CECS 229: HW 4 (Euclid's Algorithm, Extended Euclidean Algorithm, Shift Ciphers, Hashing, Inverses)

Spring 2021

Remember, we will not be collecting or grading homework. The homework is optional but highly recommended. Quiz questions will be similar to the homework questions but not identical. Solutions to these problems are posted on BeachBoard.

1. Find the gcd of the following numbers
   a. 54, 90, 120
   b. $14x^2y^3$, $49xy^4$
   c. 12xy, $60x^2y^3z$, $30x^3y^5z^8$

2. How many division steps (**minimum**) of Euclidean Algorithm are required to find the gcd of…
   a. 75, 50
   b. 21, 34

3. Write the following gcds as a linear combination using Extended Euclidean Algorithm. $\gcd(a, b) = sa + tb$. Report your s and t.
   a. $gcd\ (4, 7)$
   b. $gcd(12, 81)$
   c. $gcd(87, 182)$

4. Encrypt the word "AlphaBet" using a shift cipher with n = 23

5. Given the following values, place them into the correct location using modular hashing with linear probing. Place them in the order in which they are written:
   - 123
   - 23
   - 34
   - 67
   - 88
   - 136
   - 107

0	
1	
2	
3	
4	
5	
6	
7	

6. If possible, find the inverses of the following:
    a. 5 mod 7
    b. 2 mod 10
    c. 7 mod 18
    d. 23 mod 35
    e. 33 mod 121
    f. 42 mod 211