

Advanced Coding Practice

HW Problem #1

2023 Fall, CSE4152
Sogang University



Finding Celebrities

A celebrity is defined as a person who is known by everybody but does not know anyone. How can you find any celebrities among N people?

You can freely ask anyone as follows: "Hey, you know Mr. (or Ms.) X?"

Suppose that there are N people. Design a method that

- a) determines whether there is some celebrities among the people
- b) if there is any celebrities, find them efficiently (minimizing the number of questions you make).

Minimum calculation

Imagine an electric calculator which has only two arithmetic operations, i.e., assignment operation ($:=$) and multiplication operation (\times). We want to let this machine compute $b = a^n$ for given numbers a and n . Design a method that produce a code for this machine, minimizing the number of multiplications.

Example when $n = 16$

$x_1 := a;$

$x_2 := x_1 \times x_1; // a^2$

$x_3 := x_2 \times x_2; // a^4$

$x_4 := x_3 \times x_3; // a^8$

$x_5 := x_4 \times x_4; // a^{16}$

$b := x_5$