Computer Systems Week 7 Lab

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The code

```
BASE = $3F000000      ; base address for rpi 3B
GPIO_OFFSET = $200000 ; GPIO offset

mov r0, BASE
orr r0, GPIO_OFFSET   ; adding the offset to the base address

                      ; program GPIO18 for writing
mov r1, #1            ; write 1 into register 1
lsl r1, #24           ; shift it 24 times to get to the start bit for pin
str r1, [r0, #4]      ; write to the register

                      ; set GPIO18 to on
mov r1, #1            ; write 1 into register 1
lsl r1, #18           ; shift it 18 times to get to the write bit for the pin
str r1, [r0, #28]     ; enable write to the pin

                      ; program GPIO23 for writing
mov r1, #1
lsl r1, #9
str r1, [r0, #8]

                      ; set GPIO23 to on
mov r1, #1
lsl r1, #23
str r1, [r0, #28]

loop:                 ; loop infinitely so the program doesnt crash
b loop
```

The questions

What number bit is set (within the associated 32-bit block) to enable GPIO23 for writing?

Bit 24 is set within the register

What is the byte offset from GPIO_BASE that this 32-bit block must be written to in memory?

The byte offset from GPIO_BASE is 4

What number bit is set to set GPIO23 to on? (again within the 32-bit block associated with that GPIO pin)

Bit 9 is set within the register

What is the byte offset from GPIO_BASE that this 32-bit block must be wrtten to memory?

The byte offset from GPIO_BASE is 8

Turning off the LED

```
BASE = $3F000000
GPIO_OFFSET = $200000

mov r0, BASE
orr r0, GPIO_OFFSET

mov r1, #1
lsl r1, #24
str r1, [r0, #4]

mov r1, #1
lsl r1, #18
str r1, [r0, #40] ; change this line to write a 0 to GPIO18 instead of a 1

loop:
b loop
```