Problem A: Reinforcement Logic Optimization for a General Cost Function

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Q&A

Q1. I have some questions regarding Problem A. Firstly, I would like to know if there is a specified programming language for this competition? If Python is allowed, could you please provide the versions of the packages that can be used? Thank you for your response.

A1. We allowed C/C++ and Python. If you use additional packages, please prepare all of them in the submitted directory and make sure it works well in the contest environment.

Q2. 您好，我是今年的參賽者，想請問：對於 A 題的繳交格式，是只能繳交一個執行檔嗎？CMake build 出來的 dynamic linking library files(.so)是可以一併繳上的嗎？例如繳一個資料夾 Release，裡面有一個執行檔與許多 so 檔，且可以使用 A 題指定的 command 來執行，這樣是被允許的嗎？
Hello, I am a participant this year and I would like to inquire: Regarding the submission format for Problem A, are we only allowed to submit a single executable file? Can we also include dynamical linking library files (.so) built using CMake? For example, can we submit a folder named "Release" containing an executable file and many .so files, which can be executed using the command specified for Problem A? Is this allowed?

A2. Yes, your scenario is allowed. Please put everything need in the submitted directory and make sure it works well in the contest environment.

Q3. I have a question regarding Problem A. In problem A, can we use another method instead of Reinforcement Learning? Thank you for your response.

A3. Yes, you can use any method to solve this problem.

Q4. We encountered some problems when we tried to implement Problem A.
The following are our questions:

1. Does the test machine support the AVX, VNNI, AVX512F and AVX2 instruction
   sets?
2. How to judge whether multi-threaded or multi-processed is used during the contest?
3. We want to ensure whether the time limit for each case is 8 hours.

A4.

1. The test machine supports the AVX, AVX512, and AVX512F instruction sets.
2. The guideline is that a single run can use only one CPU at most.
3. Yes, for each case the time limit is 8 hours.

Q5. I am writing to seek clarification on a few aspects of Question A in the upcoming competition. Your guidance on the following queries would be greatly appreciated:

1. Could you please inform me about the release date for the Black Box Estimator and its examples?
2. Considering that the topic involves machine learning, I am curious to know whether the organizers will be providing GPU resources for the computational environment?
3. In the previous competitions (2021, 2022), the environment seemed to be based on C++98, which led to several issues with new syntax and compatibility. May I inquire if there will be any updates to the programming environment for this year's contest?
4. Is it acceptable to submit two executable files for our solution, provided that only the executable file intended for execution by the organizer is named correctly?

A5.

1. The testcases will be release before mid of May.
2. The competition host does not offer GPU resources.
3. In the competition, teams are only required to submit binary executable

rather than source code. Teams do not need to compile their code on the competition host, and it is not recommended to do so. During the competition, their binary executable will be transferred to evaluation workstations equipped with identical hardware and software configurations. If their program can execute properly, there should be no issues.

4. Only a single binary upload is permitted.

Q6. I am writing to seek clarification on some specific details regarding Problem A in the CAD Contest.

1. Platform Usage (Version): Could you kindly specify the platform and its version that participants are expected to use for Problem A? This information would assist us in ensuring compatibility and optimizing our workflow accordingly.
2. Supported Coding Languages and Latest Versions: It would be immensely helpful to know the coding languages permitted for Problem A and whether there are any restrictions on their versions. Additionally, if there are any updates or specific libraries/extensions participants should be aware of, kindly provide details.
3. Input and Output Specifications: Could you please provide us with detailed examples of the expected input and output formats? Furthermore, please clarify on the file format(s).
4. Cost Function Estimator Variability: Will the cost function estimator vary with each problem iteration, or does it remain consistent throughout the contest? Understanding this aspect will aid us in devising adaptive strategies for optimizing our solutions.
5. Alpha and Beta Test Submission Deadlines: For the alpha and beta testing phases, could you specify the deadlines for submission? Knowing when these phases occur and when submissions are due will allow us to plan our testing and refinement processes effectively.

A6.

1. Please kindly refer to the competition host user manual posted on the contest website.
2. In the competition, teams are only required to submit binary executable rather than source code. Teams do not need to compile their code on the competition host, and it is not recommended to do so. During the competition, their binary executable will be transferred to evaluation

workstations equipped with identical hardware and software configurations. If their program can execute properly, there should be no issues.

3. We will provide the detail description in the next update. However, we provide example output in the “examples” folder of the testcases.
4. Different cost-function estimator will be used with each problem iteration.
5. The tentative alpha test and beta test submission dates are 17 June and 22 July respectively, as indicated on the contest website. It is recommended to periodically review the website for any updates.

Q7. Hello, I just want to confirm the evaluation criteria. For problem A, is the scoring solely based on cost, without considering PPA or similar factors? Additionally, will this criteria remain unchanged in the future?

A7.

(1) The scoring is only based on the cost, the contestant should minimize the cost.
(2) We can guarantee that the contestant generates lower cost will receive higher score. However, the value of the cost may be adjusted into a suitable range if needed. (For example, by logarithm)

Q8. Our team is currently using case1 to test our program. However, when we read the file lib1.json, we tried to correspond it with the specifications of problemA (Fig2. Example of cell library file). We found that the delay, power, attritude_1, and attritude_2 are not present in the contents of lib1.json. Therefore, we would like to inquire about the specific information represented by data_1 to data_7.

A8. “delay” “power” “attribute_1” … are example field names. We don’t guarantee that every .lib file has the same field names (except cell_name and cell_type).
In this problem, we hope the contestant NOT to focus on what inside the cost-function. Instead, we hope the netlist can be optimized according to the features (numbers in the lib) and the result (cost-estimator output).

Q9. I have a question regarding the technology library for question A. For all problem iterations, will the technology library be the "lib1.json" provided in the case1, or will there be a specific library for each problem iteration?

A9. The contestant can't assume the .lib file does not change for all the cases.

Q10. If our resultant binary relies on seaveral shared object file. Can we package and upload multiple .so files together with our binary program?

A10. Yes. Please make sure the binary can be executed properly.

Q11. We want to know If the cost function for the final test is same as the eight cost functions in case1.

A11. No. A subset of the released cost functions will be included in the final evaluation. And we'll also have some new cost functions.

Q12. I have a couple of questions regarding Problem A:

1. Executable File Location:
   Could you please specify the relative path of the executable file in relation to other necessary files?
2. Front-end Logic Optimization:
   Is it allowed to optimize the front-end logic for Problem A to improve performance?

A12.

1. The file path/name will including the relative path from the executable (we may also use the absolute path, too).
2. Yes. The contestant can do any optimization for the netlist. However, the optimized netlist and the original netlist should be functionally equivalent.

Q13. Are we allowed to use an executable file as a synthesis framework, such as Berkeley ABC or Yosys? The program can still be run using the required command, and the executable will be run as a subprocess by the main executable.

A13. Yes. Please make sure the external executable(s) have the execute permission.

Q14. I have a question regarding the technology library for question A. For all problem iterations, will the technology library only contain the following 8 types of gates : not, buf, or, and, nor, nand, xor, and xnor?

A14. Yes. The “cell_type” of all the cells will be one of the 8 primitive gates.