# Programming Assignment 1: Scratch-off (Lottery) Ticket

Deadline: 4/28(Sun) 23:59:59 (No late submission)

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1. Introduction


You are now playing a scratch-off (lottery) ticket. You can win $50,000USD if you can find the winning number in one of your numbers. For convenience, you plan to firstly sort your number in an increasing sequence, and then perform the matching between the winning number and the sorted sequence. You are now request to write a RISC-V program to sort 10 your numbers in the increasing order, and then provide the position of the winning number if it matches one of your numbers.

2. Example

Assume the winning number is 15 and your numbers are 99 1 5 65 10 45 23 36 15 74. The program will sort your numbers in increasing order as 1 5 10 15 23 36 45 65 74 99. Then the program can find that the winning number 15 is located in the $4^{th}$ position of the sequence.

3. Input Format

The input file consists of 11 lines. The first line gives the winning number, and the following 10 lines give your number. All the numbers are unsigned numbers. The range of each number is between 0 to $2^{64}$. The input of the above example is:

```
15
99
1
5
65
10
45
23
36
15
74
```

4. Output Format

   The program will firstly print the increasing order sorted sequence, and then gives the position of the winning number in the sorted sequence. If the program cannot find the winning number in your numbers, it will output 0. The output of the above example is:

```
1 5 10 15 23 36 45 65 74 99
4
```

5. Evaluation

   Your assignment will be scored according to (1) the correctness of your output, (2) the readability of your source code, and (3) the demo session. You have to implement the RISC-V assembly program by yourself. Using existing tools to generate RISC-V assembly code from C/C++ code is prohibited and doing so will lead to 0 score for this assignment.

   The demo session will be held after the deadline and you have to explain your code to TAs. Absence from the demo session will lead to a huge penalty of your PA1 score.

6. RISC-V Simulator

   Please refer to https://github.com/riscv/riscv-isa-sim

7. Submission

   Please submit your source code to Portal system. The deadline is 4/28(Sun) 23:59:59 and no late submissions would be accepted. Please name your file as “PA1_your_student_ID”.

If you have any question, please E-mail to TA or me. Good luck!