CS 261 HW4

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Due Weds, March 3

This homework covers material from Chapter 3.2 up to and including Chapter 3.6 in the textbook.

1. Prove that $x^2 - 10x - 2$ is $O(x^2)$. Don't forget to solve for the correct values of c and n_0.

2. Explain what it means for a function to be $\Omega(1)$

3. Exercise 3.2.60

4. Describe how the number of comparisons used in the worst case for BubbleSort changes when the size of the list to be sorted doubles from n to 2n

5. Prove or disprove that for integers if $a|bc$ then $a|b$ or $a|c$ for integers a, b, c. (Be careful)

6. List 5 integers that are congruent to 1 modulo 12

7. Which of the following integers are congruent to 2 modulo 7? 2, 3, 16, 14, -2, -10

8. Find $gcd(123, 277)$ and $gcd(1349, 1786)$ using Euclid's algorithm - show your work

9. Decrypt the following message that was encrypted with a Caesar cypher: "ORJNER GUR JBBQ RYIRF!". Hint: One approach is to read the section on decryption of Caesar cyphers at the end of section 3.4 and try out the different possibilities.

10. Use Algorithm 5 in Section 3.6 to find find 7^{212} modulo 9. Show your work.

11. Prove that the product of any 4 consecutive integers is divisible by 12.