University of Glasgow | School of Computing Science

Assessed Coursework

Course Name	**Advanced Operating Systems (M)**			
Coursework Number	**Exercise 2**			
Deadline	**Time:**	**4:30pm**	**Date:**	**4 February 2016**
% Contribution to final course mark	**4%**		**This should take this many hours:**	**2**
Solo or Group ✓	**Solo**	✓	**Group**	
Submission Instructions	**Submit via the dropbox outside the Teaching Office in Lilybank Gardens**			
Who Will Mark This? ✓	**Lecturer** ✓		**Tutor**	**Other**
Feedback Type? ✓	**Written**		**Oral** ✓	**Both**
Individual or Generic? ✓	**Generic** ✓		**Individual**	**Both**
Other Feedback Notes				
Discussion in Class? ✓	**Yes** ✓		**No**	
Please Note: This Coursework cannot be Re-Done				

Code of Assessment Rules for Coursework Submission

Deadlines for the submission of coursework which is to be formally assessed will be published in course documentation, and work which is submitted later than the deadline will be subject to penalty as set out below. The primary grade and secondary band awarded for coursework which is submitted after the published deadline will be calculated as follows:

(i) in respect of work submitted not more than five working days after the deadline
   a. the work will be assessed in the usual way;
   b. the primary grade and secondary band so determined will then be reduced by two secondary bands for each working day (or part of a working day) the work was submitted late.

(ii) work submitted more than five working days after the deadline will be awarded Grade H.

Penalties for late submission of coursework will not be imposed if good cause is established for the late submission. You should submit documents supporting good cause via MyCampus.

Penalty for non-adherence to Submission Instructions is 2 bands

You must complete an "Own Work" form via

http://www.dcs.gla.ac.uk/socs-online for all coursework

UNLESS submitted via Moodle

Advanced Operating Systems (M): Exercise 2

Dr Colin Perkins

26 January 2016

The lectures have introduced priority-driven scheduling for aperiodic and sporadic tasks. This problem set seeks to test your understanding of that material. You should answer all questions.

Question 1: Consider a system comprising three independent periodic tasks T_1 = (4, 1), T_2 = (5, 1) and T_3 = (10, 2). Demonstrate that this system can be scheduled in a preemptive manner on a single processor using a) the rate monotonic algorithm; and b) the earliest deadline first (EDF) algorithm. [5 marks]

Question 2: The system from question 1 must also support the execution of three aperiodic jobs: A_1 which is released at time 1, A_2 which is released at time 8, and A_3 which is released at time 12. Each aperiodic job executes for 1 unit of time. The system is scheduled using a preemptive rate monotonic scheduler, on a single processor, with a server task, T_s = (3, 0.5) to schedule the aperiodic jobs. Draw a diagram to illustrate the scheduler if T_s is implemented as a polling server. What are the response times of the aperiodic jobs? [7 marks]

Question 3: Is the system from question 2 schedulable if T_s is implemented as a deferrable server? What are the response times of the aperiodic jobs? [7 marks]

Question 4: When sporadic tasks are introduced into a priority-scheduled system of periodic tasks, it becomes necessary to incorporate an acceptance test into that system. Describe the purpose of an acceptance test, and why is it important for error handling. [5 marks]

Question 5: The fixed-priority sporadic server has a complex set of budget consumption and replenishment rules. Discuss whether you believe the benefits of this server outweigh its complexity [6 marks].

Answers must be submitted by 4:30pm on 4 February 2016. As per the Code of Assessment policy regarding late submissions, submissions will be accepted for up to 5 working days beyond this due date. Any late submissions will be marked as if submitted on time, yielding a band value between 0 and 22; for each working day the submission is late, the band value will be reduced by 2. Submissions received more than 5 working days after the due date will receive an H (band value of 0).

A drop box will be available for submissions in outside the Teaching Office in Lilybank Gardens, and submissions will only be accepted via that drop box. This problem set is worth 4% of the mark for this course. Ensure that your name and matriculation number are included on each submission, and that you have submitted a statement of originality. Submissions that do not follow these submission instructions will be penalised two bands.