4. RAT ASM and Memory (15)

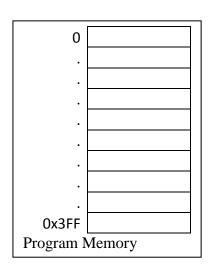
Figures 1 and 2 show the current contents of the register file and of the scratch pad memory. The following program is executed.

```
;- Memory Designation Constants
.DSEG
.ORG
        0 \times 00
;- Main program
.CSEG
.ORG
             0x57
      ST
             R1, (R4)
      ROR
             R5
      LD
             R4, (R3)
             R4, R30
label: EXOR
      BRNE
             label
```

- 1. Write the machine code for each instruction and fill in the prog_rom using 5 hex values. If there are any don't cares in the instruction, use '0' for the don't care. Label the address of each row you fill in.
- 2. Modify the register contents in the figures to show how the register contents and memory contents change as a result of execution.

0	0x08
1	0x62
2	0x0F
3	0x00
4	0x02
5	0xFD
•	
30	0x32
31	0x44
Register File	

0x23	
0x11	
0xF9	
0x1F	
0x54	
0x0B	
0x28	
0x54	
Scratch Pad Memory	



5. RAT ASM Interpretation (10)

Assume that the register R3 is initialized to 19 and the register R2 is initialized to zero. What is the value in R2 when the code reaches done? Explain your answer.

MOV R1, 0x00loop: CMP R1, R3 BRCS else BRN done R2, 0x02else: ADD R2, 0x0AXOR SUB R3, 0x01 BRN loop

done: