

2017 Summer Entrance Examination

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Programming

INSTRUCTIONS

1. Do not open this problem brochure until the signal to begin is given.
2. Write your examinee ID number below on this cover page.
3. An answer sheet and a draft sheet accompany this brochure. Write down your examinee ID number on these sheets.
4. You may choose any programming language to answer.
5. You may consult only one printed manual of a programming language during the examination. *You can use or copy any libraries or program fragments stored in your PC, but you may not connect to the Internet.*
6. By the end of the examination, make a directory/folder on your PC, whose name is the same as your examinee ID number, and put your program files and related files into the directory/folder. Copy the directory/folder onto the USB flash drive that you received.
7. At the end of the examination, the USB flash drive, the answer sheet and the draft sheet will be collected.
8. After these are collected, stay at your seat, until all the examinee program results have been checked briefly by the test supervisor.
9. After the brief check, try to save your program execution environment on the PC so that you can run your program as soon as possible during the oral examination in the afternoon.
10. *Leave your PC and this brochure together in the room for the oral examination and stay out of the room until you are called.*

Examinee ID _____

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Programming

We draw digits from 0 to 9 by the following pictographic characters constructed by * and | (vertical line). *, |, and a whitespace character are rendered with a fixed-width font.

```

**** * **** **** * * **** * **** **** ****
|   | |   |   |   |   |   |   |   |   |   |   |
*   * *   *   *   *   *   *   *   *   *   *   *
|   | |   |   |   |   |   |   |   |   |   |
**** * **** **** * **** **** * **** **** *

```

(1) Write a program that draws the pictographic characters representing the input number on the screen and then stores them in the file `out1.txt`. The pictographic characters are horizontally aligned. The space between two pictographic characters is two whitespace characters.

For example, when the input number is 813, the program will draw and store the following pictographic characters:

```

**** * ****
|   | |   |
**** * ****
|   | |   |
**** * ****

```

(2) Write a program that reads the pictographic characters stored in the file `out1.txt` generated in (1), recognizes them, and prints the number they represent.

(3) Write a program that draws the pictographic characters for the input number, considering the specified spaces and vertical positions, on the screen and then stores them in the file `out3.txt`. The input is comma-separated integers. From the beginning, they are the number drawn (non-negative integer), the vertical position of the first digit (non-negative integer), the space between the first and the second digits (positive integer), the vertical position of the second digit, the space, ... and the vertical position of the last digit. For example, when the input is the following numbers:

813,0,4,1,3,2

the program draws 813. 8 is drawn from the zeroth line, 1 is from the first line, 3 is from the second line. The space between 8 and 1 is four whitespace characters and the space between 1 and 3 is three whitespace characters. The pictographic characters will be drawn as follows:

```

****
|   |   *
****   |   ****
|   |   *   |
****   |   ****
      *   |
      *   ****

```

(4) Write a program that reads the pictographic characters stored in the file `out3.txt` generated in (3), recognizes them, and prints the number they represent.

(5) Create a copy of the file `out3.txt` generated in (3), and name it `out5.txt`. Modify the pictographic characters in the file `out5.txt` by hand to have a slightly different shape. After the modification, the size of each pictographic character is still five by four except that the size of the pictographic character for the digit 1 is either five by one or five by two. For example, the contents of `out5.txt` after modification may be 8167 represented as follows:

```
  **      *      ***      ****
|  |      |      |      |
**      |      |      *
|  |      *      ****      |
**      |      |      |      *
      *      ****
```

Write a program that reads the pictographic characters stored in the file `out5.txt`, recognizes them, and prints the most probable number they represent.

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