

1. This exercise is meant to be started during the class meeting and completed individually outside class. **Please work in groups of three to six people.** (If you need help then let me know and I will assist.) List the members of your group below. Underline your name.
  
2. Illustrate the computation  $42 - 17$  in binary using the two's-complement method in a manner similar to Figure 3.1 of the the COAD<sup>1</sup> textbook.
  
3. Indicate which of the following operations *on 4-bit signed operands* result in an overflow and *how overflow is detected* in each case: (a)  $2 + 3$  (b)  $5 - 7$  (c)  $-5 - 7$  (d)  $5 + 4$
  
4. Repeat Question 3 for the following operations *on 4-bit unsigned operands*: (a)  $2 + 3$  (b)  $14 - 5$  (c)  $9 + 11$

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<sup>1</sup>David A Patterson and John L Hennessy, *Computer Organization and Design RISC-V Edition*, 2nd edition (Morgan Kaufmann, 2020).

5. Provide RISC-V assembly code, for a RV32 RARS(M) environment, that reads two bytes from the data segment, adds them, and stores the result into the second one. Briefly explain your code.

6. Depict the states of the relevant words of the data segment and registers before and after the code of Question 5 is executed. Explain your answer.