

EE 4980
Modern Electronic Systems

HW 7

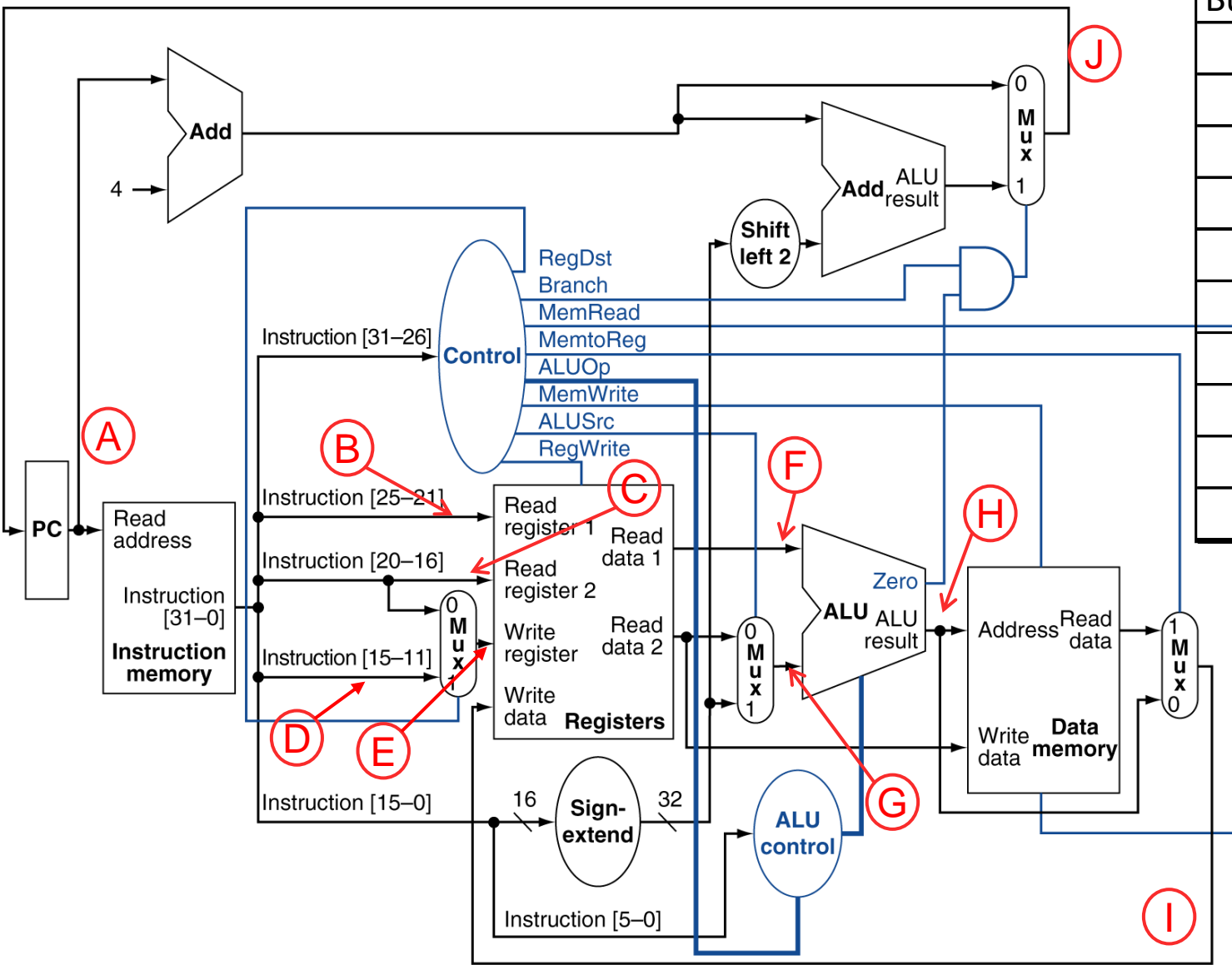
1) MIPS Assembly – 205pts

Convert the following assembly to MIPS machine code(hex please):

```
add    $t0, $s6, $s5  
addi   $t1, $s3, -18
```

2. After completion of the instruction “add \$s3,\$s3,\$t7” indicate the value of each data bus. Assume \$s3=0xABCD, \$t7=0x1234, and the instruction was located at memory location 0x100C, use x for unknown

unknown - 30pts



Bus/Wire	Value (hex)
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

Pipeline

20pts

The 4 stages of a data path have the following latencies

Stage 1: 200ps, Stage 2: 400ps, Stage 3: 300ps, Stage 4: 100ps

Pipelining these stages adds 20% to the latency of each stage

a) Should you create a pipeline or not? (show your work)

b) At what latency penalty (%) does your decision change? (show your work)

For the following RADAR system, calculate the maximum range in Km
a 3m x 3m target could be detected at 25 pts

I suggest you put this in a spreadsheet or program

I suggest you do your calculations in dB format

RADAR SYSTEM PARAMETERS

Peak Power	61.46 dB	W
Antenna Aperture	5 m x 3 m	
Pulsed Signal Frequency	2.8 GHz	
Pulse Width	600 ns	
Pulse Repetition Rate	1200 Hz	
Receiver Noise Bandwidth	61.7 dB	Hz
Effective Noise Temperature	29.5 dB	K
Typical system Losses	8 dB	
Antenna Rotation Rate	12 rpm	
Azimuth Beamwidth	1.3 °	
Antenna beam forming losses	10 db	
S/N / dwell , min for detection	12 db	