Homework 10:

Exercise 1. Do the exercises 8.6, 8.7, 8.8 in the textbook.

Exercise 2. A *common divisor* of *m* and *n* is an integer that divides both *m* and *n*. The *greatest common divisor,* written $gcd\ (m,\ n)$, is the largest common divisor of *m* and *n*. Write a function to find the greatest common divisor (gcd) of two numbers in two ways (recursive and not recursive).

Exercise 3. **BEZOUT'S THEOREM:** If a and b are positive integers, then there exist integers s and t such that gcd(a, b) = sa + tb. Write a function to find s and t.

Exercise 4. Write a function to determine if a number is the product of two primes.

(hint: if $n = p \times q$, check_prime(p) and check_prime(q)…).

Exercise 5. a) Write the funtion $rand(i, n)$ to get a random number in $[0; n]$. The function defined by

$$rand(i, n) = (7 \cdot rand(i - 1, n) + 1) \bmod n,$$

Where a seed $rand(0, n)$ = s (import time

s = time.time()).

b) Write function shuffle(alist) to shuffle items in alist.

(Hint: swap alist[i] and alist[rand(i,n)])

Exercise 6. Write a function to calculate **(c**s)%z** where

$$c = 1136503834252139, s = 2413713104313437\ and\ z = 3017141490284017.$$