

Homework 13 (Deadline **15:00, June 23**, submit your files to TronClass)

Please submit the source code only. The file name should include your student ID number. For example, if your ID number is 406290123, then the file names for problems 1 and 2 should be **406290123_hw13_1.cpp** and **406290123_hw13_2.cpp**, respectively.

1. Admission

Task Description

We want to determine the M students to enter our university according to their grades in the entrance examination. The examination contains five subjects: Chinese, English, Math, Science, and Social Study. We will admit students according to the following rules. We first compare the total scores from all five subjects, and admit the top M students with highest total scores. If there are ties in the total scores, we will compare (in this order) their scores of Math, English, Science, Chinese, and finally Social Study.

There could be extra-admission. That is, if the M -th student has the same scores on all subjects as the $(M+1)$ -th student, then we will admit all these students (with the same scores on all subjects) until we find the next student that has a lower priority. Please refer to the following example. The sorted student ID list (in decreasing priority) will be 0, 2, 1, 3, 4. Now if M is 3, we will admit students 0, 2, 1, and 3 since students 1 and 3 have the same scores in all subjects. We will not admit student 4 since he has a lower score than student 3, and the extra-admission stops.

Student ID	Chinese	English	Math	Science	Social Study	Total
0	100	100	100	100	100	500
1	100	100	100	100	80	480
2	100	100	100	100	100	500
3	100	100	100	100	80	480
4	100	100	80	100	100	480

Admission quota: three students

Final admitted students (by ranking): 0, 2, 1, 3

Input Format

The scores of the students are listed in the file, "score.txt".

The first line has two numbers M and N. M is the number of students to admit and N is the total number of students. The following N lines are scores of students. There are six numbers in each line: student ID and five scores of each subject in the order of Chinese, English, Math, Science, and Social Study.

$0 < M \leq N \leq 20000$

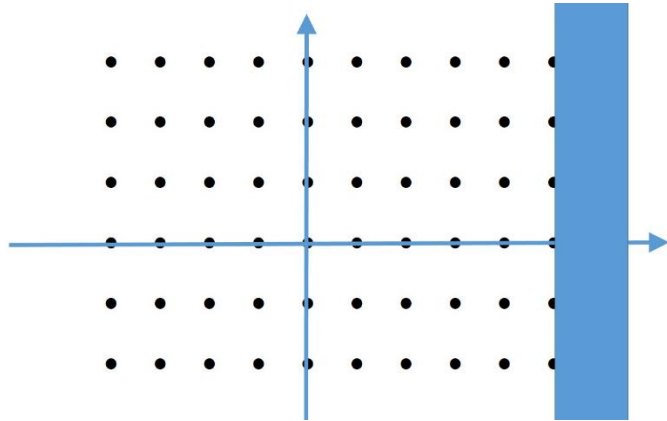
$0 \leq \text{score} \leq 100$

Output Format

The output lists the admitted students' ID by ranking. Send the list to a file, "admission.txt". If there are students with the same scores on all subjects, then output the student with smaller ID first.

2. Two-dimensional Random walk with a wall

Write a program to simulate two-dimensional random walks of an object on a lattice with a wall at $x=5$. The probabilities for taking steps in all four directions are equal. The length of step is 1. However, when the object is located at the wall, it can take steps in the other three directions with equal probability.



Your program must fulfill the following requirements. Generate 50000 walks of 100 steps starting from the origin. You have to obtain both the x and y coordinates of the final position at the end of each walk. The square of distance is defined as $D=x^2+y^2$.

Output the probability of all possible x-coordinate of the final position. The probability is defined as $N(x)/50000$, where $N(x)$ is the number that x is the final position x.

X	Probability
-100	xxx
-99	xxx
.....
5	xxx