

Embedded C Programming

Q & A

File IO

- Text Files
 - Textual representation of the data i.e. Can be opened & read/write from any text editor (e.g. notepad).
 - File IO functions: fgetc(), fputc(), fgets(), fputs(), fprintf(), fscanf().
- Binary Files
 - Binary representation of the data. Not readable from a text editor.
 - File IO functions: fread(), fwrite(), fgetc(), fputc() and fseek(), ftell().

Bitwise Assignment

```
// ...
while((regr & BV(31)) != 0)
;
// ...
```

```
num = 13; // 0 to 15 i.e. 4-bit value
// step 1: clear bit[15:12] of the given regr.
regr &= ~(0x0000000F << 12);
// 0x0000000F --> 00000000 00000000 00000000 00001111
// << 12
// --> 00000000 00000000 11110000 00000000
// ~
// --> 11111111 11111111 00001111 11111111

// regr --> xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx
// & --> 11111111 11111111 00001111 11111111
// --> xxxxxxxx xxxxxxxx 0000xxxx xxxxxxxx

// step 2: set the bit[15:12] to given num value.
regr |= num << 12;
// num --> 00000000 00000000 00000000 0000yyyy
// << 12 --> 00000000 00000000 yyyy0000 00000000

// regr --> xxxxxxxx xxxxxxxx 0000xxxx xxxxxxxx
// | --> 00000000 00000000 yyyy0000 00000000
// --> xxxxxxxx xxxxxxxx yyyyxxxx xxxxxxxx
```

Hackathon

- Goals

- Improve stamina
- Team work/Collaboration
- SDLC = Understand requirement, Design, Implementation, Testing
- Programming skills
- Time management = Understand, Task Assignment, Implementation.
- Mistakes/Problems
 - GIT
 - GIT practice was lacking
 - Assign tasks so that one user deal with one file.
 - Multiple Files
 - Multi-file project practice was lacking
 - File IO
 - File IO practice was lacking.

Structures

Member Offsets

```
#define offsetof(type, member) ((long)(&((type*)0)->member))
```

Structure Padding

- Compiler add few hidden bytes into the structure, called as structure padding or slack bytes.
- These slack bytes are added by the compiler so that memory access remains aligned and hence efficient.
- If slack bytes are not added, the system will need unaligned memory access and that will consume more bus cycles. Also in few arch like (ARM v4 and before), unaligned memory access is not supported.
- <https://www.geeksforgeeks.org/structure-member-alignment-padding-and-data-packing/>