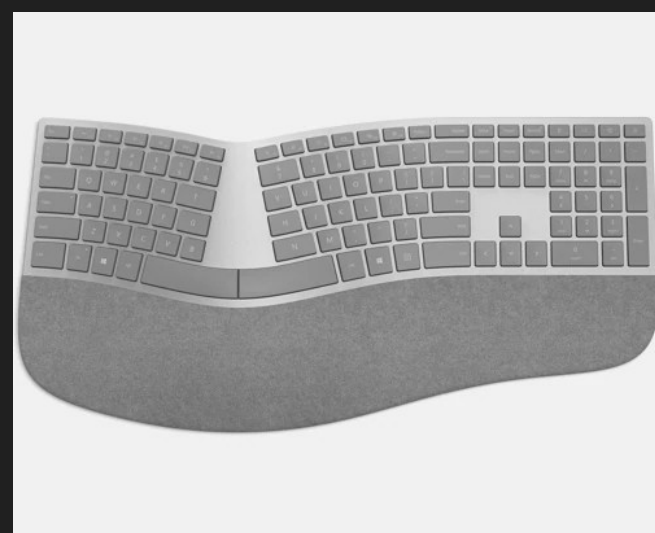
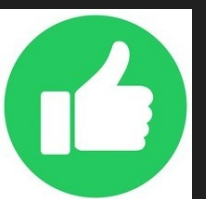
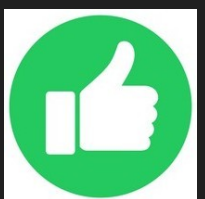
Typematrix (2003)



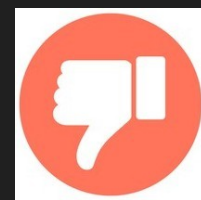
Atreus (2020)



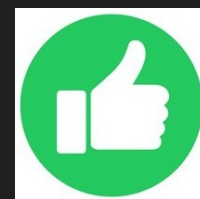
Keyboardio Model 01  
(2015-2018)



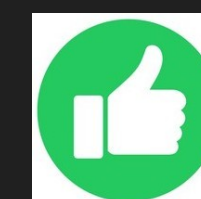
Microsoft Surface  
Ergonomic Keyboard (2016)



Kinesis Advantage (1991)



Plank EZ (2018)



Ergodox EZ (2015)

