

# Introduction to Real-Time Systems

## 실시간 시스템 개론

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# Homework 3-V2

- 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 **separately** on I-campus.
- Code [20 points]
  - Submission format
    - Format: yourid\_HW3.py
    - Your 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 **attached report template**. You should submit it as the **PDF file type**.
  - 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.

# Homework 3-V2

- [Code] Make a program that can check both the schedulability and the simulation result of a set of task.
- This program takes three command line inputs: the “*input\_file\_name.txt*” and a prioritization policy (one of *RM/DM* and *EDF*).
- 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” along with the simulation results from HW2.
- Generates “yourid\_HW3.txt” at ‘./output’ folder.

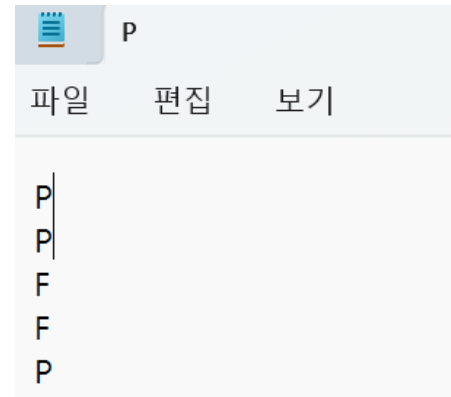
# Homework 3-V2

- [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 (only for implicit RM and constrained DM), U means utilization-based analysis (only for implicit EDF), and D means demand-based analysis (only 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:**

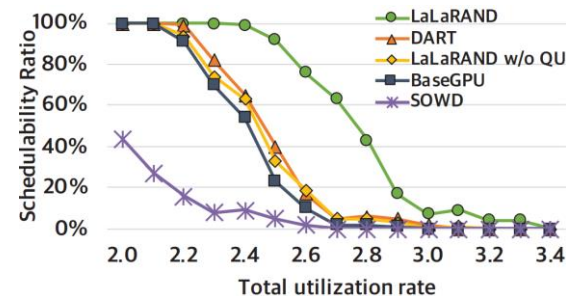
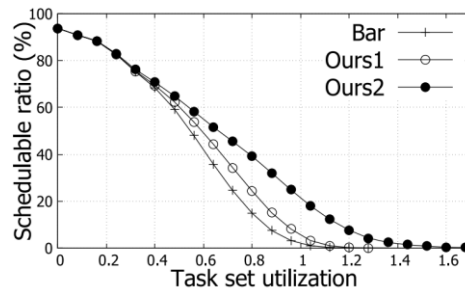
**P (Pass),**

**F (Fail)**



# Homework 3

- [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 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

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- [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