Homework 1

[33 syllabus]

Do homework problems 2.63, 2.72, 2.73, and 2.82 from Bryant & O'Hallaron 3rd edition, with the following changes and additions:

- In problem 2.63, the types of the functions' first arguments and returned values should be `long` and `unsigned long`, not `int` and `unsigned`. (The type of the second arguments remains `int`.) Also, check your 2.63 solution with both '`gcc -m32`' and '`gcc -m64`'.
- Redo problem 2.73, this time using a call to the `__builtin_add_overflow_p` function available in GCC 7 and later; the third argument of the call should be a cast that consists of a parenthesized type followed by the constant `0`. In other respects your function should continue to follow the bit-level integer coding rules.
- In problem 2.82, also analyze the following expressions:

  F.
  ```
  x % 8 == (x & 7)
  ```
  G.
  ```
  ((unsigned) -1 / 255 * (x & 255)) >> 24 == (x & 255)
  ```

Submit your homework answers as a gzipped tarball containing your answers to each problem, in the files `hw1/2.63.c`, `hw1/2.72.txt`, `hw1/2.73.c`, `hw1/2.73-redo.txt`, and `hw1/2.82.c` respectively. The `.txt` files should be plain ASCII text files with lines terminated by LF. The `.c` files should compile cleanly with shell commands like this:

```
gcc -m32 -fwrapv -O2 -Wall -Wextra -S hw1/2.73.c
```

As we will grade your submission with the latest version of GCC installed in `/usr/local/cs/bin/` on the newer SEASnet GNU/Linux servers (`lnxsrv06`, `lnxsrv07`, `lnxsrv09` and `lnxsrv10`), using the flags shown above, it would be wise to check your work on that platform. The shell command '`which gcc`' should output '`/usr/local/cs/bin/gcc`'.

To create your tarball, use the shell command:

```
tar -czf hw1.tar.gz hw1/2.63.c hw1/2.72.txt hw1/2.73.c hw1/2.82.txt hw1/2.73-redo.c
```

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