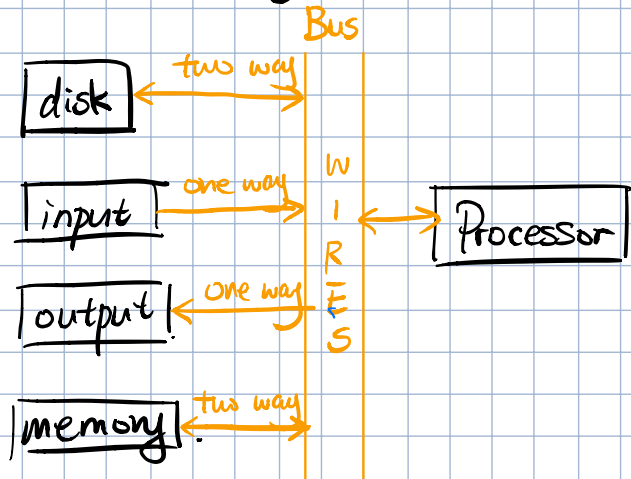


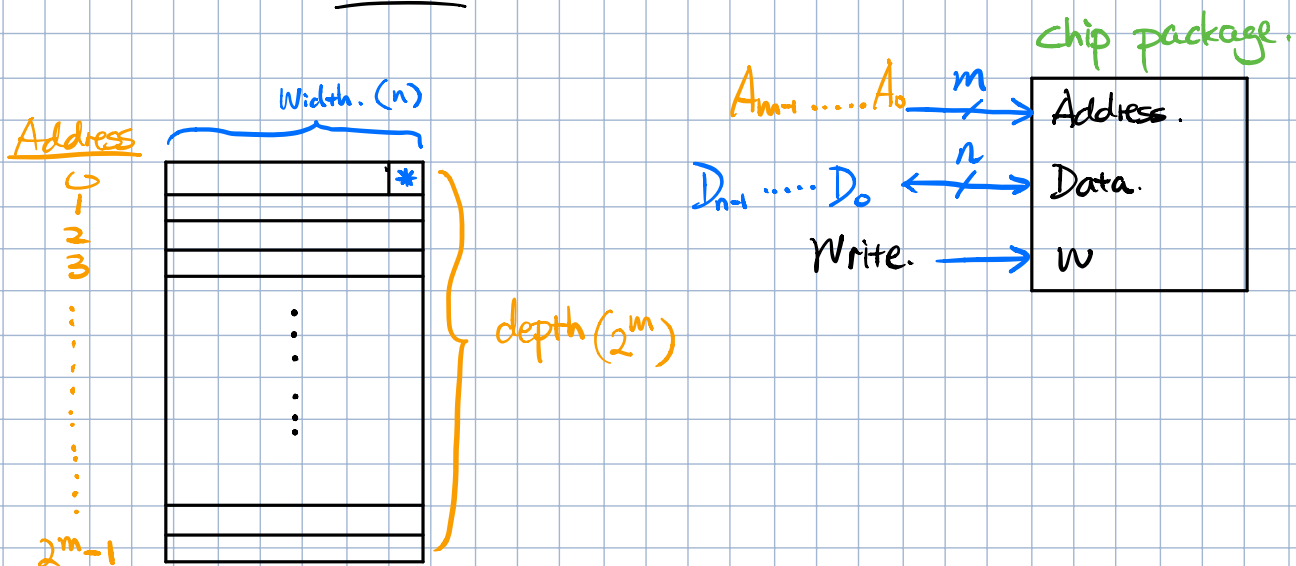
Computer Organization.

- A computer contains devices for long-term storage (disks) input/output devices (keyboard, mouse, monitor,...), short-term storage (memory) and a processor.



memory

- Electronic memory chips contain a 2-D array of 0/1 storage cells. Arranged in rows. Each row has an address.

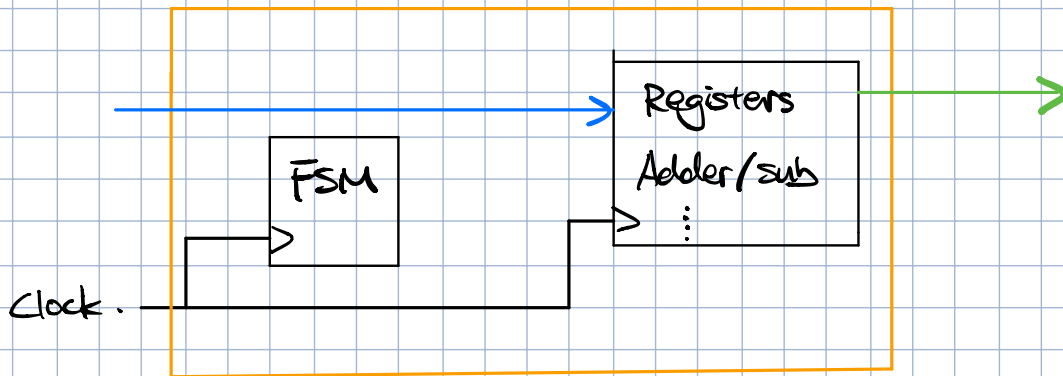


Addresses are provided by the processor. It can read the content

of a row ($w=0$) or write data into a row ($w=1$)

Processor

- contains : 1. Datapath 2. FSM.

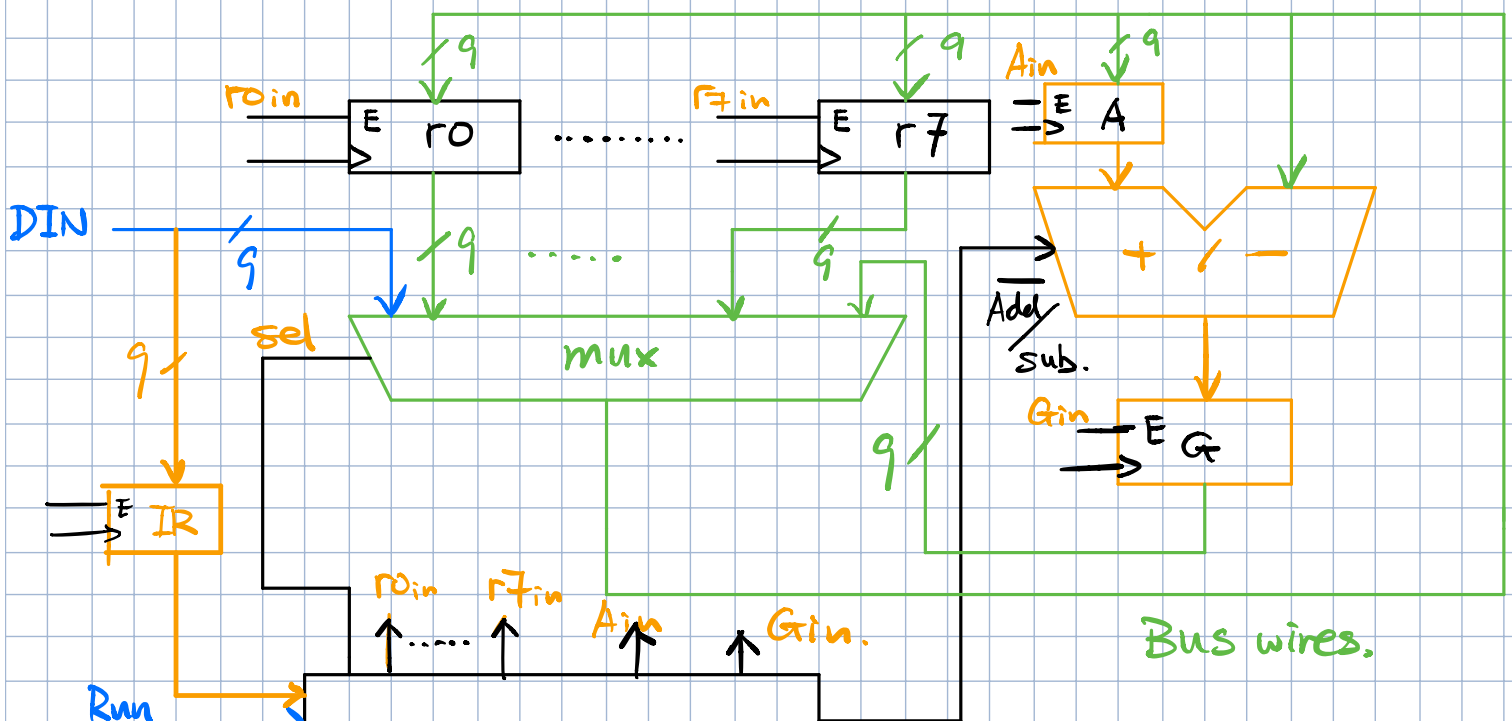


Example Processor using 9-bit registers (Lab 1/part 1)

Consider a set of 9-bit registers r_0, \dots, r_7 . We wish to be able to transfer one register to another.

$(r_x \leftarrow r_Y)$, initialize a register w/ external data.

$(rx \leftarrow D)$, add registers, subtract registers.



clock

FSM.

Instructions.

mv *rx, ry* // copy *ry* into *rx*

movi *rx, #D* // initialize *rx* w/ *D*

add *rx, ry* // *rx* gets *rx + ry*

sub *rx, ry* // *rx* gets *rx - ry*

Encode: III XXX YY

use III = 000 (*mv*), 001 (*movi*), 010 (*add*)
011 (*sub*)

Example:

mv r0, r1

movi r3, #10

add r0, r3

Assembly language code.

000 000 001

001 011 ddd

000 001 010

010 000 011

ddd = don't care

machine code

3 起 3 3 bit
For processor
read value from
next line.

(只读这个 processor)