Lab 6 Lists and Tuples

1. Driver's License Exam

The local driver's license office has asked you to create an application that grades the written portion of the driver's license exam. The exam has 20 multiple-choice questions. Here are the correct answers:

1. A	6. B	11. A	16. C
2. C	7. C	12. D	17. B
3. A	8. A	13. C	18. B
4. A	9. C	14. A	19. D
5. D	10. B	15. D	20. A

Your program should store these correct answers in a list. The program should read the student's answers for each of the 20 questions from a text file and store the answers in another list. (Create your own text file to test the application.) After the student's answers have been read from the file, the program should display a message indicating whether the student passed or failed the exam. (A student must correctly answer 15 of the 20 questions to pass the exam.) It should then display the total number of correctly answered questions, the total number of incorrectly answered questions, and a list showing the question numbers of the incorrectly answered questions.

Output example 1

```
Pass
Number of correctly answer:  17
Number of incorrectly answer:  3
Questions you got wrong were
4
8
12
```

Output example 2

```
Pass
Number of correctly answer:  19
Number of incorrectly answer:  1
A question you got wrong was
14
```

Output example 3

```
Pass
Number of correctly answer:  20
Number of incorrectly answer:  0
```

Source: Gaddis, T., & Agarwal, R.. Starting out with Python. Pearson

2. Population Data

The file 'ThaiPopulation.txt' contains the number of population in Thailand during the years 2550 through 2560. Each line in the file contains year and the number of population in that year. Write a program that reads the file's contents into a list. The program should display the following data:

• The average annual change in population during the time period

• The year with the greatest increase in population during the time period

• The year with the smallest increase in population during the time period

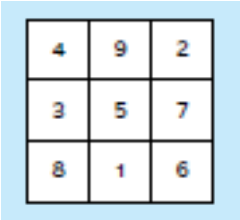
Output example

Average annual change: 315025.6 Greatest increase: 2557-2558 Smallest increase: 2551-2552

Source: Modified from Gaddis, T., & Agarwal, R.. Starting out with Python. Pearson

3. Lo Shu Magic Square

The Lo Shu Magic Square is a grid with 3 rows and 3 columns, shown in Figure below.

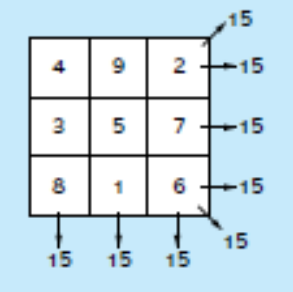


The Lo Shu Magic Square has the following properties:

• The grid contains the numbers 1 through 9 exactly.

• The sum of each row, each column, and each diagonal all add up to the same number.

This is shown in Figure below.



In a program you can simulate a magic square using a two-dimensional list. Write a program that simulates a magic square 100,000 times and determines whether the simulated square is a Lo Shu Magic Square. Print out only the simulated square that is a Lo Shu Magic Square.

Output example 1

```
Simulation # 52090 is a Lo Shu Magic Square
8 1 6
3 5 7
4 9 2
Simulation # 88055 is a Lo Shu Magic Square
2 9 4
7 5 3
6 1 8
```

Output example 2

```
Simulation # 68798 is a Lo Shu Magic Square
6 1 8
7 5 3
2 9 4
Simulation # 83215 is a Lo Shu Magic Square
8 3 4
1 5 9
6 7 2
```

Source: Modified from Gaddis, T., & Agarwal, R.. Starting out with Python. Pearson