Python Lab 5 Exercises

Question 1.

Write Python code using integer division to convert a given whole number of minutes into tuple consisting of whole number of days, hours and minutes. *For example, 3456 minutes should result in (2, 9, 36).*

Question 2.

It is claimed that the following Python code is able to *swap* the values of two variables. Check whether this claim is true or not by adding some print statements and considering at least two examples. *Include your final code and output in your answer.*

```
a = a + b
b = a - b
a = a - b
```

Question 3.

Consider the five data structures indicated in the example Python code below.

```
A = 'dog cat'
B = ['dog','cat']
C = {'dog','cat'}
D = ('dog','cat')
E = {'dog': 'cat'}
```

Write Python code to demonstrate whether each of the five data structures used above are *mutable* or *immutable* (one line of Python code per data structure). Each line of Python code should be executed separately and result in a TypeError if the data structure is immutable.

Question 4.

Consider the Python string given below. Write Python code that combines the string methods `split()` and `replace()` to return a list of words from this string without punctuation. Then modify your Python code to make sure all words are converted to lowercase and all duplicate words are removed.

```
S = 'First, solve the problem. Then, write the code.'
```

Question 5.

In two-card poker, a player is dealt two cards from a shuffled standard deck of 52 cards. Suppose each card is represented as a tuple in Python in the form of the examples below. The two cards are a *pair* if they are of the same number (2 to 14), a *flush* if they are the same suit, a *straight* if the numbers are consecutive, and a *royal flush* if they are Ace and King from the same suit.

```
cardA = ('Hearts',5)    # 5 of Hearts
cardB = ('Spades',12)   # Queen of Spades
pair = (cardA[1]==cardB[1])
```

(a) Write a Python Boolean expression that checks whether a card is a *valid* card, i.e., where the suit is one of Hearts, Diamonds, Clubs, or Spades, and the number is 2 to 10, or 11 (for Jack), 12 (for Queen), 13 (for King) or 14 (for Ace). *You can assume that the card is a tuple of length 2, with the first element being a string and the second element being an integer.*

(b) Also, write Boolean expressions in Python for *flush*, *straight*, and *royal flush* (*pair* is included above as an example).

Question 6.

Write a Python function to randomly flip a fair coin N times. Print out Tails or Heads for each flip and let the function count and return the number of Heads. *In your answer please include your Python code and the output corresponding to a function call with* $N = 10$.

Question 7.

Consider the Python function given below.

```
def mystery(A,B):
    count = 0
    n = min(len(A),len(B))
    for i in range(n):
        if (A[i]==B[i]):
            count += 1
    return(count)
```

(a) Write a suitable *docstring* that explains what the function does.

(b) Give an example call of this function to show that it is possible for the arguments `A` and `B` to have different types and the function executes successfully.

Question 8.

Consider the following Python code to store the birthdays of group of people.

```
birthdays = [('Boris', '19 June 1964'),
             ('Harry', '28 July 1993'),
             ('Donald', '14 June 1946'),
             ('Guido', '31 January 1956'),
             ('Guido', '13 April 1570')]
```

(a) Describe the data structure in the Python code above in words. *Hint: pay attention to the brackets.*

(b) Write Python code to print out each name followed by the month of their birthday in the form "Boris was born in June". *You must extract the name and month from the data structure using Python.*

(c) What issue arises if you convert the data structure above to a dictionary using the following Python code and why does it occur? Suggest a way to implement the birthday information above in a dictionary where the *key* is a person's name.

```
D = dict(birthdays)
```