ISPD & IEEE/CEDA 2006 Placement Contest:

Call for Participation

We announce the 2nd placement contest! The first placement contest was held during International Symposium on Physical Design (ISPD) 2005. It was a huge success with participations from several high quality academic placers. Through out the event, a new set of industrial placement benchmarks were released to further accelerate developments in placement research. We'd like to continue this tradition and

You are invited to participate!

The next ISPD is being held April 9-12, 2006 in San Jose, California. The placement contest will be held again just prior to the symposium. To participate, the contestant must register by January 22th, 2006. Registering will allow you to receive a few sample benchmarks and relevant perl scripts that you can test your placers. For the main contest, this time, the benchmarks will not be distributed until after the contest. The administrator will run each placer on each benchmark himself and measure quality and CPU time. Therefore, each contestant must submit a final placer executable by March 27, 2006. The quality of placement solution will be measured by the following function:

HPWL(1 + CPU_penalty_factor + Placement_congestion_penalty_factor)

The purpose of CPU_penalty_factor is designed to gently encourage CPU performance. For example, if placer A finishes in half the time of placer B, with perhaps 3% worse wirelength, then A would be considered roughly equivalent to B. So, A would get a benefit of -0.03 for CPU_penalty_factor. The exact penalty factor will be determind later. The intention is to encourage placers to get faster but not at the cost of significant solution quality. For example, a very fast random placer will still not be at all competitive.

For the placement_congestion_penalty_factor, the placement region will be divided into a set of equal-sized bins, around 10 to 12 circuit row highs. The benchmark will have an associated target density (TD) that the placer should try to obey. For example, if TD=0.7, every bin should be less than or equal to 70% occupied. The idea behind this objective is to improve routability, allow space for buffering and gate sizing, allow space for the clock tree to be inserted later, etc. In other words, this spacing helps make the placement instance more realistic. However, we do not want the target density to become a strict constraint. So instead, we will incorporate it into the objective function. For bins that slightly violate the target density, there will be a very small penalty. Larger violations result in a larger penalty. We will supply a perl script that analyzes the placement and scores the placement_congestion_penalty_factor well before the contest. Again, the intent is to encourage the placer to be able to spread the design while not forcing it to every bin. The maximum possible penalty will likely not exceed the value k*(1-TD) with small constant k. The lower the target density is, the more spreading is required and the higher the penalty will be for not spreading.

A placement solution must be legal in order to be considered. The exact scoring function based on these factors will be announced later. There may potentially be awards for several different categories, and there will be at least $4000 in prize money (and perhaps more) available to the winning placers.

The contest will include 4-6 real industrial designs with sizes ranging from 300K-2.5 M objects. The designs will again come from ASICs, but some of the characteristics will be a bit more diverse. In particular, **some large blocks may be moveable** and some designs may have **higher densities**. The specifics of the contest designs will be posted to ISPD website later, but before the contest. The Bookshelf file format will once again be used.

Please make note of the following:

- Gi-Joon Nam from IBM Research will be administering the placement contest. Any questions about the contest should be directed to him at **gnam@us.ibm.com**.
- To enter the contest, you must register by January 22th, 2006 by sending email to the contest administrator. Include the name of the placer, the names of the developers, and the affiliation.
- On January 30th, 2006, we will make a few sample benchmarks and some perl scripts available to participating teams to test your placer.
- By February 6th, 2006, each team must submit a placer executable and a script to test running it on administrator's platforms.
- By March 27th, 2006, a contest placer executable and a script must be submitted to the contest administrator.
- Results of the contest will be announced during ISPD 2006.