The role of reactive and game tasks in competitions

The story

Each task in the IOI, traditionally, is described as a real life situation and in some cases with characters endowed with real names and real habits.

The story

The students at first have to throw off the story and to discover the real problem to be solved and programmed. Sometimes this is quite natural, when the story and the problem are in harmony, but it happens that this may not be so easy especially when the story does not fit well with the problem.

The story

When the task is a game one there is no need for a story. The story and the problem almost are the same.

The size of input data

In almost all competitions the input data is a real problem in itself when very large files are to be constructed. The concern for such large files is related to the aim to estimate the efficiency of algorithm used by the student. Sometimes the enormous quantity of input data is far from being a natural description of a real world situation as the story pretends to give.

The size of input data

In reactive tasks, especially in game tasks, the input data is not such a concern for the author.

In game tasks given in IOI the input data are quite natural and fit perfectly with the story.

*Task **4*** (Long-list of tasks, IOI'1990, Minsk, Belarus). *Given integer number K. A strip of paper is divided into N cells ($K \le N \le 40$). Two players choose and cross out K empty adjacent cells one by one. The winner is the one who has made the last move.*

In this task the input is ***only two integers*** *K*, *N* where $K \le N \le 40$.

This is not the case in some IOI batch tasks

SEEING THE BOUNDARY (IOI'2003, Kenosha, USA).

The size of input data

- Farmer's Don ***field*** is 500km X 500km = 250 000 square km! This is almost the surface of Italy!
- This looks not as a farm but as a stone depository with as many as 30 000 huge rocks!
- Farmer Don himself must be cautious not to touch a rock, not to stand ***within*** a rock, and not to stand on a rock!

Inventing strategy

Being quite natural and endowed with a rich flavor of challenge, the reactive tasks and game tasks arouse the interest of the student for not only trying to win a game but to discover the best algorithm that ensures the victory when they have to move first. Even when the contest is finished, students are more biased to discuss game tasks with the aim to discover what they missed doing during the contest.

Not only competition

Using computer games is an effective way to teach computing skills, and utilizing course curriculums that teach how to program computer games would invariably teach the basic skills required to program anything.

Not only competition

Programming games will endow the students with some skills which will be very useful for their future activities. Nowadays the computer game market is in expansion and the students will be the future programmers and more.

Not only competition

As Gordon Novak Jr. noticed: “Games are good vehicles for research because they are well formalized, small, and self-contained. They are therefore easily programmed. Games can be good models of competitive situations, so principles discovered in game-playing programs may be applicable to practical problems”.

Reactive tasks

According to the IOI 2008 Competition Rules for the reactive tasks the task statements should define among others:

*** the interface specification of the "opponent" library,**
*** explanation of how to interact with the "opponent" library,**
*** instructions on how to compile their programs with provided "opponent" library,**

These are the same characteristics as the game tasks where the player 1 (the contestant)
plays against the player 2 (the opponent library).

From the first IOI till now there have been 23 reactive and game tasks versus 97 batch ones. There are only two IOIs where two game tasks were presented – IOI'2001, Tampere, Finland and IOI'2006, Merida, Mexico.

Perhaps there are two HSC leaders fond of game tasks – Jyrki Nummenmaa, and Cesar Cepeda.

The reactive tasks and especially game tasks at the IOI must be considered as very useful tool for making this event more attractive to the students. These kinds of tasks are very challenging, and students are very motivated to undertake their programming. These kinds of tasks are very close to real life situations, and the students do not spend too many efforts understanding or remembering them. The game tasks are in harmony with the story describing them and do not need too much input data.

Thank You for attention!