

jian-jia.chen [☺] tu-dortmund.de
 georg.von-der-brueggen [☺] tu-dortmund.de
 wen-hung.huang [☺] tu-dortmund.de
 jan.kleinsorge [☺] tu-dortmund.de

Exercises for Lecture
 Real-Time Systems and Applications
 Summer Semester 15

Exercise Sheet 2

(11 Punkte)

Exercise Due at Wednesday, April 22, 2015, 12:00 Uhr

Hinweise: Gruppenarbeit von bis zu drei Personen aus der gleichen Übungsgruppe ist möglich. Bitte vergessen Sie nicht Ihre Namen und Ihre Matrikelnummern auf die Lösung zu schreiben. **Die Abgaben können in den beschrifteten Briefkasten vor dem Sekretariat des LS12 (OH16/E22) eingeworfen oder per Mail (PDF Format) an georg.von-der-brueggen [☺] tu-dortmund.de abgegeben werden.**

Note: It is allowed to work in a group of up to three persons, if these persons are from the same practice group. Please do not forget to write your name and your Matrikelnummer on the solutions. **The solutions can either be placed in the mailbox in front of the secretary's office of LS 12 (OH/E22) or sent by mail (PDF format) to georg.von-der-brueggen [☺] tu-dortmund.de**

Exercise Sessions:

Do, 10:15 - 11:45 OH16/E18
 Do, 14:15 - 15:45 OH16/E18

2.1 Real-Time System Characteristics (2 Punkte)

What are the main differences between general purpose computing and real-time computing? List some applications for different levels of supports of real-time systems.

2.2 Definition of Worst-Case Execution Time (2 Punkte)

For real-time systems, it is important to know the maximum (worst-case) execution time of each task a priori. What are the definition and difference between the worst-case execution time and the worst-case response time? Even if the worst-case execution time of a task is given, there are several other problems that may be encountered during the design of a scheduling algorithm for a real-time system. Can you think of some difficulties? What are possible solutions?

2.3 Basic Scheduling (4 Punkte)

Suppose that the following set of jobs is given:

	J_1	J_2	J_3	J_4	J_5
a_j	0	2	8	10	15
C_j	4	3	6	3	4
d_j	6	8	16	22	20

1. What is the resulting schedule of the shortest-job-first (SJF) scheduling policy?
2. What is the resulting schedule of the earliest-deadline-first (EDF) scheduling policy?
3. What is the average response time of SJF and EDF, respectively?

4. Mr. S claims that SJF is optimal for his system, and Miss E claims that EDF is optimal for her system. Is it possible that both of them are correct? Please make their descriptions more clear.

2.4 Recurrent Task Models and Scheduling (2 Punkte)

Explain sporadic tasks and periodic tasks and their differences. What are their typical parameters and the applications of such task models?