Introduction

CUMCM (The Contemporary Undergraduate Mathematical Contest in Modeling) is an annual contest for undergraduates all over the world, organized by CSIAM (China Society for Industrial and Applied Mathematics). It has been held annually since 1992. In the year of 2010, more than 17000 teams (more than 50000 students) from over 1100 institutions participated in the contest.

In the contest, three students (it does not matter they are from majors in mathematics or from non-mathematical fields) advised by at most one teacher form a team. The team's task is to develop in three days mathematical and/or computer models to solve a simplified real-word problem in engineering, management, etc. During the contest days, the students can use any references or materials they can find (including the materials on the INTERNET), but discussions with the advisor or out-of-team members are forbidden. The role of the contest is to improve students' understanding of mathematics, especially mathematical modeling and mathematical software, and to enhance students' motivation for studying mathematics and to cultivate students' creativity and overall ability.

Date and Time

The contest is organized every year. CUMCM-2011 will start at 8:00AM 9th September 2011 and end at 8:00AM 12th September 2011 (Beijing Time).

Registration

For the participants from regions other than mainland China, their registration fee will be waived off. Please register through the website **http://en.mcm.edu.cn** before **6:00PM, 1st Sept.**, 2011 (Beijing Time). For registration, each team must sign up an account in this website, and then provides registration information through "Membership".

The Awarding system

The teams are rewarded as first and second prizes with certifications issued by the organizer. All other teams that successfully participate the contest will get certifications of "Successful Participation".
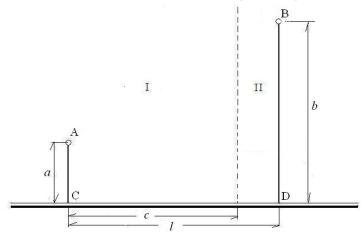
Sample Problem: **Expo 2010 Shanghai**   **CUMCM 2010**

The Expo 2010 Shanghai is the first time in the history that China hosts "The World Exposition". From 1851 when the first expo was hosted by London, it has been becoming an important stage on which every country can show its culture and history, demonstrate the leading edge technologies, and share its vision on the future development.

Please carefully select a proper aspect of Expo 2010 Shanghai, try to build a mathematical model to describe this aspect; then by collecting and leveraging the data from Internet, to do a quantitative evaluation on the influence of Expo 2010 Shanghai.

The oil field corporation plans to build two oil refineries on the same side of a railway and to build a new train station to transport the refined gasoline. Since this scheme is popular, the designer wants to set up a general mathematical model and develop a related mathematical method for minimizing the cost of the pipeline construction.

1. Give your design for the different distances between two refineries and the different distances of the refineries to the railway. If there is a part of the pipeline shared by two refineries, you should consider either the situation of the shared pipeline being cost same of the pipeline used only by a single refinery or the situation of different costs.

2. Now we should give a specific design for a more complicate case. The locations of the refineries is shown in the following figure, where refinery A is located in the suburb (area I in the figure), refinery B is in the downtown (area II) and two different regions are partitioned by the dashed line and the distances denoted by letters in the figure are $a = 5$, $b = 8$, $c = 15$, $l = 20$ (unit: km).

The cost of each kilometer of pipeline is 72 thousands RMB and some extra expenses should pay while the pipeline across the downtown. To estimate those extra expenses, three engineering consulting firms are employed to give their evaluations among them, firm 1 is of qualification A and the other two are of qualification B. The resulting evaluations are:

Engineering consulting firms	Firm 1	Firm 2	Firm 3
Extra expenses (thousands RMB/km)	210	240	200

Please give your design for the pipeline planning and the corresponding cost.

3. To save more for this practical problem, we try to use pipeline with different diameter according to the productions of these two refineries. Then the pipeline for refinery A costs 56 thousands RMB per kilometer, the pipeline for finery B costs 60 thousands RMB per kilometer and the pipeline shared by them costs 72 thousands RMB per kilometer. The extra expenses for across downtown are the same as above. Give the optimal pipeline planning and calculate the corresponding cost.

Inquiries

If you have any questions concerning the contest or registration process, please visit the website **http://en.mcm.edu.cn**, or contact:

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