Exercise of Programming Language, Homework E5

Write 5 Python programs to solve the following questions. Please name your program files as *Q1.py*, *Q2.py*, and so on, *i.e.*, according to the serial number of questions. All data files you need for this homework can be obtained from the e3 system.

1. Given an integer variable *n*, write a program to print out a rhombus, the boundary of which is composed of "*"s. The widest place of this rhombus should be the n^{th} line. For example, if *n* = 5, your rhombus should look like this:

```
    *
   * *
  *   *
 *     *
*       *
 *     *
  *   *
   * *
    *
```

2. Write a program to extract the exon fragments from the DNA sequence available in *genomic_dna.txt* and output the concatenated (merged) sequence of these exons into *genomic_dna.coding.txt*. The range of exons are listed below.

   Exon 1: form the 1st nucleotide to "GTA" (GTA included)
   Exon 2: from the 90th nucleotide to the end of the original sequence

3. Write a program that will compute and print out the summation of all odd numbers between 1 and 10000 (including 1).

4. Using the *protein.txt* file, write a program that will extract the odd number residues and concatenate them into a new sequence. Do the same to the even number residues. Note that here we have to consider the first residue of the protein sequence to be numbered as 1 (rather than 0). Your output may look like this:

```
Odd residues : ACAQT…
Even residues: GNGLV…
```

5. Write a program with loops that will print out a matrix **EXACTLY** the same as the one saved in file *matrix.txt*.