國立屏東大學 資訊工程學系

Real-Time Operating Systems 即時作業系統

課程資訊

- **上課時間：** Wednesday 9:00-12:00
- **上課教室：** 二館M2413 CSIE Seminar Room
- 本學期採用16+2方式，除每週上課3小時，另外於10/22日及12/17日的18:00-21:00舉行期中及期末考試，總計全學期共上課54小時。

課程投影片

- 課程投影片皆為PDF檔案，請自行安裝適合的PDF檔案閱覽軟體。
- 請至課程Teams團隊(https://reurl.cc/DOemNR)下載
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Tentative Schedule

本課程採16+2彈性授課方式，除16週(每週3堂課)的授課外，另安排2週(共計6堂課)的彈性授課，詳細規劃如下表：

週次	日期	預定進度
01	09/03	Syllabus
		Process Scheduling
02	09/10	Windows Process Scheduling (1)
03	09/17	Windows Process Scheduling (2)
04	09/24	Independent Real-Time Task Scheduling (1)
05	10/01	Independent Real-Time Task Scheduling (2)
06	10/08	Independent Real-Time Task Scheduling (3)
07	10/15	Independent Real-Time Task Scheduling (4)
08	10/22	Review
		18:00-21:00 Midterm Exam
09	10/29	Dependent Real-Time Task Scheduling (1)
10	11/05	Dependent Real-Time Task Scheduling (2)
11	11/12	Dependent Real-Time Task Scheduling (3)
12	11/19	Dependent Real-Time Task Scheduling (4)

13	11/26	Review
		Final Exam 18:00-21:00
14	12/03	Project Presentation
15	12/10	Paper Presentation
16	12/17	Paper Presentation

Textbook

- TB1: Operating System Concepts, 10th Edition, Abraham Silberscharz, Peter Baer Galvin and Greg Gagne, John Wiley & Sons, Inc., ISBN: 9781118063330.
- TB2: Operating Systems: Three Easy Pieces (https://pages.cs.wisc.edu/~remzi/OSTEP/).
- TB3: Real-Time Systems, Jane W. S. Liu, ISBN: 9780130996510.

Papers to read

- J.A. Stankovic, Misconceptions about real-time computing: a serious problem for next-generation systems, Computer, Vol. 21(10), pp. 10-19, 1998.IEEE Xplore
- C. L. Liu and James W. Layland, Scheduling Algorithms for Multiprogramming in a Hard-Real-Time Environment, Journal of the ACM (JACM), Vol. 20(1), pp. 46-61, Jan. 1973. ACM DL
- Sha, L., Rajkumar, R., & Lehoczky, J. P., Priority Inheritance Protocols: An Approach to Real-Time Synchronization. IEEE Transactions on Computers, 39(9), 1175–1185, 1990. IEEE Xplore
- Baker, T. P., Stack-based scheduling of realtime processes. Real-Time Systems, 3(1), pp. 67-99, 1991. Conference Version from IEEE Xplore

Presentation (Selected Papers)

Each student will be required to present at least one related paper from the following list:

- 12/3
- 12/10
- 12/17

- 李明發(BBB114003) 5 12/03
- 卓霈晅(BBB114008) 9 12/10
- 黃文煜(BBB114010) 6 12/10
- 張睿森(BBB114014) 3 12/10
- 曾英雄(BBB114018) 8 12/17
- 陳宏丞(BBB114021) 7 12/17
- 王鐙億(CBB111227) 2 12/03
- 謝政軒(CBB111237) 1 12/10

1 Min-Ih Chen and Kwei-Jay Lin, Dynamic Priority Ceilings: A Concurrency Control Protocol for Real-Time Systems, Real-Time Systems, Vol. 2(4), pp.325-346, 1990.

2.Jun Wu, Tei-Wei Kuo and Chih-wen Hsueh, "RCPCP: A Ceiling-Based Protocol for Single and Multiple Disks Environments," The Computer Journal, Vol. 46, No. 2, pp. 161-173, February 2003.

3.Tei-Wei Kuo, Jun Wu and Hsin-Chia Hsih, "Real-Time Concurrency Control in a Multiprocessor Environment," IEEE Transactions on Parallel and Distributed Systems (TPDS), (SCI, EI), Vol. 13, No. 6, pp. 659-671, June 2002.

4. Jian-Jia Chen, Jun Wu and Chi-Sheng Shih, “Approximation Algorithm for Scheduling Real-Time Jobs with Multiple Feasible Intervals”, Journal of Real-Time Systems, (SCI,EI), Vol. 34, Issue 3, pp. 155-172, November 2006.

5. Kam-Yiu Lam and Joseph Kee-Yin Ng, A Conditional Abortable Priority Ceiling Protocol for Scheduling Mixed Real-Time Tasks, Journal of Systems Architecture, Vol. 46, pp. 573-585, 2000

6.Buttazzo, G. C., Rate Monotonic vs. EDF: Judgment Day. Real-Time Systems, 29(1), 5–25, 2005

7. Sprunt, B., Sha, L., and Lehoczky, J., Aperiodic task scheduling for Hard-Real-Time systems. Real-Time Systems: The International Journal of Time-Critical Computing Systems, 1(1), 27–60, 1989.

8.Hakan Aydin, Daniel Mosse, and Pedro Media-Alvarez, Power-Aware Scheduling for Periodic Real-Time Tasks, IEEE Transactions on Computers, Vol. 53, No. 5, pp.584-600, May 2004.

9.Jun Wu, Energy-Efficient Scheduling of Real-Time Tasks with Shared Resources, Future Generation Computer Systems (FGCS), Volume 56, pp. 179-191. March 2016.

10. Jun Wu and Kai-Long Ke, Energy-Efficient Real-Time Scheduling of Tasks with Abortable Critical Sections. Journal of Information Science and Engineering (JISE), Vol. 30, No. 3, pp.765-786, May 2014.

Grading Policy

- Homework 10%, late submission is NOT ALLOWED!!!
- Projects 20%, late submission is NOT ALLOWED!!!
- Midterm Exam 25% (10/22 Wednesday 18:00-21:00)
- Final Exam 25% (11/26, Wednesday 18:00-21:00)
- Paper Presentation 20%
- Class Participation Bonus 10%