Introduction to Real-Time Systems
실시간 시스템 개론

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Homework 3

- 50 points

- Due date: 12/11 Wed 23:59 (no late submission accepted)
  - We will not discuss this homework in the class (some solutions from students "may be" provided.)

- Please submit the code and the report <mark>separately</mark> on I-campus.

- Code [20 points]
  - Submission format
    - Format: yourid_HW3.py
    - You file should work on Python 3.8.10 at Linux.
  - Submission to [Assignment][Code Submission ONLY] Homework 3 (due date: 12/11 23:59 no later submission accepted)
    - Only the py file type is acceptable.

- Report [30 points]
  - Submission format
    - Format: yourid_HW3.pdf
    - Use the <mark>attached report template</mark>. You should submit it as the <mark>PDF file type.</mark>
  - Submission to [Assignment][Report Submission ONLY] Homework 3 (due date: 12/11 23:59 no later submission accepted)
    - Only the pdf file type is acceptable.
 - If suspected of copying the code, the teaching assistant may ask for an explanation based on the report.

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- **[Code] Make a program that can check the schedulability of set of task.**
  - This program takes three command line inputs: the *"input_file_name.txt"*, a prioritization policy (one of *RM/DM* and *EDF*) and its schedulability analysis.
  - Make schedulability analyses for following scheduling algorithms:
    - Implicit preemptive EDF (utilization based analysis)
    - Implicit preemptive RM (response time analysis)
    - Constrained preemptive EDF (demand based analysis)
    - Constrained preemptive DM (response time analysis)
  - The input file follows the same format as in HW1.
  - Output "P" if the task set passes the schedulability analysis for all tasks; otherwise output "F".
  - Generates "yourid_HW3.txt" at './output' folder.
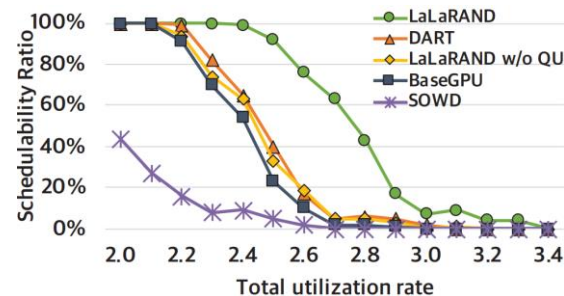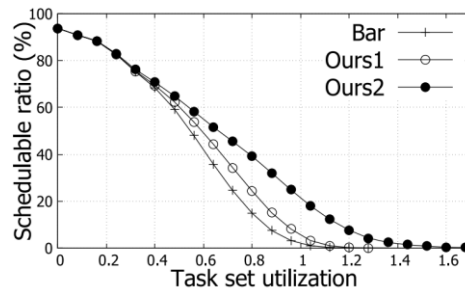
Homework 3

- [Code] Make a program that can check both the schedulability and the simulation result of a set of task.

  - The number of lines of the input file and the output file should be same. For example, if the input file has 100 lines, the 'yourid_HW3.txt' should also have 100 lines. And there is only one number for each line.

  - Example of program execution.

    - # python3 'yourid_HW3.py' 'input_file.txt' RM R

      - Only the following pairs are possible: (RM R) (EDF U) (DM R) (EDF D)

        - R means response time analysis (for implicit RM and constrained DM), U means utilization-based analysis (for implicit EDF), and D means demand-based analysis (for constrained EDF).

    - As explained in the previous slide, the input file name is 'input_file.txt', the prioritization policy is RM and c means the task set have constrained deadlines.

  - Example of output file.

    Schedulability analysis result:
    P (Pass),
    F (Fail)
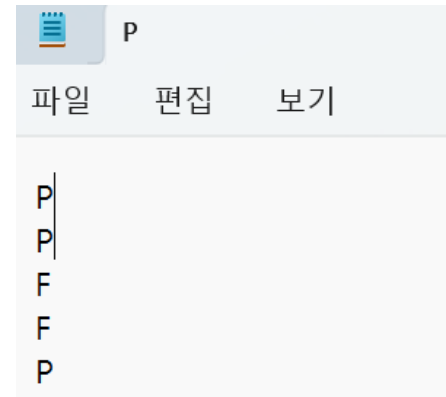
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- [Report] Write a report on HW3.
    - The report should include not only merely descriptions of the code but also a detailed analysis, encompassing a comprehensive evaluation of both simulation results in HW2 and schedulability analysis in HW3.
    - Do not use exercise templates. The report must be prepared using the attached ACM one-column format and should be between a minimum of two pages and a maximum of four pages.
    - Your report should include at least one graph like the one below, for each of implicit and constrained deadline task sets (therefore at least two graphs).
        - The graph should separately illustrate and explain the results for implicit and constrained cases.

    - Refer to the evaluation sections of the attached papers below for guidance.
        - https://rtclskku.github.io/website/papers/IJ202206LPL.pdf
        - https://rtclskku.github.io/website/papers/IC202112KLL.pdf

Homework 3

- [Scoring] The total score is 50 points, with 20 points allocated to the code and 30 points to the report.

  - The code score is determined by 4 test cases, each worth 5 points.

  - The report may include a graph, simulation comparison (i.e., HW2) and detailed analysis of schedulability analysis and simulation results.

    - Reports can be evaluated rigorously.

  - If you have any questions regarding the Homework 3, please contact the TA via the email below.

    - E-mail : yuns0509@g.skku.edu

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