Homework 6

Exercise 1. Do the exercises from 5.8 to 5.11 in the textbook.
Exercise 2. Do the exercises from 6.4 to 6.6 in the textbook.
Exercise 3. Let a message:

Machine learning; (ML) is the study of \ computer algorithms that improve automatically through# experience. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so. Machine{ learning} algorithms are used in a wide variety of applications, such as email filtering and computer() vision, where it is difficult or infeasible to develop conventional algorithms to perform the needed tasks. Machine# learning is closely related to computational *statistics, which focuses on making predictions! using computers. The study of mathematical optimization delivers methods, theory and application domains to the-- field ;of machine learning. Data mining is a related field of study, focusing on exploratory data analysis through unsupervised learning In its application across business problems, machine learning is also referred to as predictive analytics.

a) How many sentences are there in the message? Count the words in each sentence.
b) Let the set

dseb_words = {‘data’, ‘machine’, learning’, ‘mining’, ‘analysis’, ‘unsupervised’, ‘business’, ‘optimization’, ‘model’}.

1) Count the frequency of each word in dseb_words in the sentences in the message and store them in a dictionary.
2) Do words in dseb_words usually appear at the beginning or end of a sentence? (If the sentence =word_1 …word_n, then the beginning = word_1…word_n//2, and the rest is the end of the sentence).

Exercise 4. Consider the following code

```
import random
random.seed = 63

women = ['Anh', 'Chi', 'Mai']
men   = ['Bình','Đức', 'Mạnh','Minh']
names = women + men
customers = []
for _ in range(200):
    name = random.choice(names)
    age = random.randrange(1,70,5)
    price = random.randrange(100,500,10)
    customers.append((name, age, price))

customers
```

Each item on the list of customers contains the name, age, and money that must pay.

a) Create a dictionary as {'men': {(name, age): money, ...}, 'women':{(name, age): money, ...}}. Do women or men spend more money? Calculate the average amount of money spent by women and men (Same name and exact age are considered one customer).
b) The age groups are divided as follows: (0; 18], [18; 23), [23; 35), [35; 60) and over 60. Calculate the total orders, amount, and average amount by gender and age group.