Instructions for Authors of SBC Conferences Papers and Abstracts

Giovani Ferreira[1], **Gustavo Coimbra**[1], **Eduardo San**[1]

[1]CEUB - Centro Universitário de Brasília
Caixa Postal 4488 – 70.904-970 – Brasília – DF – Brazil

Abstract.

Resumo.

1. Introduction

2. Related Concepts

2.1. Time

It's important to understand what is time and it's related concepts. For this purpose, the definitions provided by [Kopetz 2011] will be considered:

1. The flow of time is a directed time line that extends from the past into the future.
2. A cut of the time line is called an instant.
3. Any ideal occurrence that happens at an instant is called an event.
4. The present point in time, now, is a very special event that separates the past from the future.
5. An interval on the time line, called a duration, is defined by two events, the start event and the terminating event of the interval.
6. The instant when a result must be produced is called a deadline.

2.2. Real-time systems

A real-time computer system is a computer system where the correctness of the system behavior depends not only on the logical results of the computations, but also on the physical time when these results are produced [Kopetz 2011].

The correctness of a system, according to a definition provided by [Ayeni 2012], refers to the behaviour of the system over time.

Real-time systems can be classified in 2 different ways [Stankovic and Ramamritham 1990]:

1. Static real-time system: where all deadlines can be guaranteed a priori.
2. Dynamic real-time system: large, complex, distributed, adaptive, contain many types of timing constraints, need to operate in a highly nondeterministic environment, and evolves over a long system lifetime.

A real-time computer system must react to stimuli from its environment within time intervals dictated by its environment.

The type of the deadline affects the real-time system. [Kopetz 2011] classifies deadline as:

1. Soft deadline: If a result has utility even after the deadline has passed,
2. Firm deadline: If a result does not matter after the deadline.
3. Hard deadline: If severe consequences could result if a firm deadline is missed.

A real-time system is affected by the type of the deadline. If the system must met at least one hard deadline, it's called a hard real-time computer system. If no hard deadline exists, then the system is called a soft real-time computer system.

The design of a hard real-time system is fundamentally different from the design of a soft real-time system. While a hard real-time computer system must sustain a guaranteed temporal behavior under all specified load and fault conditions, it is permissible for a soft real-time computer system to miss a deadline occasionally [Kopetz 2011].

[Stankovic 1996] also points that hard real-time systems usually cause several consequences, even death, when missed an important deadline

2.3. Tasks

For [Stankovic 1996] tasks can be classified in three different ways:

1. Periodic task: activated every T units. The deadline for each activated instance may be less than, equal to, or greater than the period T.
2. Aperiodic task: activated at unpredictable times.
3. Sporadic task: an aperiodic task with the additional constraint that there is a minimum interarrival time between task activations.

Real-time scheduling is the process of creating start and finish times for sets of tasks such that all timing, precedence, and resource constraints are met.

3. Proposal

4. Experiments and Evaluation

5. Conclusion

Referências

Ayeni, B. K. (2012). Real-time embedded system.

Kopetz, H. (2011). *Real-time systems: design principles for distributed embedded applications*. Springer Science & Business Media.

Stankovic, J. A. (1996). Real-time and embedded systems. *ACM Computing Surveys (CSUR)*, 28(1):205–208.

Stankovic, J. A. and Ramamritham, K. (1990). What is predictability for real-time systems? *Real-Time Systems*, 2(4):247–254.