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Assignment #4

Issued 10/15 Due 10/21

HW4-1 (30 points)

Suppose you know that when a function with prototype

```
long decode4(long x, long y, long z)
```

is compiled into assembly code, the body of the code is as follows

```
addq    %rsi, %rdi
imulq   %rdx, %rdi
movq    %rdi, %rax
sarq    $15, %rax
salq    $31, %rax
andq    %rdi, %rax
ret
```

Parameters `x`, `y`, and `z` are passed in registers `%rdi`, `%rsi`, and `%rdx`. The code stores the return value in register `%rax`.

Write C code for `decode4` that will have an effect equivalent to our assembly code. You can test your solution by compiling your code with the `-S` switch. Your compiler may not generate identical code, but it should be functionally equivalent (and it ought to at least compile). Using the `-Os` flag will probably help you get similar code.

Homework is due at the time of day that class starts. Two options to submit your .c file:

- Easiest if you are working on a Loyola GNU/Linux machine: Copy your file to the directory `~rig/c264hw4sub` with a filename in the form `Email-X.c`, where `Email` is your email address, and `X` is a "random" string of at least 8 alphanumeric characters. The Unix command for this would look *similar* to:

  ```
  cp decode4.c ~rig/c264hw4sub/YOUREMAILADDRESS-RANDOM.c
  ```

  where you must put your own things for "YOUREMAILADDRESS" and "RANDOM". (Don't cut and paste from the PDF, or your tilde might not come out right.) *Remember that if you submit this way the file must be readable by everybody, though you will want to have used* `chmod` *to protect the directory containing the file. Protections show with the* `ls -l` *command illustrated below.* You can verify successful submision by using the "ls" command with the same file name you just copied to, specifically you can use a command *similar* to:

  ```
  ls -l ~rig/c264hw4sub/YOUREMAILADDRESS-RANDOM.c
  ```

- Or if you prefer: Submit the file through the online submission mechanism on my course web page. Submit it as `decode4.c` or `4.c`.