CSI 30, Homework 7 on sections 3.1, 4.1

Due by Wed, Apr 19.

Please use lots of space and explain your answers, showing clearly any work you had to do. Each question is worth 3 points for a total of 15.

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(1) Show all the steps used by the procedure *bubble sort* to put the list $8, 9, 4, 2, 7$ into increasing order as follows. List the numbers in a column and show what happens to them in the first pass. Then show what happens in the next passes.

(2) Explain why each of these are true or false:

(a) $2 \mid 14$

(b) $3 \mid 179$

(c) $24 \mid 0$

(Hint: the symbol $\mid$ means "divides", so the first one is saying "2 divides 14". Written in full it is saying "2 divides evenly into 14 (with zero remainder)".)

(3) If you divide an integer by 11 what are the possible values of the remainder?

(4) In this question we are dividing 221 by 7.

(a) Find 221 **div** 7. (That's the quotient.)

(b) Find 221 **mod** 7. (That's the remainder.)

(c) What does $a = dq + r$ in the division algorithm say in this example?

(5) Explain why these are true or false:

(a) $31 \equiv 15 \pmod 5$

(b) $200 \equiv 200 \pmod 7$

(c) $3785 \equiv 1970 \pmod{11}$

If you get stuck on a question or aren't sure if you understand it:

- Go over the relevant class notes and section in the textbook.
- Check if you get the right answer for a similar odd-numbered question in the textbook (answers at the back of the book).
- Ask me about it after class.
- Come to my office hours: Tue 3 - 4, Wed 3 - 4 in CP 317.
- Go to the Math Tutorial Lab in-person in CP 303 or online.