Introdução ao trabalho científico

(AULA 2)

INF030 – MÉTODOS CIENTÍFICOS EM COMPUTAÇÃO

FLÁVIA MARISTELA

FLAVIAMSN AT IFBA.EDU.BR

FLAVIAMARISTELA AT GMAIL.COM

Agenda

Ciência e Conhecimento Científico

Importância

Área de Pesquisa

Subárea

Tema

Problema

Objetivos

Conhecimento

1. Entendimento sobre algo; saber

2. Ação de entender por meio da inteligência, da razão ou da experiência.

Tipos de Conhecimento

Ciência e Conhecimento científico

CONHECIMENTO EMPÍRICO

Aquele que obtemos a partir de nossa interação e observação do mundo

Baseado nas informações obtidas por meio de tentativa e erro

Prático

Ametódico

Não precisa ser comprovado

Pode servir de base para o conhecimento científico

CONHECIMENTO CIENTÍFICO

Compreende as informações e fatos comprovados por meio da ciência

Usa lógica e pensamento crítico

Demonstra se determinada teoria é verdadeira ou falsa

Faz uso de métodos e resultados que podem ser verificado

Importância

- Na academia, produzimos conhecimento científico:
  - ✓ Repetibilidade
  - ✓ Validação
  - ✓ Método e metodologia
  - ✓ Ferramentas
  - ✓ Formalismo
  - ✓ Disseminação

- ✓ Material: Metodologia da Pesquisa Científica - UFSM

Então, resumindo...

A pesquisa científica é o conjunto de ações que tem o objetivo de encontrar a solução para um problema.

Essas ações têm como base procedimentos sistemáticos.

Consequentemente, a pesquisa parte de um problema. Justamente porque você precisa chegar a uma solução para ele.

E por onde eu começo?

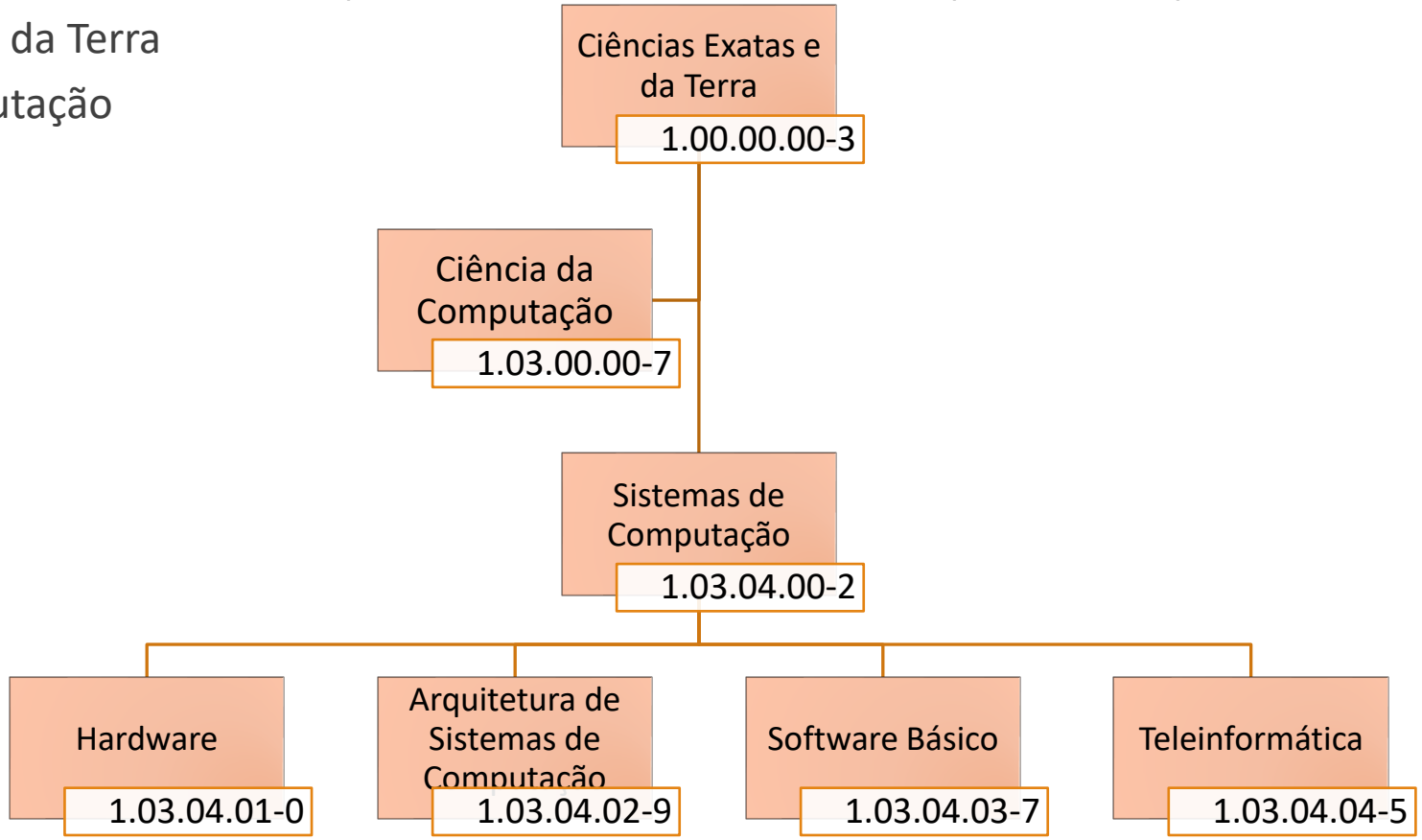
Área de Pesquisa

- Reflete uma área do conhecimento
- Frequentemente, a área da pesquisa é abrangente demais
- Podemos definir uma subárea, para ajudar a definir melhor o problema em questão

Gostaria de fazer uma pesquisa na área de Sistemas Embarcados.

Área de Pesquisa

- Áreas do Conhecimento definidas pelo Comitê Nacional de Pesquisa (CNPq)
  - Ciências Exatas e da Terra
  - Ciência da Computação



Tema

- Reflete o assunto que se deseja estudar.
- Deve ser preciso o bastante
- Toda pesquisa deve estar focada sobre um problema

Penso em fazer uma pesquisa em Economia de Energia para sistemas embarcados.

Problema

Define que aspecto do tema você deseja tratar

Questão específica que se deseja investigar dentro do tema.

O tema ainda é algo abrangente demais, então o **problema de pesquisa** é uma forma de delimitar o que será tratado.

Objetivos

- Em geral, um trabalho científico é descrito em termos de seus objetivos.

- Objetivo **GERAL**:
  - Apresenta a ideia central do trabalho
  - Deve expressar de forma clara qual a intenção do trabalho

- Objetivos **ESPECÍFICOS**:
  - Descreve como você pretende alcançar o objetivo geral. Ou seja, descreve como você pretende fazer o seu trabalho.
  - Em geral é descrito por mais de uma atividade

Como isso tudo se junta?

Título

Work In Progress: Dealing with Aperiodic Tasks on Quasi-Partitioning Scheduling

Autores

Flávia Maristela Santos Nascimento
Federal Institute of Bahia
Academic Department of Computer Science
Email: flaviamsn@ifba.edu.br

George Lima
Federal University of Bahia
Department of Computer Science
Email: gmlima@ufba.br

Ernesto Massa
State University of Bahia
DCET-II
Email: esmneto@uneb.br

Resumo

***Abstract*—Quasi-Partition Scheduling (QPS) is a new scheduling approach with low preemption and migration overhead. QPS was originally proposed taking into consideration hard periodic and sporadic tasks. In this paper we discuss a proposal for extending QPS to deal with soft aperiodic tasks.**

Motivação e Justificativa

I. Introduction

Quasi-Partition Scheduling (QPS) [1], [2] is a new scheduling approach with low preemption and migration overhead. Such a scheme is based on processor bandwidth reservation, according to which processing resources portions are assigned to a set of servers in an offline manner. Moreover, QPS is optimal in the sense that any schedulable set of implicit deadline sporadic tasks can be correctly scheduled by it. An implicit deadline sporadic task has deadline equal to its minimum inter-arrival time, also called period.

QPS was originally proposed taking into consideration sporadic tasks only. In this paper we discuss possible extensions of QPS to deal with soft aperiodic tasks, which are those whose arrival pattern cannot be defined beforehand. Before discussing the need to adapt QPS, we introduce it through an illustrative example.

Example 1.1: Let the task set $\Gamma = \{\tau_1, \tau_2, \tau_3\}$ be scheduled according to QPS on two processors π_1 and π_2. These tasks have the same deadline at time 10 and are released at instant 0. Between the release time and deadline these tasks require, respectively, $C_i = 6, 6, 8$ time units, $i = 1, 2, 3$. The total utilization of Γ is $U(\Gamma) = 6/10 + 6/10 + 8/10 = 2$.

QPS schedules Example 1.1 as follows. It first partitions the system tasks into two subsets, $P^1 = \{\tau_1, \tau_2\}$ and $P^2 = \{\tau_3\}$. Note that P^1 requires more than one processor, $U(P^1) = 1.2$, while P^2 requires less than one processor. QPS manages the schedule of P^1 on two processors via a set of *fixed rate EDF* two servers are set to independently serve τ_1 and τ_2 with utilization $U(\sigma^A) = U(\tau_1) - U(\sigma^S) = 0.4$ and $U(\sigma^B) = U(\tau_2) - U(\sigma^S) = 0.4$. Servers σ^A, σ^B and σ^S occupy 100% of π_1 in Figure 1 while σ^M and τ_3 are assigned to the other processor. Local EDF is applied on each processor to schedule servers and tasks assigned to them; servers inherit the deadline of their clients.

As can be seen in Figure 1, on π_2 σ^M is selected to execute within $[0, 2)$ via EDF. This choice is actually arbitrary in this example since all servers have the same deadline at $t = 10$. The schedule of σ^M forces the execution of execution of σ^S on π_2. Both these servers in turn, schedule their client set in P^1. QPS ensures that these two connected servers do not select the same client at any time. The other scheduling decisions are then usual partitioned EDF rules on each processor, resulting in the schedule shown in Figure 1. More detailed information about QPS servers can be found in [1], [2].

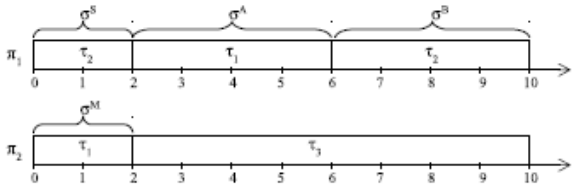


Fig. 1. QPS schedule for Example 1.1

Some aspects when considering aperiodic tasks are worth noting. The task-server-processor assignment is based on offline information, e.g tasks' utilizations are known beforehand, differing from what is expected for soft aperiodic task. Further,

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At run-time P^1 is scheduled by four servers, denoted σ^A, σ^B, σ^M and σ^S, all of them implementing EDF-based rules. More specifically, each server has one or more clients (which can be tasks or other servers) and whenever a server is

processor. Local EDF is applied on each processor to schedule servers and tasks assigned to them; servers inherit the deadline of their clients.

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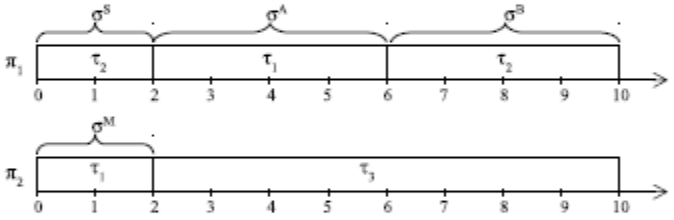

Fig. 1. QPS schedule for Example 1.1

Some aspects when considering aperiodic tasks are worth noting. The task-server-processor assignment is based on offline information, e.g tasks' utilizations are known beforehand, differing from what is expected for soft aperiodic task. Further, care must be taken when scheduling aperiodic tasks since the schedulability of sporadic tasks must be preserved. Moreover, it is desirable to minimize the response time of aperiodic tasks as they are usually linked to time-oriented QoS, as it is the case for multimedia applications. Such aspects will be discussed next.

ObjetivoS

E já que estamos falando sobre isso...

Formatos - *Templates*

Servem para padronizar a apresentação dos trabalhos científicos

Para nós, de computação, os formatos mais conhecidos são:

- SBC – Sociedade Brasileira de Computação
- ACM
- ELSEVIER
- IEEE

SBC

Sociedade Brasileira de Computação (SBC)

Author Name , Second Author Name

[1] Author Department – Author Institution

[2] Second Author Department – Second Author Institution

author@fastformat.co, secondauthor@fastformat.co

Abstract. *Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.*

Resumo. *Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.*

1. Introdução

A seção de Introdução, assim como o resumo (ou abstract), são considerados a porta de entrada para que o leitor se interesse pelo seu texto. Veja a seguir algumas **funções e objetivos** da Introdução:

- Apresentar o tópico ou contexto que será discutido no artigo ou monografia. Você pode fazer isso citando os estudos mais importante da área e colocando seu ponto de vista sobre o problema.
- Descrever a proposta do trabalho. Essa descrição pode ser feita por meio de hipóteses, perguntas, ou usando o problema que você pretende atacar.
- Explicar brevemente o problema que tentará solucionar ou até mesmo a abordagem utilizada, e se possível, apresentar alguns resultados do seu estudo.
- Caso tenha espaço suficiente, é importante colocar no ultimo parágrafo da introdução, uma descrição sobre a estrutura completa do documento, mostrando o que será descrito em cada uma das seções seguintes.

ACM

ACM Word Template for SIG Site

1st Author
1st author's affiliation
1st line of address
2nd line of address
Telephone number, incl. country code
1st author's E-mail address

2nd Author
2nd author's affiliation
1st line of address
2nd line of address
Telephone number, incl. country code
2nd E-mail

3rd Author
3rd author's affiliation
1st line of address
2nd line of address
Telephone number, incl. country code
3rd E-mail

ABSTRACT

In this paper, we describe the formatting guidelines for ACM SIG Proceedings.

Categories and Subject Descriptors

D.3.3 [**Programming Languages**]: Language Constructs and Features – *abstract data types, polymorphism, control structures.* This is just an example, please use the correct category and subject descriptors for your submission. The ACM Computing Classification Scheme: http://www.acm.org/class/1998/

General Terms

Your general terms must be any of the following 16 designated terms: Algorithms, Management, Measurement, Documentation, Performance, Design, Economics, Reliability, Experimentation, Security, Human Factors, Standardization, Languages, Theory, Legal Aspects, Verification.

Keywords

Keywords are your own designated keywords.

1. INTRODUCTION

The proceedings are the records of the conference. ACM hopes to give these conference by-products a single, high-quality appearance. To do this, we ask that authors follow some simple guidelines. In essence, we ask you to make your paper look exactly like this document. The easiest way to do this is simply to down-load a template from [2], and replace the content with your own material.

2. PAGE SIZE

All material on each page should fit within a rectangle of 18 × 23.5 cm (7" × 9.25"), centered on the page, beginning 1.9 cm (0.75") from the top of the page and ending with 2.54 cm (1") from the bottom. The right and left margins should be 1.9 cm (.75").

The text should be in two 8.45 cm (3.33") columns with a .83 cm (.33") gutter.

3. TYPESET TEXT

3.1 Normal or Body Text

Please use a 9-point Times Roman font, or other Roman font with serifs, as close as possible in appearance to Times Roman in which these guidelines have been set. The goal is to have a 9-point text, as you see here. Please use sans-serif or non-proportional fonts only for special purposes, such as distinguishing source code text. If Times Roman is not available, try the font named Computer Modern Roman. On a Macintosh, use the font named Times. Right margins should be justified, not ragged.

3.2 Title and Authors

The title (Helvetica 18-point bold), authors' names (Helvetica 12-point) and affiliations (Helvetica 10-point) run across the full width of the page – one column wide. We also recommend phone number (Helvetica 10-point) and e-mail address (Helvetica 12-point). See the top of this page for three addresses. If only one address is needed, center all address text. For two addresses, use two centered tabs, and so on. For more than three authors, you may have to improvise.[1]

3.3 First Page Copyright Notice

Please leave 3.81 cm (1.5") of blank text box at the bottom of the left column of the first page for the copyright notice.

3.4 Subsequent Pages

For pages other than the first page, start at the top of the page, and continue in double-column format. The two columns on the last page should be as close to equal length as possible.

Table 1. Table captions should be placed above the table

Graphics	Top	In-between	Bottom
Tables	End	Last	First
Figures	Good	Similar	Very well

[1] If necessary, you may place some address information in a footnote, or in a named section at the end of your paper.

IEEE

Conference Paper Title

Author Name
Author Department
Author Institution
author@fastformat.co

***Resumo*—As the title, the abstract and the abstract of your work is the gateway to the reader, besides giving an overview of your work, should arouse the interest of it. Because the abstract has a limited amount of text, many people find it difficult to write concise and interesting text. Thus, we will present a technique to facilitate the elaboration of the abstract and the abstract that consists of dividing them into five parts: context, objective, method, results and conclusion.**

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I. Introduction

The Introduction section, as well as the abstract, is considered the gateway for the reader to be interested in your text. Here are some functions and objectives of the Introduction:

- Present the topic or context that will be discussed in the article or monograph. You can do this by quoting the most important studies in the area and putting your point of view on the problem.
- Describe the work proposal. This description can be made through hypotheses, questions, or using the problem you intend to tackle.
- Briefly explain the problem you are trying to solve or even the approach you are using, and if possible present some results from your study.
- If you have enough space, it is important to put in the last paragraph of the introduction a description of the complete structure of the document, showing what will be described in each of the following sections.

A. Structure

Keep in mind that the introduction should be done in a way that captures the reader's interest. Thus, a widely used approach is the funnel structure. Thus, we begin to describe the general aspects, showing the context in which we will work, then moving on to a more specific topic (eg, scientific context) until we arrive at the work proposal and the reason for its execution.

B. Flow

Begin writing the introduction by clearly identifying the area of interest. To do this, you can take a few keywords from the document title and write the first sentences of the introduction considering those words. This makes you talk about the main subject of the document without losing focus.

The context of the study can be established using a brief and balanced review of articles in that area. It's interesting that you show the reader what you know about the problem before going into the details of experiments or studies. This brief review can be done by considering the key articles regarding the topic covered in the study. The depth to which you should report these articles is not an easy task, but with practice and reading other articles it will become natural for you. Bringing the reader from the most general context to the most specific until you arrive at your proposal, all done smoothly, is a determining factor for you to have good results.

Okay, but what article should I look at to make this brief review of the problem? You should use journal articles to support the context in which you will work on the article. Journal articles are a good choice because most of them are of a better quality, and they deal with original topics most of the time. Considering these articles does not prevent you from reading some studies published in conference proceedings, these are important for you to have a foundation on that topic you will write. When you start writing this portion of the introduction, try to cite journal articles that show relevant results in your research area. Published literature reviews are very useful as it summarizes all the research done on that topic over a period of time.

Make sure you have clearly written your proposal and / or hypothesis that you will investigate. You can write your proposal smoothly by following the normal development of the paragraph or using sentences such as: (1) The purpose of this study is.... or (2) We investigated three different mechanisms to explain the.... Most of the time, these sentences are written near the end of the introduction, usually at the end of the paragraph.

Write clearly the reason why your proposal solves (or does not solve) the problem studied. This information should follow the sentence previously placed on the work proposal. Why did you choose a certain type of search method? What metrics did you use in the study? Importantly, the techniques and protocols followed by the study need not be detailed in this paragraph. This will be the responsibility of the next section on materials and methods.

II. Related Work

Write here your literature review...

ELSEVIER

Unncessarily Complicated Research Title

John Smith

California, United States

Abstract

Suspendisse potenti. Suspendisse quis sem elit, et mattis nisl. Phasellus consequat erat eu velit rhoncus non pharetra neque auctor. Phasellus eu lacus quam. Ut ipsum dolor, euismod aliquam congue sed, lobortis et orci. Mauris eget velit id arcu ultricies auctor in eget dolor. Pellentesque suscipit adipiscing sem, imperdiet laoreet dolor elementum ut. Mauris condimentum est sed velit lacinia placerat. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nullam diam metus, pharetra vitae euismod sed, placerat ultrices eros. Aliquam tincidunt dapibus venenatis. In interdum tellus nec justo accumsan aliquam. Nulla sit amet massa augue.

Keywords: Science, Publication, Complicated

1. The First Section

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Ferramentas

- Editores de texto
- IDE LaTeX
- Planilhas
- R Language
- R IDE
- Editores gráficos
- Ferramentas para gerenciar referencias (JabRef, Zotero)