

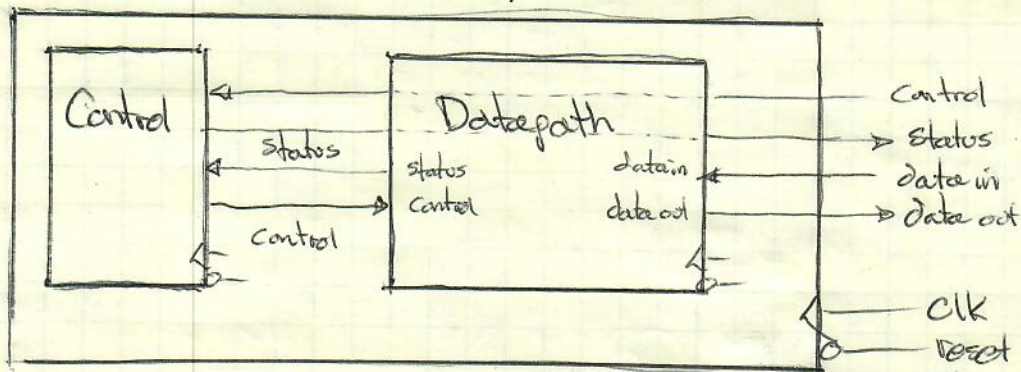
Push HW #11 back to Friday

Chapter 8 - Datapath & Control

Break design into

Datapath - perform operations needed

Control - Sequence operations

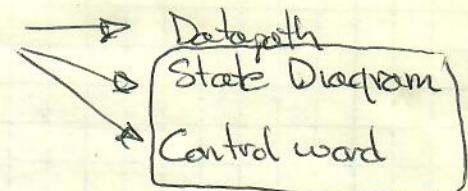


Design Process

Word Statement

→ Algorithm

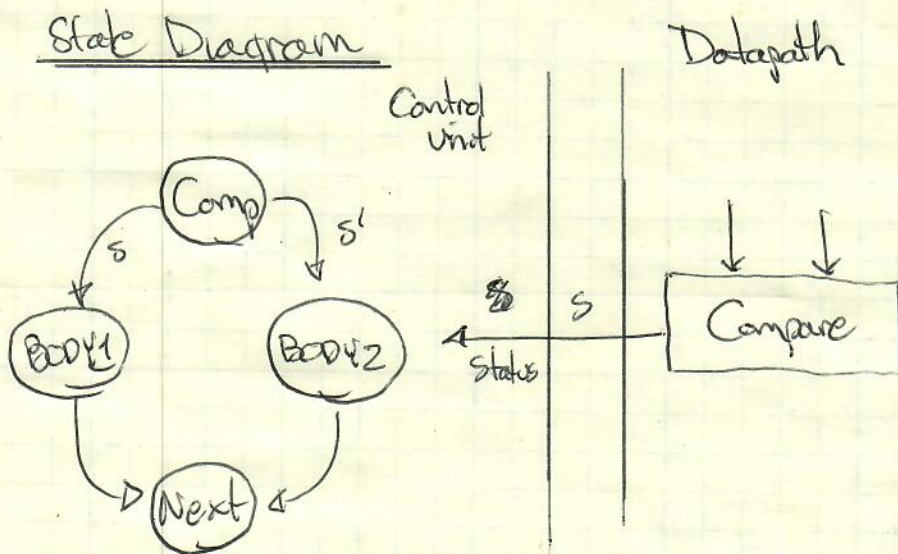
Mini C
if/then
for loop
while loop
Assignment



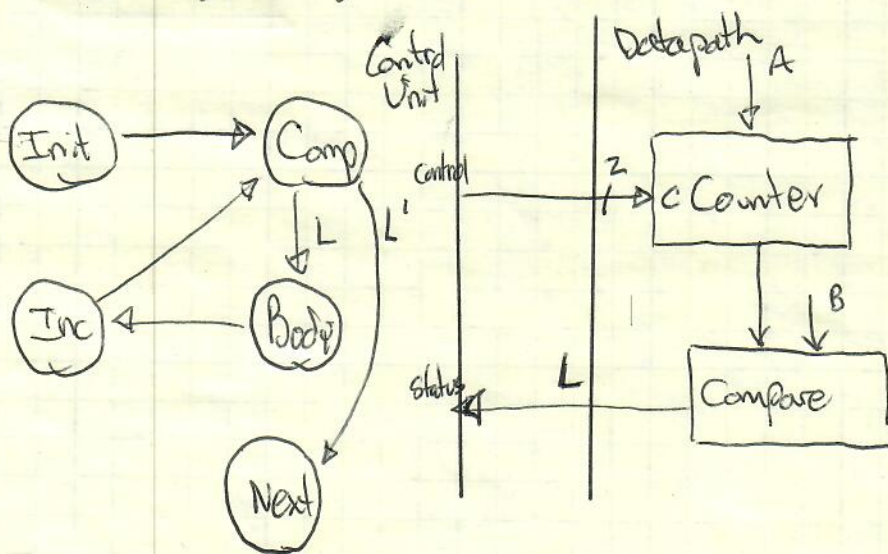
Control word

* Each line of code is parsed and converted into some components in datapath
some states in the State Diagram

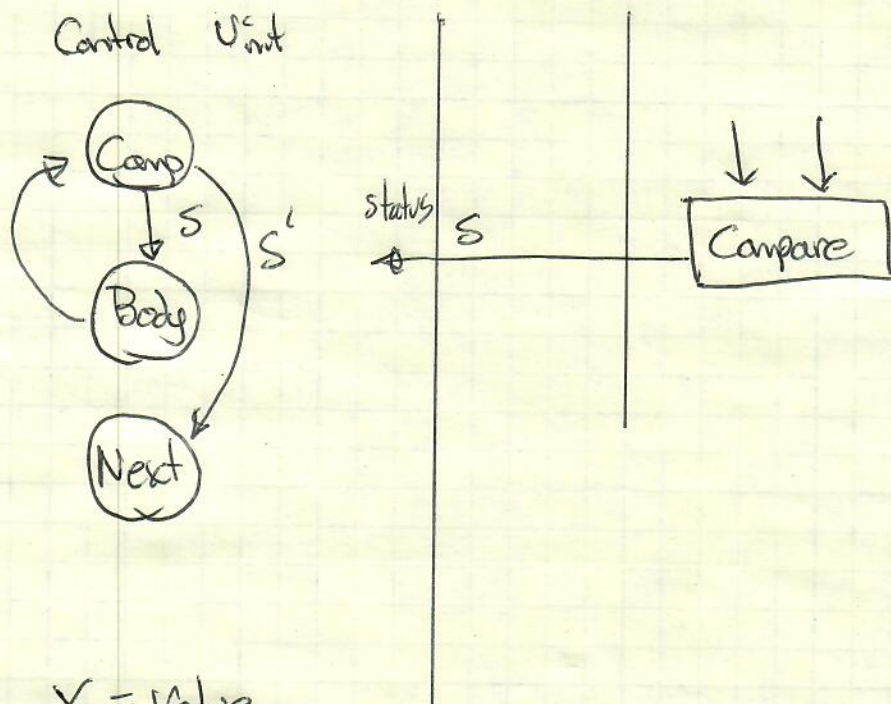
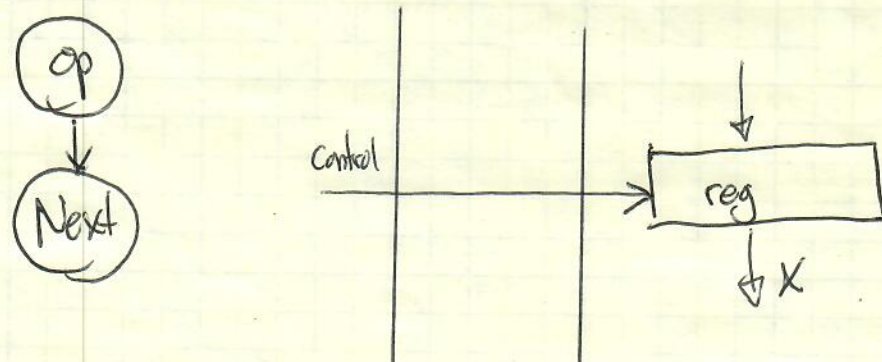
① If (condition) then BODY1 else BODY2



② for (i=A; i<B; i++) BODY



③ While (Condition) BODY

State DiagramDatapath④ $X = \text{Value}$ 

⑤ Control word Table

For each building block in datapath: include its Control bits as a column in the control word table.

The rows are the states.

Fill out control word table.

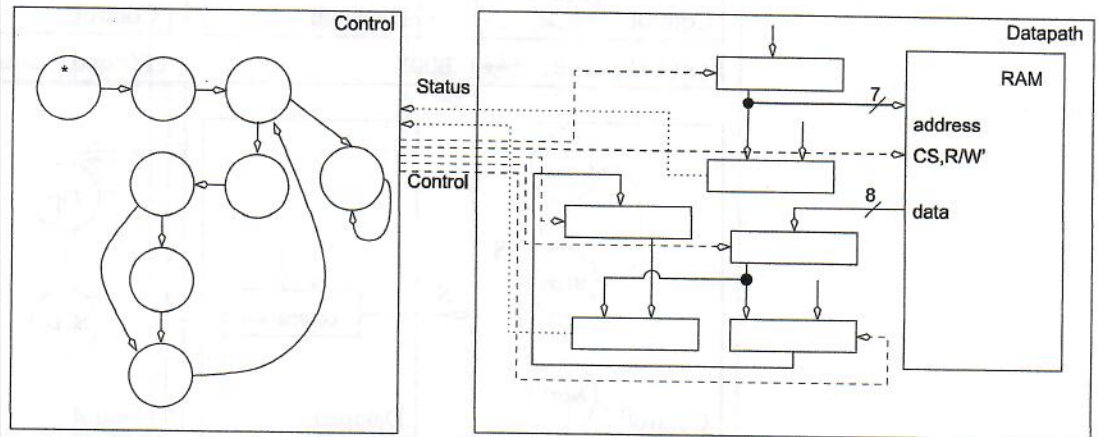
Table 8-1 from text.

Minimum Search Design a digital circuit that looks for the smallest 8-bit integer in a 128x8 bit RAM. The numbers are stored at addresses 0...99, you may assume that the RAM is preloaded with data.

```

1. min = 0xFF;           // Set the min reg to largest value
2. for (i=0; i<100; i++) { // Search through the entire array
3.     MBR=RAM[i];        // read an 8-bit value from the RAM
4.     if (MBR<min) then   // If MBR is smaller than min
5.         min = MBR;     // then set min to the smallest value
6. } // end for

```



State	CS	RE	WE	Reg Min	Min mux	Counter	MBR
	0 off	0 idle	0 idle	0 hold	0 load FF	00 hold	0 hold
	1 active	1 read	1 write	1 load	1 load MBR	01 load	1 load
						10 count	
						11 reset	
InitMin							
InitI							
CompC							
Read							
CompM							
NewMin							
Inc							
Done							