Peer-graded Assignment: Assignment 3

You passed!
Congratulations. You earned 200 / 200 points. Review the feedback below and continue the course when you are ready. You can also help more classmates by reviewing their submissions.

Review Classmates' Work

Instructions

My submission

Development of Real-Time Systems – Assignment 3

Overview

Discussions

Help Center

In this assignment we will focus a bit more on the theoretical side. We will have a look at verifying real-time system by using the cyclic structured construct handled in the course and a simulation environment to automatically schedule a full timeline. The main purpose of the assignment is to expose the student to several ways of planning and verifying a real-time system in practice.

Pre-requisite

A PC capable of running python programs

Pen and paper

After completing this assignment, you will be able to:

- Optimize cyclic structured scheduler by finding the largest frame size
- Use SimSo to simulate a set of tasks
- Verify a set of tasks with SimSo
- Determine the total utilization of a set of tasks

Theory assignment

The following part of assignment is a purely theoretical task that requires no additional tools. The task is to find the largest possible frame size for the cyclic structured scheduler by following requirements 1,2 and 3 for finding the largest frame size. The following three task

sets should be used:

1. T1(15, 1, 14) T2(20, 2, 26) T3(22, 3)
2. T1(4, 1) T2(5, 2, 7) T3(20, 5)
3. T1(5, 0.1) T2(7, 1) T3(12, 6) T4(45, 9)

-Provide a written report which should contain:

- Calculations for each step for finding the frame size for each task set
- Resulting frame size for each task set

Simulation assignment

The assignment is to use a real-time simulator to verify feasibility of a set of tasks

-Download the SimSo scheduler Here

-The example has been run under Windows 7 but other platforms are also supported by the scheduler

-Install SimSo and familiarize yourself with the tool. More information is found in This document

Input the tasks T1(2, 0.5), T2(3, 1.2), T3(6, 0.5) and the RM scheduler into the SimSo simulator

-Use SimSo to schedule the task set

Provide a report answering the following questions:

- What is the utilization factor of the system and what is the value for Urm(3)
- What is the minimum/maximum/average response time of all tasks?
- Is any task missing the deadline? Which task? Where?
- If a deadline is missed, could it be avoided by changing the scheduler?

Input the tasks T1(2, 0.5, 1.9) T2(5, 2) T3(1, 0.1, 0.5) T4(10, 5, 20) and the EDF scheduler into the SimSo simulator

-Use SimSo to schedule the task set

Provide a report answering the following questions:

- What is the utilization factor of the system and what is the value for Urm(4)
- What is the minimum/maximum/average response time of all tasks?
- Is any task missing the deadline? Which task? Where?
- If a deadline is missed, could it be avoided by changing the scheduler?

Review criteria less

Everyone enrolled in this course must review at least three other submissions to ensure everyone receives a grade.

Help Center