

## Last time

- Loops
- Function calls
- I/O devices

## Today (25 minutes)

- Bit-wise function example
- Exam locations
- Look at keyboard driver

## Assembly function writing—practice with bits!

Write a function which returns the “N<sup>th</sup>” bit of a number. So if our number is 010001 the rightmost bit is the “0<sup>th</sup>” bit (and so is a 1) while the “1<sup>st</sup>” bit is the next rightmost (so is a 0). The function should be named “bs” (bit select) and it takes two arguments: bs\_X (the number) and bs\_N (the bit number). Its return value is to be in “bs\_result”.

Let’s talk about how to do this from an algorithmic viewpoint first.

- Probably the easiest way is to right shift the value “N” bits and then “AND” it with 1.
  - So if I want the 4<sup>th</sup> right-most bit of 010001 (where we start counting at 0...) we could right shift by 4 (so 000001) and then AND it with 1 getting 000001. If we went for the 2<sup>nd</sup> bit, what would happen?

So write that code!

## Keyboard example

From lab 7:

ps2\_command and ps2\_response implement the [standard I/O protocol](#). There are no command parameters. The response parameters are ps2\_pressed and ps2\_ascii[7:0]. The response parameters represent a **keyboard event**, describing which key was acted on (ps2\_ascii) and whether the action was a key press or key release (ps2\_pressed). If ps2\_pressed is 1, the event was a key press. If ps2\_pressed is 0, the event was a key release. ps2\_ascii contains the ASCII value for the key that was pressed or released.

ase100 simulates the PS/2 keyboard controller accurately enough to test your device driver and to run assembly-language programs. ase100 sees keyboard events when the mouse is in the VGA window.

Consider the following code:

```
LEDTEST

        cp 0x80000020 one
wait    bne wait 0x80000021 one
        cp 0x80000001 one
        halt

one .data 1
```

What happens when you run this?

## Exam stuff

### Room assignments (by lab section)

EWRE 185:

252 nbusuito troychen aparnasr brinday amodepal scschwa shikev arvela aanant beqid achiwaha varunk adapa nitinram kishbrao tanvirs lyuchen marksja ojhasata psturm

EWRE 136

254 shuvro jxliu tmazer kjwa henryjc alassman kmilka scbridge bacheung ahrisue snavraj tiberiu

EECS 1500

254 bbabbs prospecs parkjack cschmotz dahdunn hanjason asofian sosaluis

256 sahilg sschmatz thorrez zboyang dbruni muelliot msegedin vsubra conjam sguan mccabequ ydtak jeremyng hbrendan jpmorrow vaishr smousigi nbtavis henwang kevwolf

258 ahouse tongyliu bwzhang kevezhao saadk znofzing maypifer edstan gcheydle skimkim niechris jmpat dimabond ajglass mikkatz alexwass danjchoi grladd sthmprrn tmrupp

### Other information

- You will get 2 exams. The TC part is 30 points, the technical part is 70.
  - There are 2 practice versions of both on the website.
  - You will have 80 minutes for the whole thing.
- We will try to start at 2:40 exactly.
  - So try to get there and seated beforehand.
- Closed book. No calculator. Just you and a writing utensil (or two).