CPSC 1301, Computer Science I Lab Assignment

Lab 05b

Problem 1

Write a program that takes three command line arguments: stake, goal, and tries. `stake` is the initial pot of money to gamble. `goal` is the ultimate monetary goal of the gambler. `tries` is the number of bet the gambler wants to make. The odds of winning are fifty percent. The program runs until (i) the goal is reached, (ii) the pot reches zero, i.e., the gambler has lost all his money, or (iii) he has reached the number of bets he wished to make.

```
    C:\Users\ccc31\cols-st\cpsc1301\tests>a38_gambler.py 100 110 20
80% wins
Avg # bets: 1174

C:\Users\ccc31\cols-st\cpsc1301\tests>a38_gambler.py 100 110 20
85% wins
Avg # bets: 855

C:\Users\ccc31\cols-st\cpsc1301\tests>a38_gambler.py 100 200 20
35% wins
Avg # bets: 8266
```

Problem 2

Write a program that accepts a positive integer n as a command line argument and returns the prime factors of n.

```
    C:\Users\ccc31\cols-st\cpsc1301\tests>a39_factors.py 8
2
2
2


C:\Users\ccc31\cols-st\cpsc1301\tests>a39_factors.py 88
2
2
2
11


C:\Users\ccc31\cols-st\cpsc1301\tests>a39_factors.py 185
5
37
```

Problem 3

Write a program that takes two command line arguments as decimal numbers (to two places, as in dollars and cents), an amount tendered, and calculates the change in dollars, quarters, dimes, nickles, and cents.

```
    C:\Users\ccc31\cols-st\cpsc1301\tests>a40_makechange.py 33.59 40
the price is 33.59, you tendered 40.00
Your change is 6 dollars, 1 quarters, 1 dimes, 1 nickles, and 1 cents

C:\Users\ccc31\cols-st\cpsc1301\tests>a40_makechange.py 7.99 10
the price is 7.99, you tendered 10.00
Your change is 2 dollars, 0 quarters, 0 dimes, 0 nickles, and 1 cents
```

Problem 4

Write a Python program that takes two positive integers as command line arguments, items and size. `items` is the number of items that the return value contains. `size` is the length of the input list, from 0 to `size`. The program returns *items* items chosen at random from the list, with no item repeated.

```
    C:\Users\ccc31\cols-st\cpsc1301\tests>a41_sample.py 7 13
5 7 11 9 2 0 10

C:\Users\ccc31\cols-st\cpsc1301\tests>a41_sample.py 5 15
12 0 1 8 10
```

Problem 5

You want to collect a complete collection of "coupons" from 1 to n. You collect coupons at random from 1 to n. Write a Python program that implments this and reports the number of coupons you have to collect to collect one of each.

```
    C:\Users\ccc31\cols-st\cpsc1301\tests>a42_couponcollector.py 10
35
True True True True True True True True True True

C:\Users\ccc31\cols-st\cpsc1301\tests>a42_couponcollector.py 23
77
True True True True True True True True True True True True True True True True True True True True Tru

C:\Users\ccc31\cols-st\cpsc1301\tests>a42_couponcollector.py 4
4
True True True True
```

Problem 6

Write a Python program that accepts a positive integer as a command line argument and returns `true` if it is prome, `false` otherwise.

```
    C:\Users\ccc31\cols-st\cpsc1301\tests>a43_isprime.py 6
Is 6 a prime number? false
```

```
C:\Users\ccc31\cols-st\cpsc1301\tests>a43_isprime.py 7
Is 7 a prime number? true

C:\Users\ccc31\cols-st\cpsc1301\tests>a43_isprime.py 8
Is 8 a prime number? false

C:\Users\ccc31\cols-st\cpsc1301\tests>a43_isprime.py 571
Is 571 a prime number? true
```