C Coding Guidelines

Contents

Syntax

Formatting your code using *sindent*

sindent, my own taste of GNU *indent*, format your code according to the Linux kernel coding style (`-linux`) plus a few option it's missing (`-psl -prs -npcs`), which allows for easier `grep`-ing of function definitions and function calls.

Variables

Local: *{name_of_var}*
Global: *g_{detailed_name_of_var}*

```
int i;
extern int g_alien_cnt;
```

Functions

Names

{libLabel}_{object}_{action_or_verb} or *{libLabel}_{action_or_verb}_{object}*

```
sfSyl_welcome_txt_print ();
sfSyl_print_welcome_txt ();
```

Rationale: first form is easier for completion.

Definitions

[attributes]{type}
{func_name}({args})
{
/...*/*
}

```
noreturn void
usage( int status )
{
    /*...*/
    exit( status );
}
```

Rationale: easier to `grep "^func_name"`.

Pointers declaration

*{type} *{var}*

```
int *var1, *var2;   /* 2 pointers */
```

Rationale: avoid confusion like in `int *var1, var2;    /* 1 pointer, 1 int ! */` .

Typedefs

[libLabel_]{name}_t

```
superint_t i;
sfs_superint_t j;
```

Structures

{name_of_struct}_s
{name_of_struct_var}

```
datstruct_s this_is_a_struct;
```

Enums

{name_of_enum}_e
{ENUM_CONST}
{name_of_enum_var}

```
enum mood_e { TAKE_IT, GIVE_IT, KEEP_IT } my_mood;
```

Gotos

[GT_]{ThisPart} or *[GT_]{this_part}*

```
EmergencyClosure:
GT_EmergencyClosure:
GT_emergency_closure:
```

Goto statements must always be on the very first level of indentation: they must be immediatly noticeable.

Define

[TYPE_]{NAME_OF_DEF}

```
#define ALIENS_ON_PLANET_CNT    1234
```

Macros

[M_]{OBJECT}_{VERB} or *[M_]{VERB}_{OBJECT}*

```
#define ALIENS_ON_PLANET_LOCATE ()
#define M_ALIENS_ON_PLANET_LOCATE ()
#define LOCATE_ALIENS_ON_PLANET ()
```

Header guards

{NAME_OF_HEADER}_H

```
#ifndef MY_COOL_LIB_H
#define MY_COOL_LIB_H
/*...*/
#endif
```

Rationale: _- and __-starting header guards are used by standard library headers.

Parentheses / braces

We have different policies for functions and statements for the sake of distinction.

Functions calls

{func_name}({args});

```
printf( "spaces btwn args and parentheses : %d", true_dat );
```

Statements

{statement} ({condition}) {
/...*/*
}

```
if (true_dat == 1) {
    /*...*/
} else {
    /*...*/
}
```

Code example

```
#ifndef THAT_GUARD_THOUGH_H
#define THAT_GUARD_THOUGH_H

#include "myheader.h"

#include <header1.h>
#include <header2.h>

#define STR_SIZE_OF_PLANET  "BIG"

noreturn void
f_datFunc( void )
{
    unsigned int aliens_cnt = 100;
    int happn = 0;

    printf( "This planet is %s.\n", STR_SIZE_OF_PLANET );
    if (aliens_cnt > 50) {
        puts( "it's happening" );
        happn = 1;
    } else if (aliens_cnt > 0) {
        puts( "we still have time" );
        happn = 0;
    } else { puts( "ERROR" ); goto GT_Habbening; }

    switch (happn) {
        case 0:
            return( EXIT_SUCCESS );
        default:
    GT_Habbening:
            return( EXIT_FAILURE );
```

```
    }
}


#endif      /* ndef THAT_GUARD_THOUGH_H */
```

General advices

- *snake_case*: easier to type, harder to read
  - Though: some of the best ever written softwares were made in *snake_case*
- *camelCase*: harder to type, easier to read
  - Microsoft uses it, so...
- Dividing the code in functions increase its comprehension and readability.
- Code must not be generic, but very specific to what exactly you're doing.

File organization

Header files

- Each source file has a corresponding header file of the same name.
- Main source file (containing `main()`) is of the name of the program. E.g.: `img2b64.c` or `sed.c`.
- The main header file contains global macros, declaration of global variables, enums and structs, etc.
- *Never define in header files*, only just declare. Global variables are defined at the top of the main source file, outside of `main()`.
- Every source file `#include`s both their own header file and the main header file (in that order).
- For all files, never `#include` more than you need.
- Always use header guards in header files.

Project Hierarchy Standard

I hereby propose a standard for organizing project file.

Tree

```
[PROJECT DIRECTORY]/
|-- bin
|   |-- data -> ../data
|   |-- my_project
|   |-- my_project.exe
|   +-- my_project.log
|-- data
|   |-- images
|   +-- ...
|-- etc
|   +-- my_project.conf
|-- lib32
|   |-- libcsfml-audio.dll
|   +-- ...
|-- lib64
|   |-- libcsfml-audio.so.1.6
```

```
|   +-- ...
|-- man
|   +-- my_project.6
|-- docs
|   |-- AUTHORS.txt
|   |-- LICENSE.SFML.txt
|   |-- LICENSE.txt
|   |-- changelog
|   +-- copyright
|-- src
|   |-- font
|   |   +-- usedGPLFont.zip
|   |-- inc
|   |   +-- SFML
|   |       |-- Audio
|   |       |   |-- AudioResource.hpp
|   |       |   |-- Types.h
|   |       |   +-- ...
|   |       |-- Graphics
|   |       |   +-- ...
|   |       +-- ...
|   |-- Makefile
|   |-- my_project.c
|   |-- my_project.h
|   |-- utils.c
|   +-- ...
|-- wip
|   |-- DevLog
|   |   |-- Screenshot - 12142013 - 02:44:22 PM.png
|   |   +-- ...
|   |-- datMusicParts
|   |   +-- ...
|   +-- ...
|-- NOTES
|-- README
+-- TODO
```

Directories

Directory	Content
`./`	Regular README files and possibly other (few) things
`./bin`	Binairies ; where the program is built
`./data`	Project data (images, sounds, fonts, etc...)
`./etc`	Configuration files
`./lib32`	32-bit libraries (`*.lib`, `*.so`, `*.a`, `*.dll`)
`./lib64`	64-bit libraries (`*.lib`, `*.so`, `*.a`, `*.dll`)
`./man`	Linux manual pages
`./docs`	Remaining licensing information and other informative text files (not mandatory)
`./src`	Source files
`./src/inc`	Included external headers
`./wip`	"**W**ork **I**n **P**rogress" development material (to remove once released)

References/resources

- ***Linux Kernel Coding style***: https://www.kernel.org/doc/html/v4.10/process/coding-style.html
- ***Notes on Programming in C***, Rob Pike: https://www.lysator.liu.se/c/pikestyle.html
- ***C Header File Guidelines***, David Kieras, University of Michigan: http://umich.edu/~eecs381/handouts/CHeaderFileGuidelines.pdf
- ***JPL Coding Standard C***, Jet Propulsion Laboratory, NASA: https://lars-lab.jpl.nasa.gov/JPL_Coding_Standard_C.pdf