

INTRODUÇÃO À PROGRAMAÇÃO

UTILIZANDO O R

Parte 1

Aishameriane Schmidt e Leilane Cambará
aishameriane@gmail.com e leilane.cambara@gmail.com
Universidade Federal de Santa Catarina
2019/01



AISHAMERICANE SCHMIDT

- $\frac{3}{4}$ **Técnica em Eletrônica** (Liberato, 2003)
- Estatista** (UFRGS, 2010)
- $\frac{9}{10}$ **Economista** (UDESC, 2019)
- $\frac{9}{10}$ **Mestra em Economia** (UFSC, 2019)



AISHAMERICANE
SCHMIDT

Trabalhou com estatística aplicada a

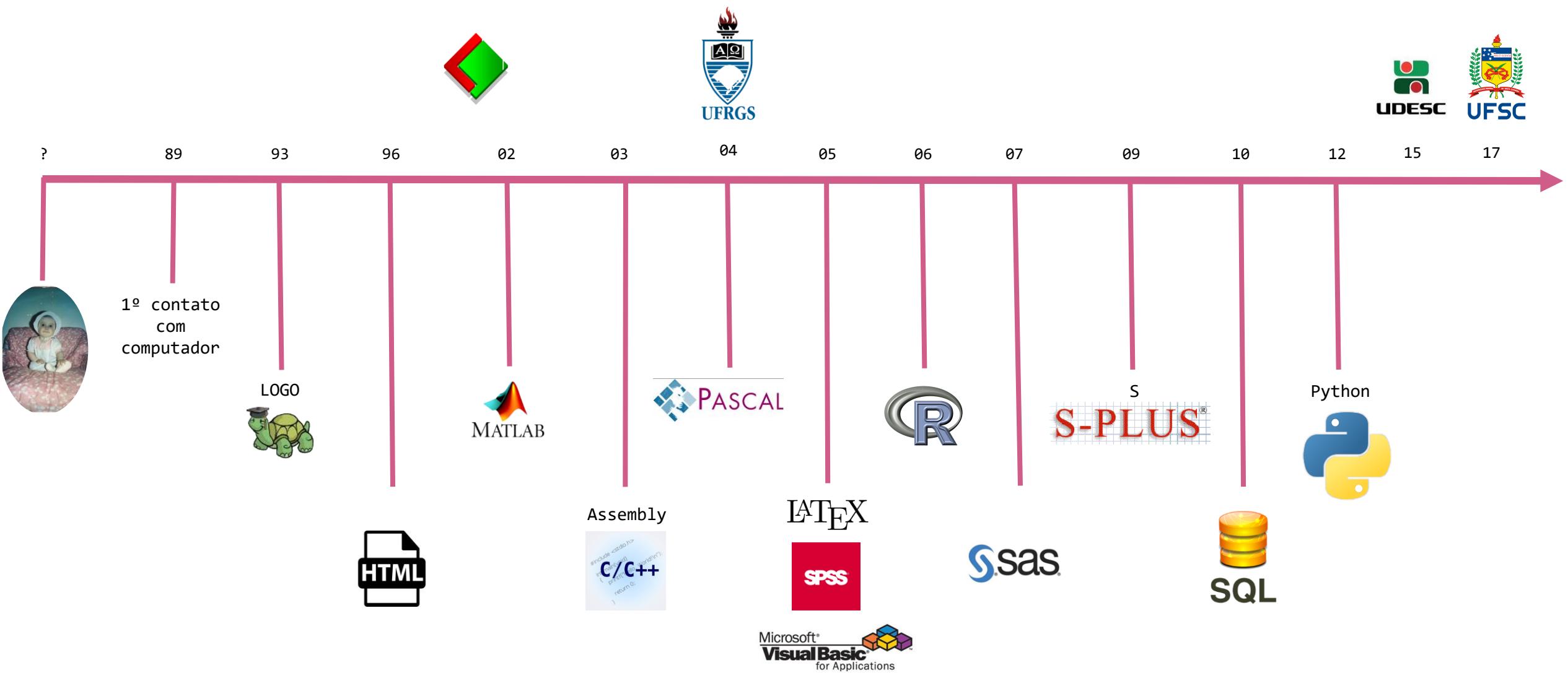
- *Marketing,*
- *Pesquisa em saúde pública e genética,*
- *Produtos financeiros,*
- *Sistemas de recomendação*
- *Modelos preditivos em educação*
- *etc*



AISHAMERICANE
SCHMIDT

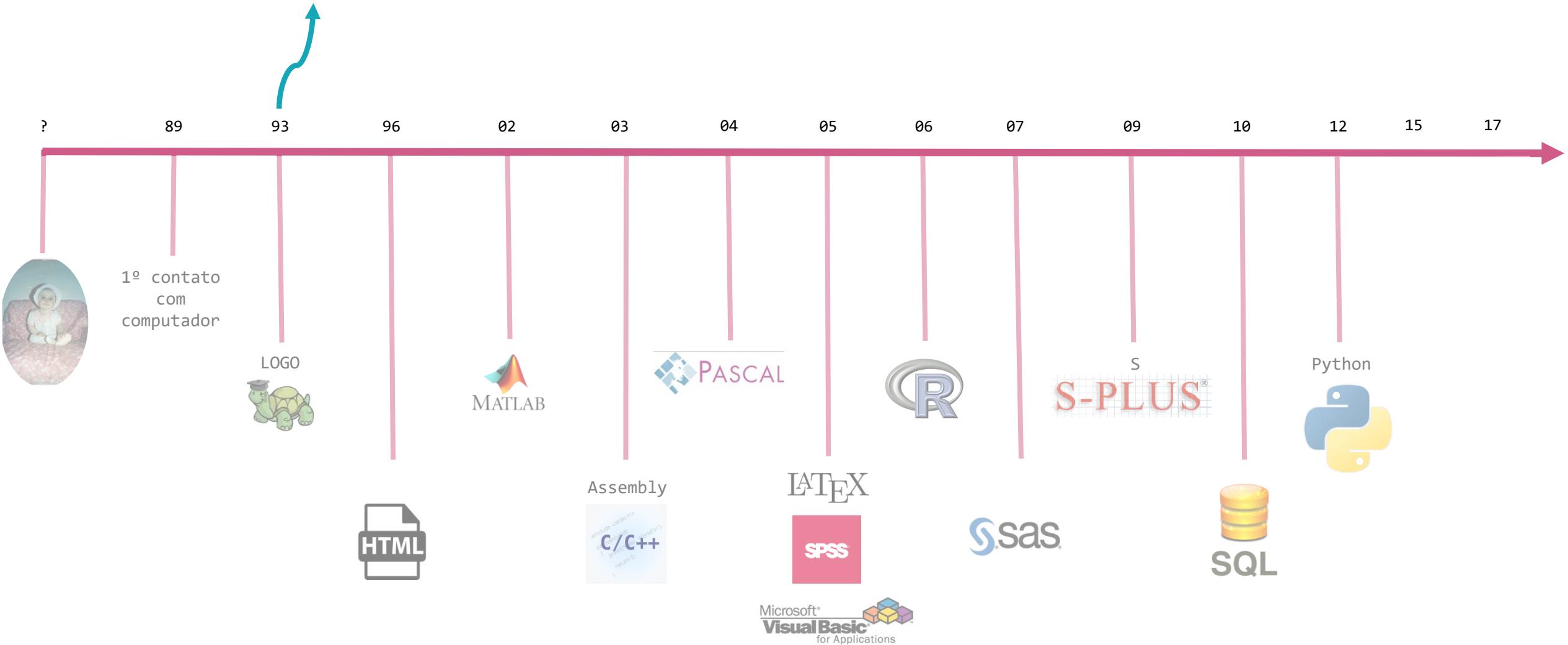
Não poderia viver de fazer programa

Aishameriane Schmidt



Formatou o
computador da
família tentando
instalar um jogo

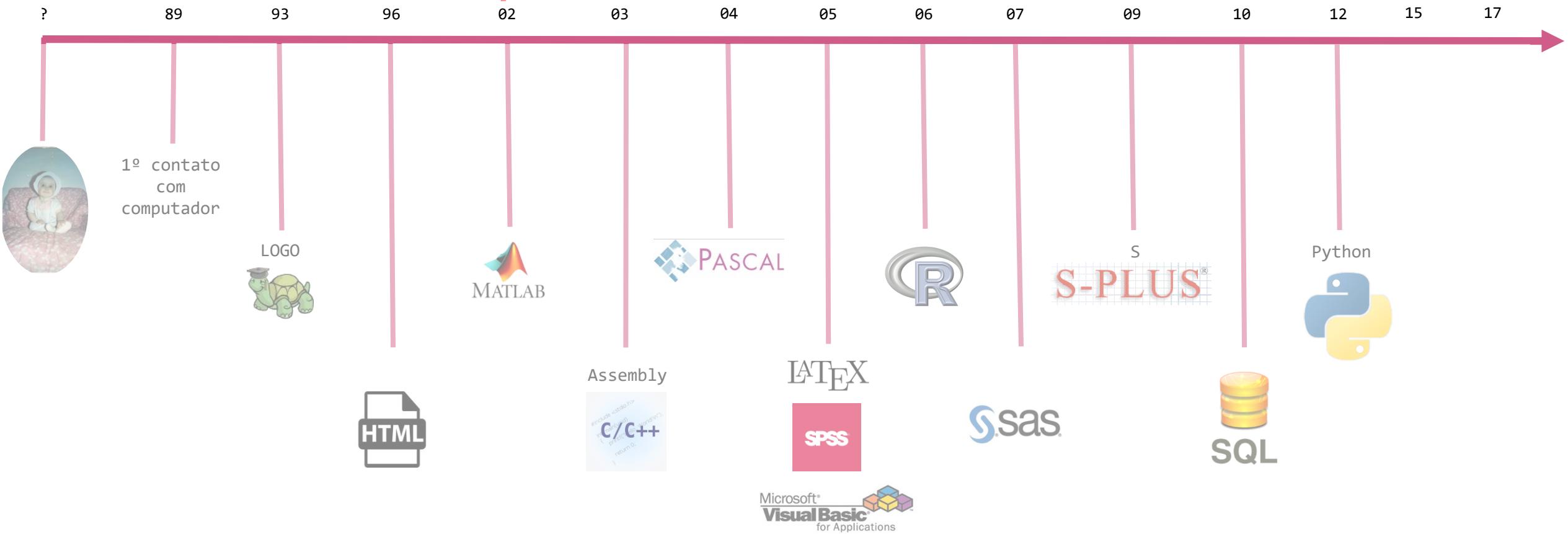
Aishameriane Schmidt

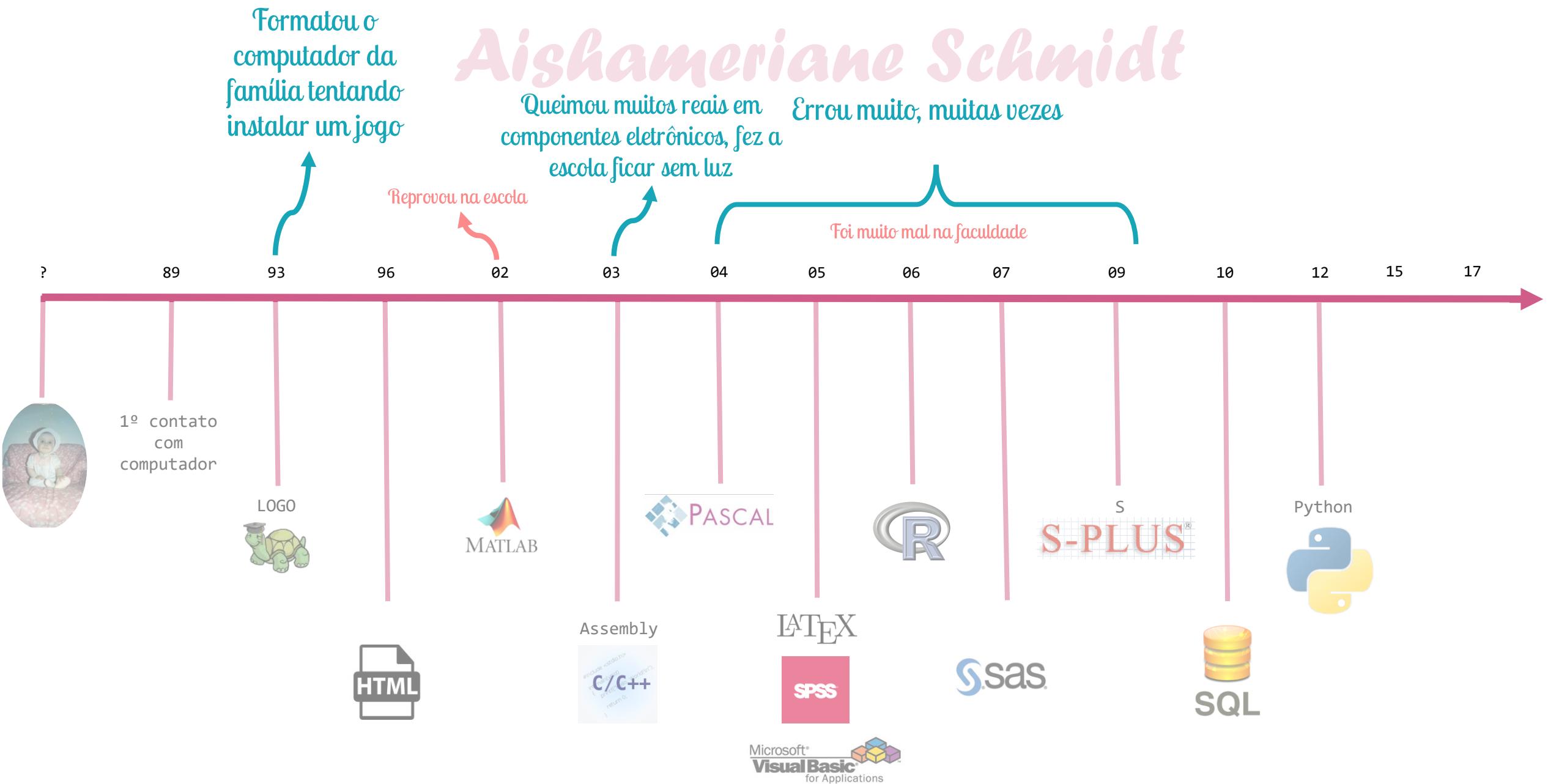


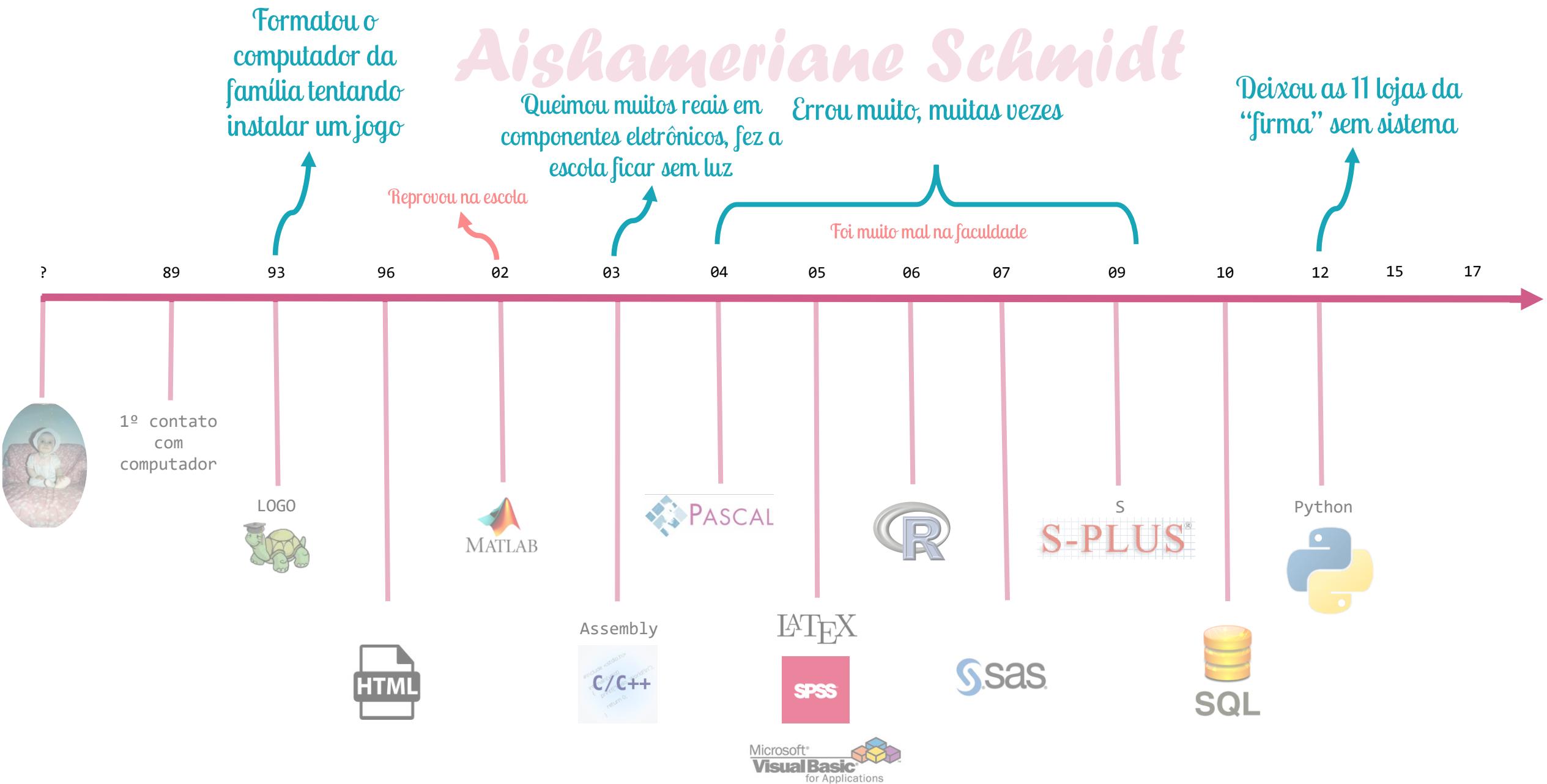
Aishameriane Schmidt

Formatou o computador da família tentando instalar um jogo

Queimou muitos reais em componentes eletrônicos, fez a escola ficar sem luz





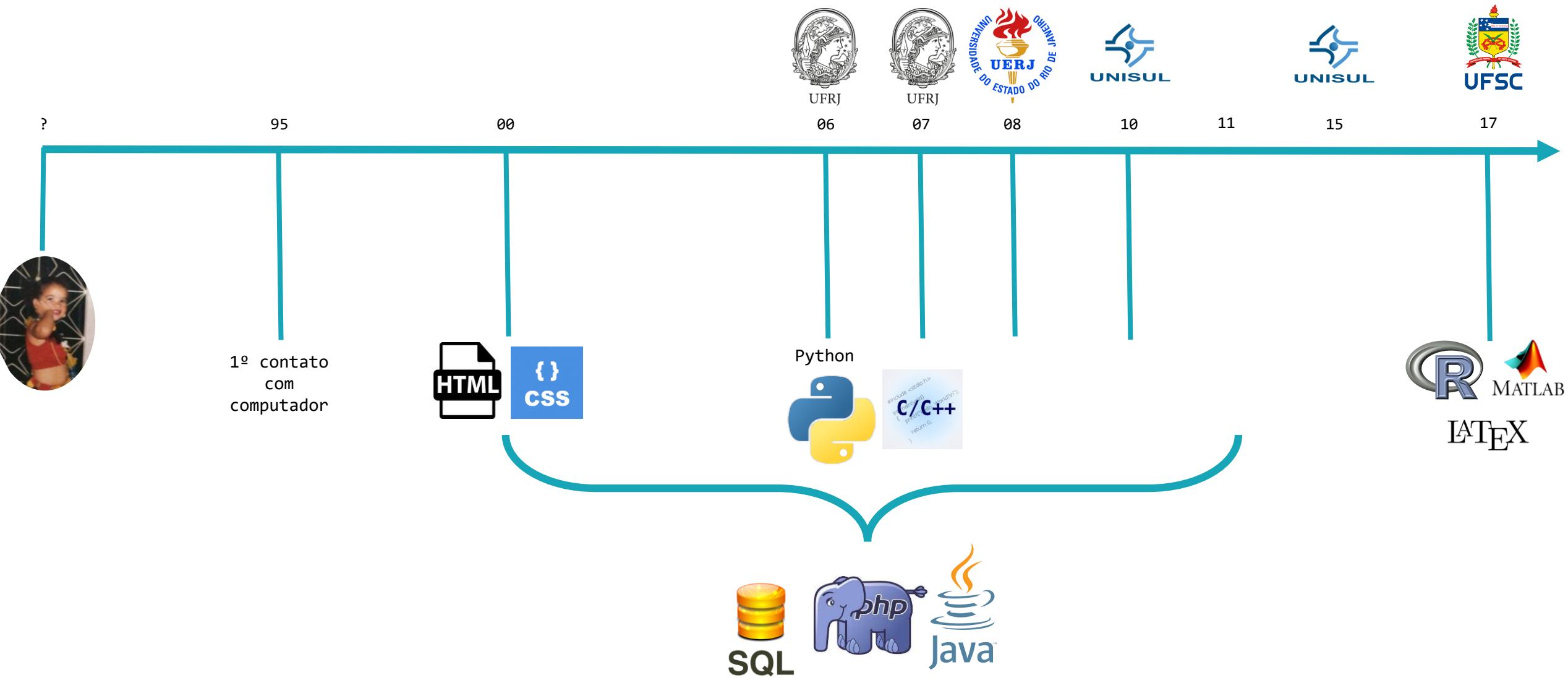


LEILANE CAMBARÁ

- $\frac{1}{10}$ *Engenharia de Computação e Informação* (UFRJ, 2006-X)
- $<\frac{1}{10}$ *Engenharia Ambiental* (UFRJ, 2007-X)
- 1 *Administradora* (UERJ, 2008-2012)
- 1 *Economista* (Unisul, 2010-2014)
- 1 *Esp. em Gestão de Finanças* (Unisul, 2015-2016)
- $\frac{9}{10}$ *Mestra em Economia* (UFSC, 2015-2019)



Leilane Cambará



Avisos gerais

ATTENTION, PLEASE.
ATTENTION.

Ww. Nn. . .

A woman with voluminous, curly blonde hair is standing in front of a shimmering, sequined curtain. She is wearing a bright yellow, sleeveless, sequined top. Her expression is neutral, and she is looking slightly to her right. The lighting is warm, creating a golden glow on her hair and face.

Can I get an amen?

CONTEÚDO

- ✓ *Avisos gerais*
- ✓ *Programação: aspectos históricos e motivação*
- ✓ *R: histórico, aplicações e recursos*
- ✓ *Primeiro contato: Usando o Rstudio*
- ✓ *Sujando as mãos:*
 - *Operações aritméticas, Booleanos, Matrizes, Criação de variáveis*
 - *Leitura de dados externos, estatísticas descritivas*
 - *Gerando um relatório com R Markdown*



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 - *Gerando um relatório com R Markdown*



Por que programar?



Se você não é ele....





Revenue Forecasting Data Analyst

(Menlo Park, CA)

Requirements

- BS or MS in business-related or quantitative field (Economics, Math, Statistics, Engineering, or similar discipline)
- 2+ years experience in data science, analytics, finance, or planning
- Solid Excel and PowerPoint skills
- Solid SQL skills or fluency in at least one programming language (experience with R and/or Python is a plus)
- High attention to detail is a must
- Exceptional analytical and problem-solving skills
- Highly motivated and hard-working
- Genuine excitement for developing and analyzing large, complex data sets and converting them into actionable insights



Business Integrity Associate, Data Operations

(Menlo Park, CA)

Requirements

- 5+ years experience doing quantitative analysis
- BA/BS in Computer Science, Math/Finance, Physics, Applied Economics, Statistics or other technical field. Advanced degrees preferred
- 4+ years of Excel and SQL required
- Development experience in at least one scripting language (PHP, Python, Perl)
- Experience with reporting systems and efficient data pipeline architecture
- 4+ years of initiating and driving projects to completion with minimal guidance
- Experience with statistical analysis, and a statistical package such as R, MATLAB, SPSS, SAS, or Stata preferred but not a must
- Strong communication skills, creative problem-solving and curiosity is a must
- Highly motivated and hard-working with ability to think clearly under pressure, both individually and in team environment
- Ability to break large, complex problems down into smaller pieces and distill that

Economist



All times are in Pacific Daylight Time.

Basic Qualifications

- PhD in Economics
- Experience with Stata, R or SAS
- Excellent verbal and written communication skills

Preferred Qualifications

- Two to three years of experience in customer behavior modeling, pricing, private consulting or in academic research
- Strong background in econometrics, industrial organization, economic theory, and quantitative methods
- Strong research track record
- Experience using SQL and Python

Macro Economist – New York, NY

Email this job 

- › Date: 17 May 2016
- › Location: United States, New York
- › Salary: 75,000 - 90,000\$ per Annum



Macro Economist – New York, NY

Our client, a top independent research firm, is looking to add a Macro Economist to its US Economist team. The main responsibility of the Macro Economist will be to build and maintain economic models to aid in forecasting and scenario analysis of the United States macro economy.

This position will report to the Chief US Economist

Requirements:

- 3+ years working in an Economist role
- Knowledge in Econometrics including software experience in Stata, R, and Matlab
- Experience with macroeconomic modeling required.
- Background using VAR, ECM, or Factor Analysis
- Desire to work in a team
- Ability to juggle multiple projects at once
- Research experience required
- Strong quantitative and qualitative abilities
- Strong background and understanding in macroeconomics
- Bachelors Degree in Economics, Finance, or Business. A masters and/or PhD in Economics is preferred.

Senior Economist

Business | San Francisco, CA



Apply

Email Listing to a Friend

Qualifications:

- PhD or Master's in economics, statistics or related degree from a top graduate school
- At least 7-10 years of economic or quantitative research. At least three years of applied research experience in the tech industry or similar is highly desired, but not required.
- Familiarity with publicly available summary data and microdata
- Fluency with SQL required, and preferably experienced with Hadoop/Hive/Presto
- Advance experience with Stata, R, or other statistics applications
- Knowledge of or demonstrated interest in housing and local economies
- Solid understanding of economic concepts and econometrics
- Team player with creativity, curiosity, tenacity, and conscientiousness
- Driven self-starter with a strong attention to detail and ability to prioritize effectively and meet deadlines.
- Strong writing skills – ideally someone who can correctly and concisely explain research findings in a consumer-friendly narrative.

Not required, but highly desired: proficiency of data visualization tools such as D3, CartoDB, and Tableau.



Business Analyst, Global Shared Services, Insights

Facebook

São Paulo -Brazil



Posted 6 days ago



8394 views

Requirements

- Bachelor's or Master's degree in an analytical field (e.g. Marketing/Marketing Science, Computer Science, Mathematics, Statistics, **Finance or Economics,**)
- Passion for and background in consumer internet and social media is strongly preferred
- 3-5 years experience, with 2+ years of work experience in data analytics
- Proficiency in SQL and Excel
- Prior experience in data analytics and statistical programming with proficiency in using statistical tools such as R, SAS, SPSS etc.
- Working knowledge of data visualization tools such as Tableau, Micro Strategy etc.
- Proven experience leading data driven projects from definition through interpretation and execution
- Strong analytical skills, with experience solving ambiguous problems using data and providing practical business insights
- Fast learner
- achieve power-user status on multiple tools quickly



Operations and Logistics Manager - Porto Alegre

Uber

Porto Alegre - Rio Grande do Sul - Brazil

Posted 3 days ago

167 views

[Apply on company website](#)

[Save](#)

WE'RE LOOKING FOR:

- Bachelor's degree in Economics, Finance, Statistics, Engineering or similar field.
- 3-6 years of Strategy Consulting, Accounting, or Banking background with previous experience using data to drive business decisions.
- Excellent excel skills, SQL skills preferred.
- Demonstrated leadership of leading initiatives and projects at your organization.
- Startup (all-hands-on-deck) approach.



LAR Economics and Business Analyst

Intel Corporation

Sao Paulo

Posted 106 days ago

2533 views

[Apply on company website](#)

[Save](#)

Job description

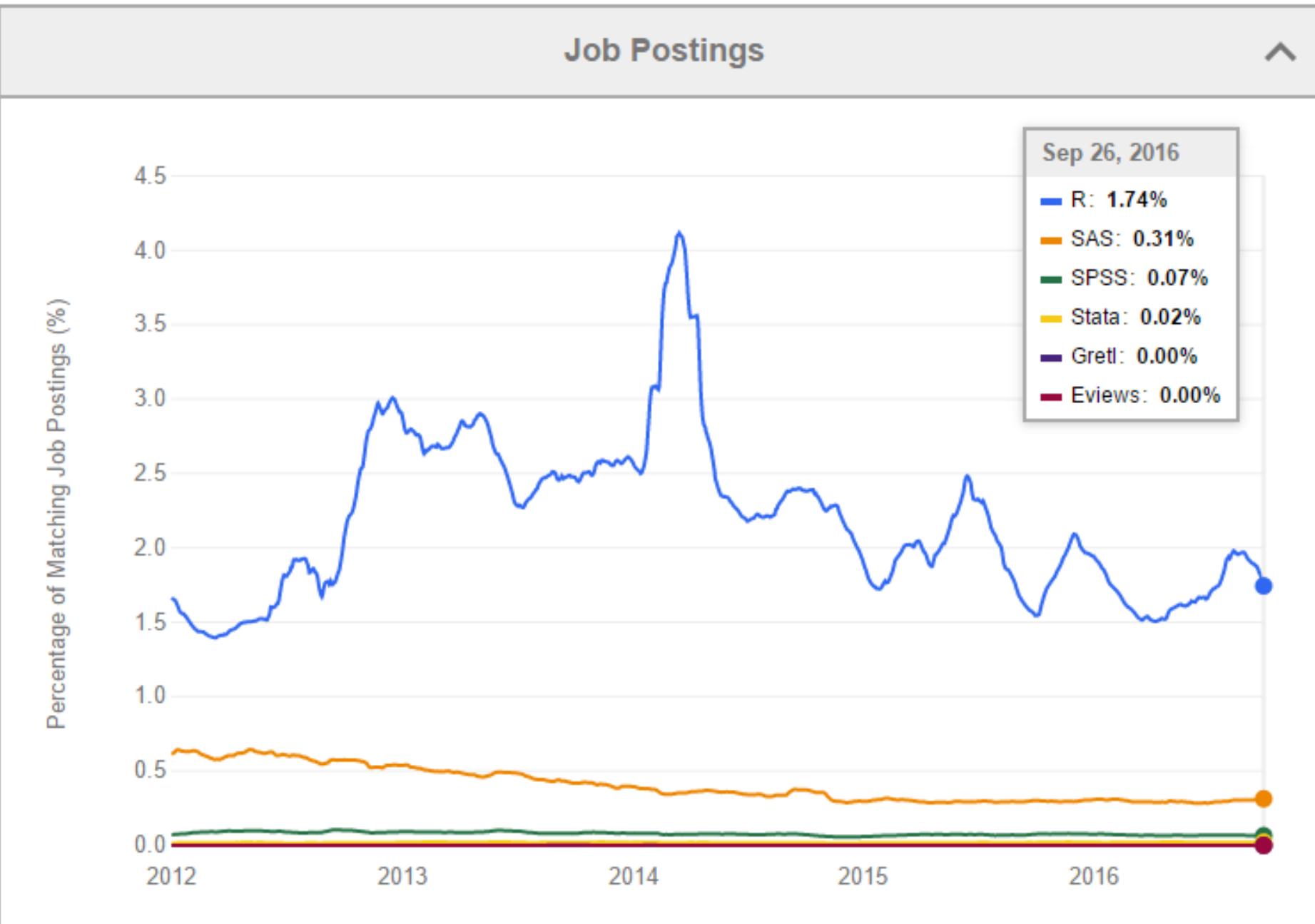
In this position, you will be responsible for developing a deep understanding of Latin American region (LAR) market trends and economics and applying models to forecast units, revenues, and product mix of PCs, servers, and other ICT devices. You will be developing and maintaining a high quality database using industry, economic, and company data. You will also be responsible for working with stakeholders to drive action based upon the forecasts. Stakeholders include Sales and Marketing Group (SMG), Microprocessor Marketing and Business Planning (MMBP), Technology Manufacturing Group (TMG) and Product Divisions. You will be expected to travel to other Intel sites across the globe to attend global forums.

Desired Skills and Experience

You should possess an advanced degree with significant professional experience (preferably with experience in a position with responsibility for developing, maintaining, monitoring, and improving analytical business models). Additional qualifications include:

- Demonstrated competence in locating, understanding, and organizing market and ICT industry
- Experience with industry studies that will support a vertical approach to estimating demand
- Successfully supported requests for special studies, and developed presentations for management and for yourself
- Experience in complex processes such as forecasting, budgeting, or analytical marketing research
- Expertise in an area such as statistics, econometrics, economics, finance, or analytical marketing
- Knowledge of Big Data issues and methods.
- Demonstrated passion for working on complex problems
- History of being a strong contributor to an analytical team
- Adept with several software packages
- Excellent speaking and writing skills
- Ability to handle the demands of simultaneous projects
- Demonstrated the ability to work on your own or with other dedicated teammates
- Demonstrated a record of meeting deadlines and surpassing expectations

Tendência nas ofertas de emprego por tipo de software no site Indeed.com – 2012 a 2016





MISTAKES

IT COULD BE THAT THE PURPOSE OF YOUR LIFE IS
ONLY TO SERVE AS A WARNING TO OTHERS.

É possível que o seu
propósito de vida seja
apenas servir de aviso
para os outros

NBER WORKING PAPER SERIES

GROWTH IN A TIME OF DEBT

Carmen M. Reinhart
Kenneth S. Rogoff

Working Paper 15639
<http://www.nber.org/papers/w15639>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
January 2010

ABSTRACT

We study economic growth and inflation at different levels of government and external debt. Our analysis is based on new data on forty-four countries spanning about two hundred years. The dataset incorporates over 3,700 annual observations covering a wide range of political systems, institutions, exchange rate arrangements, and historic circumstances. Our main findings are: First, the relationship between government debt and real GDP growth is weak for debt/GDP ratios below a threshold of 90 percent of GDP. Above 90 percent, median growth rates fall by one percent, and average growth falls considerably more. We find that the threshold for public debt is similar in advanced and emerging economies. Second, emerging markets face lower thresholds for external debt (public and private)—which is usually denominated in a foreign currency. When external debt reaches 60 percent of GDP, annual growth declines by about two percent; for higher levels, growth rates are roughly cut in half. Third, there is no apparent contemporaneous link between inflation and public debt levels for the advanced countries as a group (some countries, such as the United States, have experienced higher inflation when debt/GDP is high). The story is entirely different for emerging markets, where inflation rises sharply as debt increases.

“Quando a dívida externa chega a 60% do PIB, o crescimento anual decresce aproximadamente 2%”

Johnny Isakson, a Republican from Georgia and always a gentleman, stood up to ask his question: “Do we need to act this year? Is it better to act quickly?”

“Absolutely,” Rogoff said. “Not acting moves the risk closer,” he explained, because every year of not acting adds another year of debt accumulation. “You have very few levers at this point,” he warned us.



Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff

Thomas Herndon*

Michael Ash

Robert Pollin

April 15, 2013

JEL CODES: E60, E62, E65

Abstract

We replicate Reinhart and Rogoff (2010a and 2010b) and find that coding errors, selective exclusion of available data, and unconventional weighting of summary statistics lead to serious errors that inaccurately represent the relationship between public debt and GDP growth among 20 advanced economies in the post-war period. Our finding is that when properly calculated, the average real GDP growth rate for countries carrying a public-debt-to-GDP ratio of over 90 percent is actually 2.2 percent, not -0.1 percent as published in Reinhart and Rogoff. That is, contrary to RR, average GDP growth at public debt/GDP ratios over 90 percent is not dramatically different than when debt/GDP ratios are lower.

Replicamos o estudo de Reinhart e Rogoff e encontramos que (1) **erros de código**, (2) exclusão seletiva de dados da amostra e (3) ponderação não convencional das estatísticas descritivas levaram a sérios erros que representaram de maneira incorreta a relação entre déficit público e crescimento do PIB (...)

“(...) Um erro na planilha excluiu por completo cinco países da análise (...) Foram calculadas as médias usando as células 30 a 44 ao invés de 30 a 49. (...) Este erro é responsável por um erro da magnitude de -0.3 pontos percentuais (...)"

Fonte: <http://www.businessinsider.com/thomas-herndon-michael-ash-and-robert-pollin-on-reinhart-and-rogoff-2013-4>

	B	C	I	J	K	L	M
2			Real GDP growth Debt/GDP				
3			30 or less	30 to 60	60 to 90	90 or above	30 or less
4	Country	Coverage					
26			3.7	3.0	3.5	1.7	5.5
27	Minimum		1.6	0.3	1.3	-1.8	0.8
28	Maximum		5.4	4.9	10.2	3.6	13.3
29							
30	US	1946-2009	n.a.	3.4	3.3	-2.0	n.a.
31	UK	1946-2009	n.a.	2.4	2.5	2.4	n.a.
32	Sweden	1946-2009	3.6	2.9	2.7	n.a.	6.3
33	Spain	1946-2009	1.5	3.4	4.2	n.a.	9.9
34	Portugal	1952-2009	4.8	2.5	0.3	n.a.	7.9
35	New Zealand	1948-2009	2.5	2.9	3.9	-7.9	2.6
36	Netherlands	1956-2009	4.1	2.7	1.1	n.a.	6.4
37	Norway	1947-2009	3.4	5.1	n.a.	n.a.	5.4
38	Japan	1946-2009	7.0	4.0	1.0	0.7	7.0
39	Italy	1951-2009	5.4	2.1	1.8	1.0	5.6
40	Ireland	1948-2009	4.4	4.5	4.0	2.4	2.9
41	Greece	1970-2009	4.0	0.3	2.7	2.9	13.3
42	Germany	1946-2009	3.9	0.9	n.a.	n.a.	3.2
43	France	1949-2009	4.9	2.7	3.0	n.a.	5.2
44	Finland	1946-2009	3.8	2.4	5.5	n.a.	7.0
45	Denmark	1950-2009	3.5	1.7	2.4	n.a.	5.6
46	Canada	1951-2009	1.9	3.6	4.1	n.a.	2.2
47	Belgium	1947-2009	n.a.	4.2	3.1	2.6	n.a.
48	Austria	1948-2009	5.2	3.3	-3.8	n.a.	5.7
49	Australia	1951-2009	3.2	4.9	4.0	n.a.	5.9
50							
51			4.1	2.8	2.8	=AVERAGE(L30:L44)	

*“Everybody in this country
should learn how to program a
computer... Because it teaches
you how to think”*

Steve Jobs

Fonte: Code.org (<https://youtu.be/nKIu9yen5nc>)

Tradução: todos neste país (EUA) deveriam aprender como programar um computador... porque isso te ensina a pensar.

Como aprender a programar?



**I HAVE NO IDEA
WHAT I'M DOING**



THE FUTURE

IS MADE OF

MISTAKES!

Autonomia é essencial!



Alguns recursos para aprender mais sobre programação (em geral)

- Code dot org
<https://studio.code.org/>
- Computer Science 101 (Stanford)
<https://www.coursera.org/course/cs101>
- Learn to Program: The Fundamentals (Univ. of Toronto)
[Python]
<https://www.coursera.org/course/programming1>
- Curso de Métodos Computacionais em Economia (UnB)
<http://danielcajueiro.blogspot.com.br/2016/02/como-sera-o-curso-de-metodos.html>

Alguns recursos para aprender mais sobre programação (em geral)

- Algorithmic Toolbox
<https://www.coursera.org/learn/algorithmic-toolbox>
- Introduction to Computer Science (Harvard)
[https://www.edx.org/course/introduction-computer-science-harvardx-cs50x#!](https://www.edx.org/course/introduction-computer-science-harvardx-cs50x#/)
- Codecademy
<https://www.codecademy.com/>
- A comparision of programming languages in economics
<http://www.nber.org/papers/w20263.pdf>

O QUE É UM BOM PROGRAMA?

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <p><a class="button" href="/archiv/page/2">Zobrazit další příspěvky &raquo;
34 </div><!-- /content -->
35 <?php get_sidebar(); ?>
36 <div class="cleaner"></div>
37 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(312); 
38 while ( $loop->have_posts() ) : $loop->the_post();
39 require ('part-homepage-cat-feed.php');
40 endwhile;
41 wp_reset_query(); ?>
42 <div class="cleaner"></div>
43 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122);
44 while ( $loop->have_posts() ) : $loop->the_post();
45 require ('part-homepage-cat-feed.php');
46 endwhile;
47 wp_reset_query(); ?>
48 <div class="cleaner"></div>
49 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6);
50 while ( $loop->have_posts() ) : $loop->the_post();
51 require ('part-homepage-cat-feed.php');
52 endwhile;
53 wp_reset_query(); ?>
54 <div class="cleaner"></div>
55 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(3);
56 while ( $loop->have_posts() ) : $loop->the_post();
57 require ('part-homepage-cat-feed.php');
58 endwhile;
59 wp_reset_query(); ?>
60 <div class="cleaner"></div>
61 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6); ?>
```



You wont be bored at RandomOverload.net

Créditos da imagem: <https://randomoverload.org/there-i-fixed-it-screw-your-no-microwave-policy>



Entender inglês, você precisa.

CONTÉUDO

- ✓ *Avisos gerais*
- ✓ *Programação: aspectos históricos e motivação*
- ✓ *R: histórico, aplicações e recursos*
- ✓ *Primeiro contato: Usando o Rstudio*
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 - *Gerando um relatório com R Markdown*





R





R é uma
linguagem de
programação



R é uma
linguagem de
programação



Baseado em S
(1976)



R é uma
linguagem de
programação

Baseado em S
(1976)

Bell Labs
\$\$\$



R é uma
linguagem de
programação

Bell Labs
\$\$\$

Baseado em S
(1976)

Criado na
Austrália
(1991)



R é uma
linguagem de
programação

Bell Labs
\$\$\$

Baseado em S
(1976)

Criado na
Austrália
(1991)

Free
Software!

VANTAGENS DO R (*a.k.a porque o R é rei!*)

É livre

- 0. Liberdade de executar como desejar, para qualquer propósito
- 1. Estudar como o programa funciona e adaptá-lo
- 2. Liberdade de redistribuir cópias
- 3. Liberdade de distribuir cópias com versões modificadas.

VANTAGENS DO R (*a.k.a porque o R é rei!*)

Sistema de
Pacotes

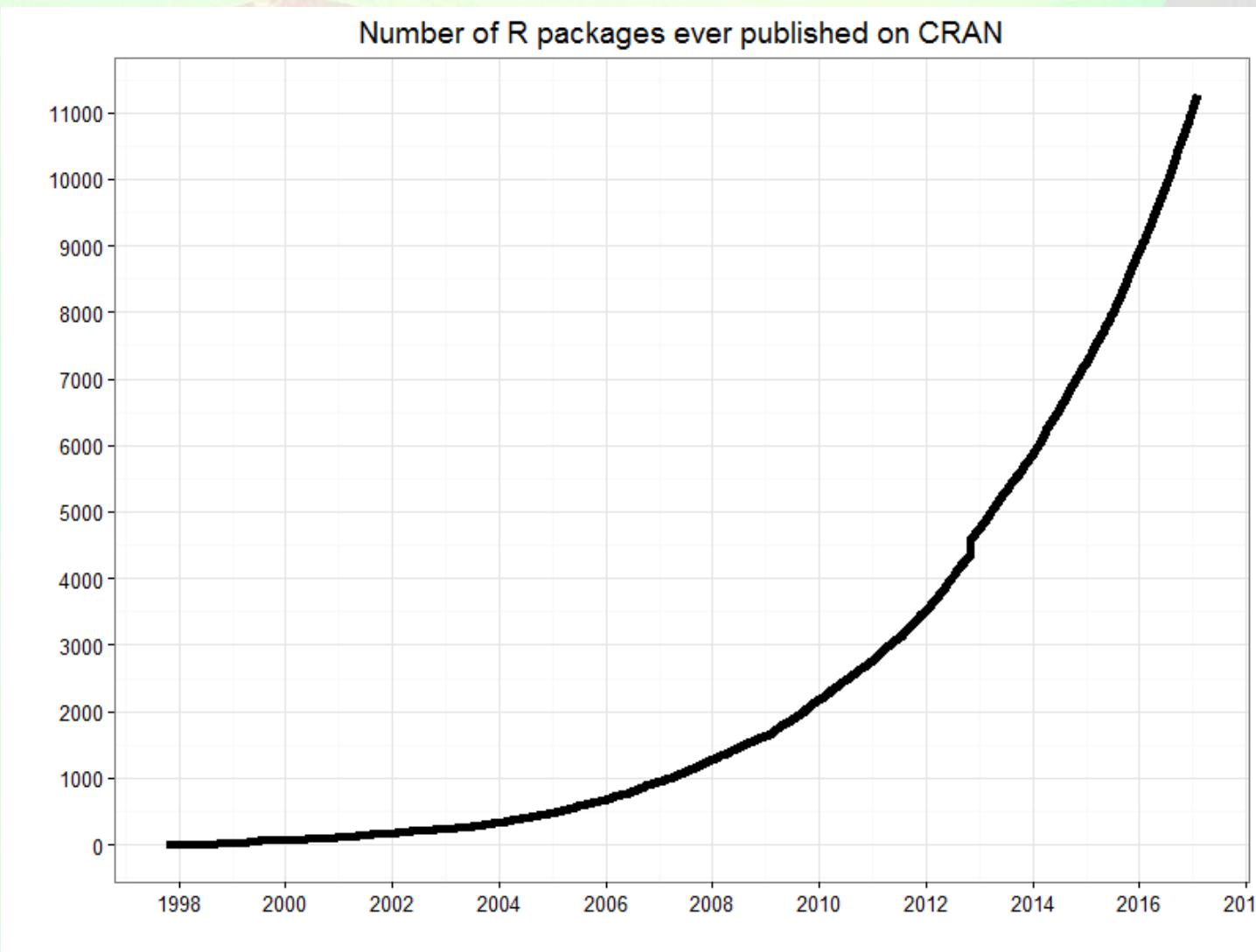
R = base + todo o resto

Qualquer pessoa pode desenvolver
“pacotes” e disponibilizar

Existe uma “curadoria” de pacotes

Atualmente existem 8449 pacotes no CRAN
11.166

VANTAGENS DO R *(a.k.a porque o R é rei!)*



Fonte:
<http://blog.revolutionanalytics.com/2017/01/cran-10000.html>

VANTAGENS DO R (*a.k.a porque o R é rei!*)

Comunidade

CRAN

Comprehensive R Archive Network

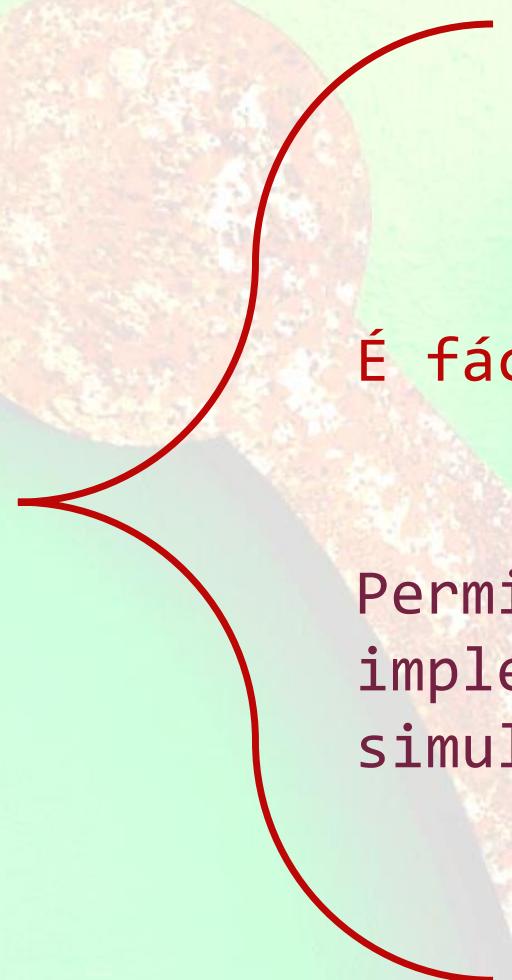
Os pacotes são desenvolvidos pela comunidade

Fóruns de discussão, lista de e-mails

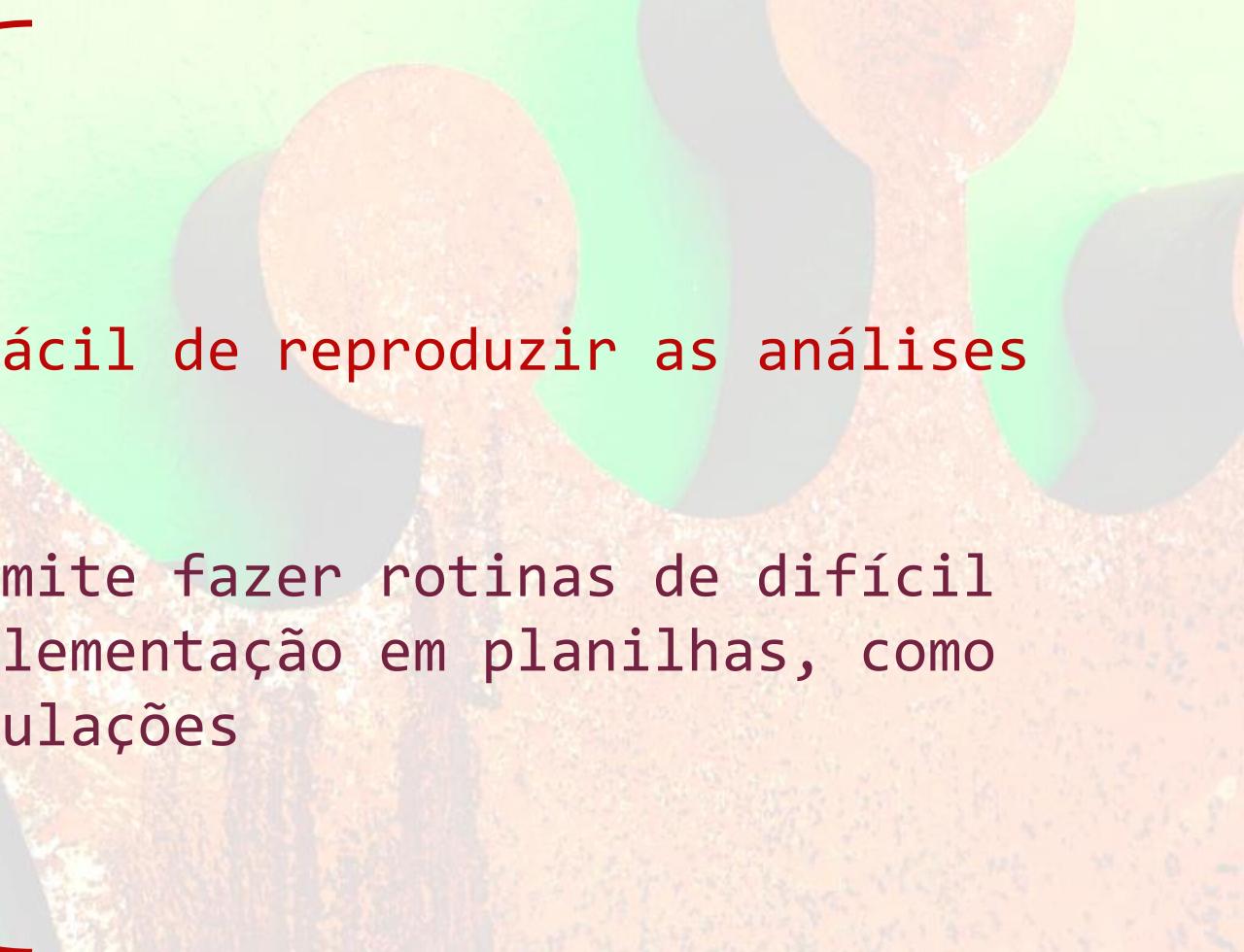
VANTAGENS DO R (*a.k.a porque o R é rei!*)



É uma linguagem de programação

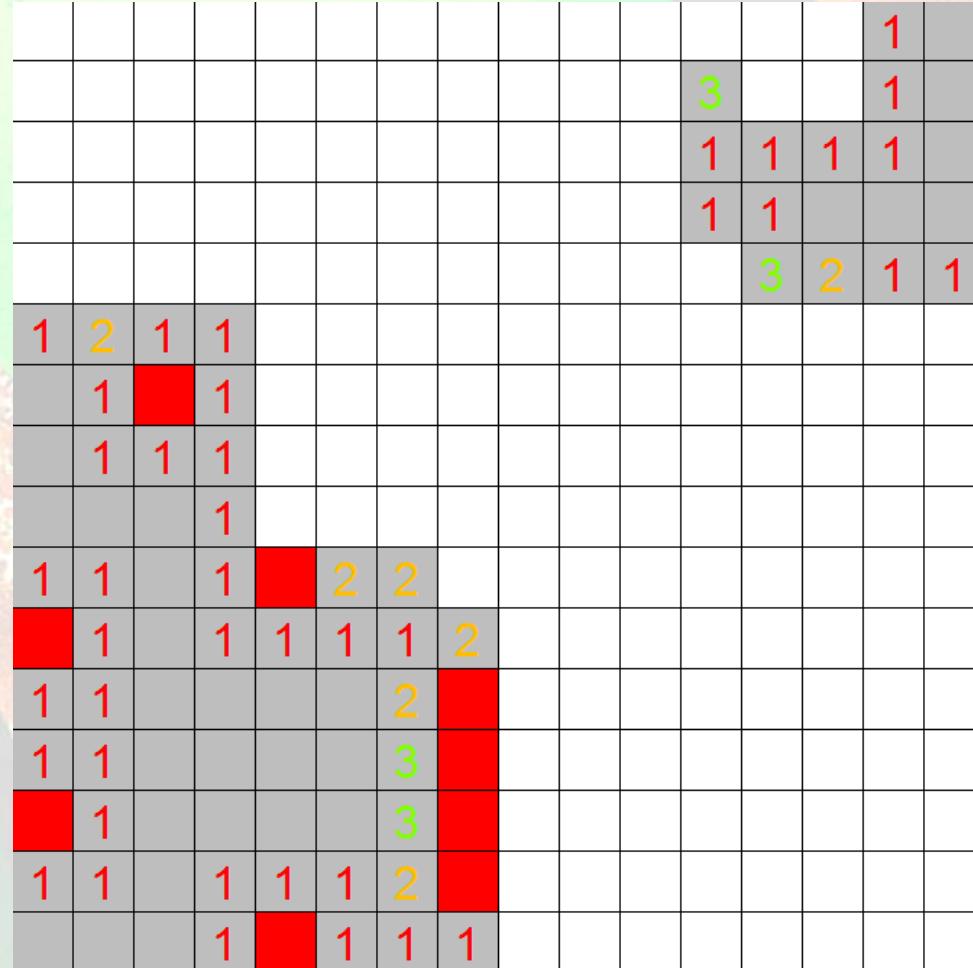
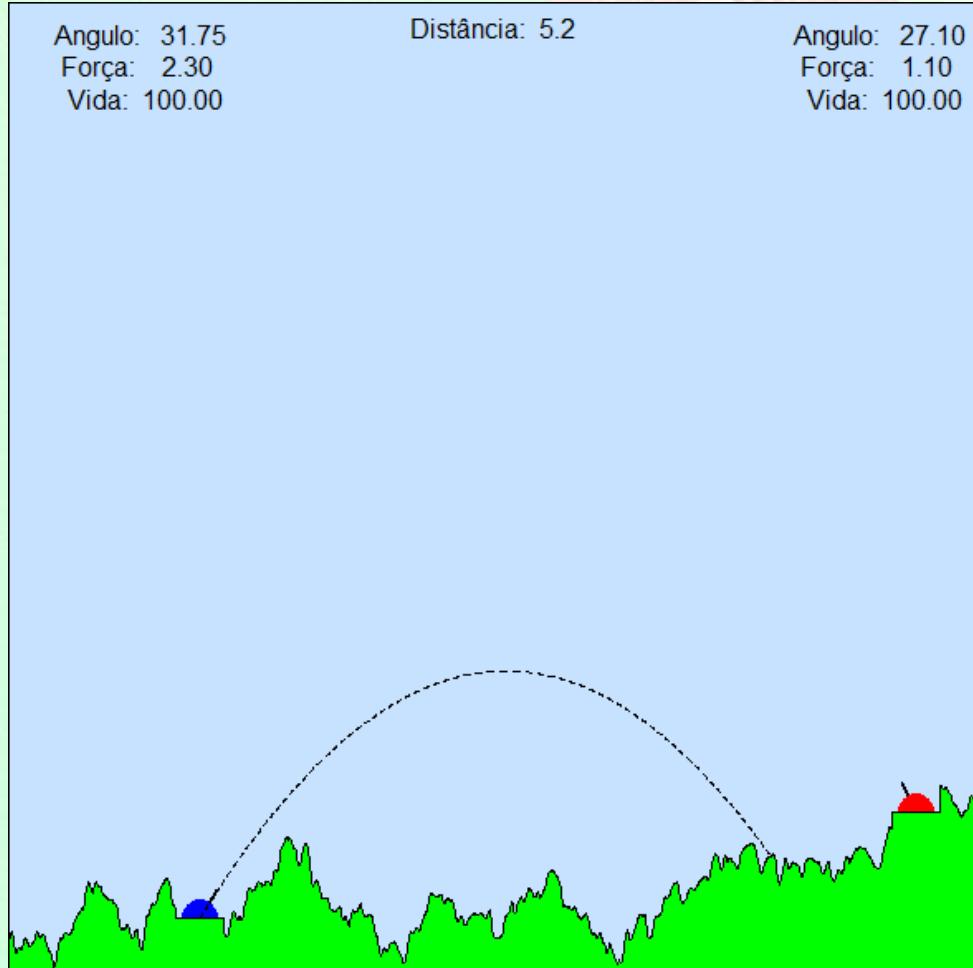


É fácil de reproduzir as análises



Permite fazer rotinas de difícil implementação em planilhas, como simulações

VANTAGENS DO R (*a.k.a porque o R é rei!*)

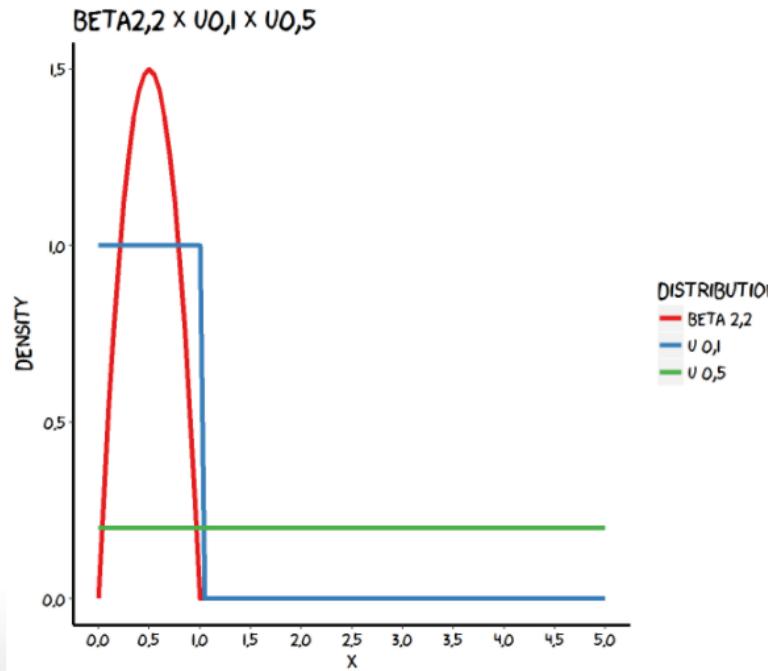


Jogos implementados em R: tanks (esq.) e campo minado (dir.).

Fonte: <http://www.dadosaleatorios.com.br/2015/10/r-tambem-pode-ser-diversao.html>

VANTAGENS DO R (*a.k.a porque o R é rei!*)

Importance sampling



Métodos de Monte Carlo

Ideias básicas

- Métodos de Monte Carlo são uma alternativa para resolução de integrais (especialmente em casos multivariados onde a dimensão do problema torna os algoritmos não estocásticos muito lentos);
- Uma vez que a abordagem bayesiana requer o cálculo de distribuições a posteriori que muitas vezes envolve a resolução de integrais, os algoritmos de MC acabam sendo muito úteis neste contexto;
- MC é baseado na ideia de reamostrar valores de uma distribuição de probabilidade (simulação estocástica). Utilizando um gerador de números pseudo-aleatórios podemos obter valores de qualquer distribuição (através da $F^{-1}(\cdot)$)

Método

Considere a seguinte integral:

$$\int g(\theta)h(\theta|x)d\theta = \mathbb{E}[g(\theta)|x] \quad (01)$$

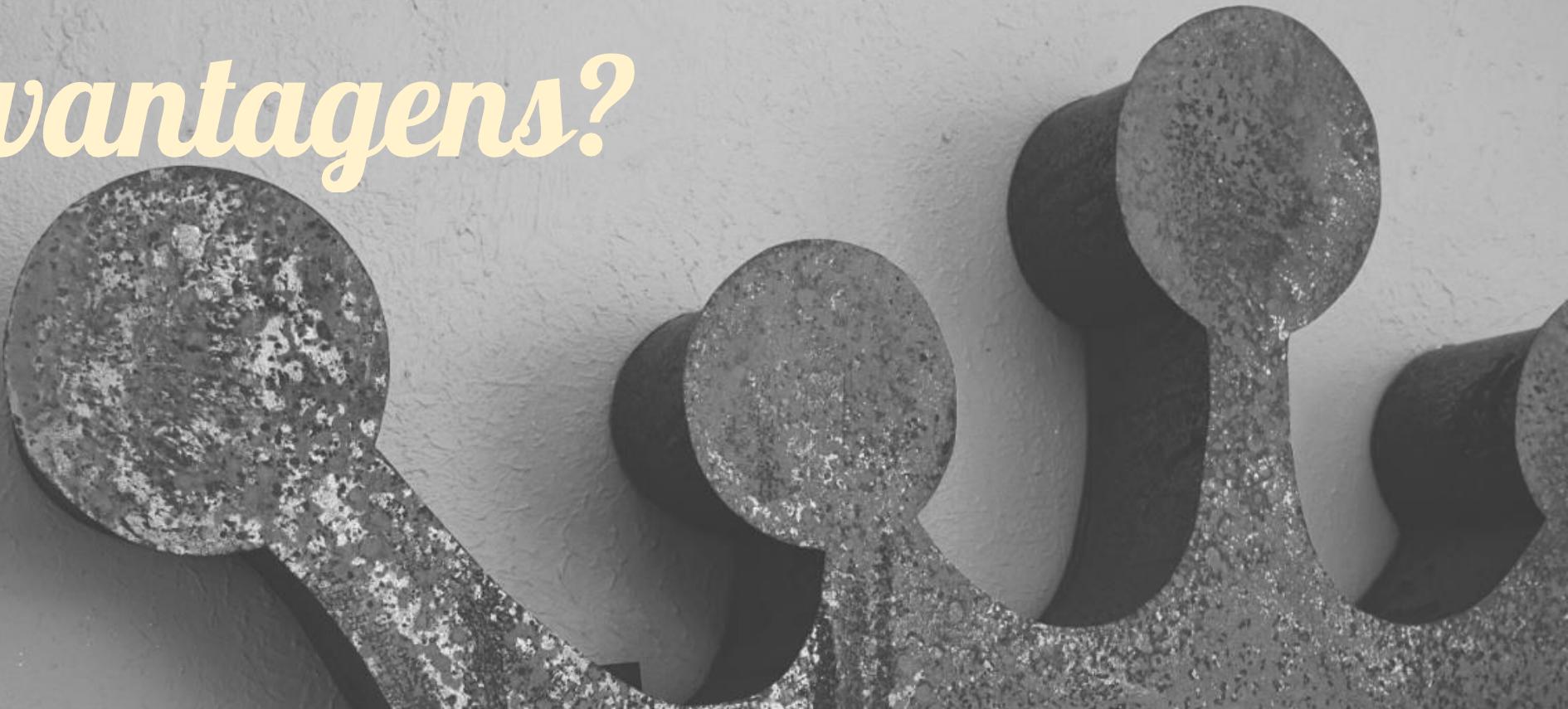
Podemos ainda nos utilizar da probabilidade condicional $f(x|\theta) = \frac{f_{X,\theta}(x,\theta)}{\pi(\theta)} \Rightarrow f_{X,\theta}(x,\theta) = f(x|\theta)\pi(\theta)$ para reescrever $h(\theta|x) = \frac{f(x|\theta)\pi(\theta)}{f_x(x)}$. Como o denominador é uma constante, podemos simplesmente definir o problema da integral acima da seguinte maneira:

$$\int_{\Theta} g(\theta)f(x|\theta)\pi(\theta)d\theta \quad (02)$$

A primeira forma é como está definido o problema em (Paulino, Amaral., and Murteira 2003) (página 286) e a segunda é como está em (Robert 2007) (página 294).

(Murteira) Se pudermos simular uma amostra $\theta_1, \dots, \theta_n$ da densidade a posteriori $h(\theta|x)$, o método de MC irá aproximar por uma média amostral:

E as desvantagens?





Não pergunte para mim!

Alguns aspectos que podem ser um problema

- Tecnologia antiga

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <div class="cleaner" style="text-align: right; margin-top: -10px;">
34 <a href="#" class="button" href="/archiv/page/2">Zobrazit další příspěvky &raquo;
35 </div><!-- /content -->
36
37 </div><!-- /content -->
38 <?php get_sidebar(); ?>
39 <div class="cleaner"></div>
40 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(312); ?>
41 <?php $loop = new WP_Query('posts_per_page=6&cat=312'); ?>
42 while ($loop->have_posts() ) : $loop->the_post();
43 require ('part-homepage-cat-feed.php');
44 endwhile;
45 wp_reset_query(); ?>
46 <div class="cleaner"></div>
47 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122); ?>
48 <?php $loop = new WP_Query('posts_per_page=6&cat=122'); ?>
49 while ($loop->have_posts() ) : $loop->the_post();
50 require ('part-homepage-cat-feed.php');
51 endwhile;
52 wp_reset_query(); ?>
53 <div class="cleaner"></div>
54 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6); ?>
55 <?php $loop = new WP_Query('posts_per_page=6&cat=6'); ?>
56 while ($loop->have_posts() ) : $loop->the_post();
57 require ('part-homepage-cat-feed.php');
58 endwhile;
59 wp_reset_query(); ?>
60 <div class="cleaner"></div>
61 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?>
62 <?php $loop = new WP_Query('posts_per_page=6&cat=1'); ?>
```

Alguns aspectos que podem ser um problema

- Tecnologia antiga
- Poucos recursos gráficos ‘poderosos’

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <a href="/archiv/page/2" class="button" style="float: right;">Zobrazit další příspěvky &gt;
34 </div><!-- /content -->
35 <?php get_sidebar(); ?>
36 <div class="cleaner"></div>
37 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(31); ?>
38 <?php $loop = new WP_Query('posts_per_page=6&cat=312'); ?>
39 while ($loop->have_posts() ) : $loop->the_post();
40 require ('part-homepage-cat-feed.php');
41 endwhile;
42 wp_reset_query(); ?>
43 <div class="cleaner"></div>
44 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122); ?>
45 <?php $loop = new WP_Query('posts_per_page=6&cat=122'); ?>
46 while ($loop->have_posts() ) : $loop->the_post();
47 require ('part-homepage-cat-feed.php');
48 endwhile;
49 wp_reset_query(); ?>
50 <div class="cleaner"></div>
51 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6); ?>
52 <?php $loop = new WP_Query('posts_per_page=6&cat=6'); ?>
53 while ($loop->have_posts() ) : $loop->the_post();
54 require ('part-homepage-cat-feed.php');
55 endwhile;
56 wp_reset_query(); ?>
57 <div class="cleaner"></div>
58 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?>
59 <?php $loop = new WP_Query('posts_per_page=6&cat=1'); ?>
60 while ($loop->have_posts() ) : $loop->the_post();
61 require ('part-homepage-cat-feed.php');
62 endwhile;
63 wp_reset_query(); ?>
```

Alguns aspectos que podem ser um problema

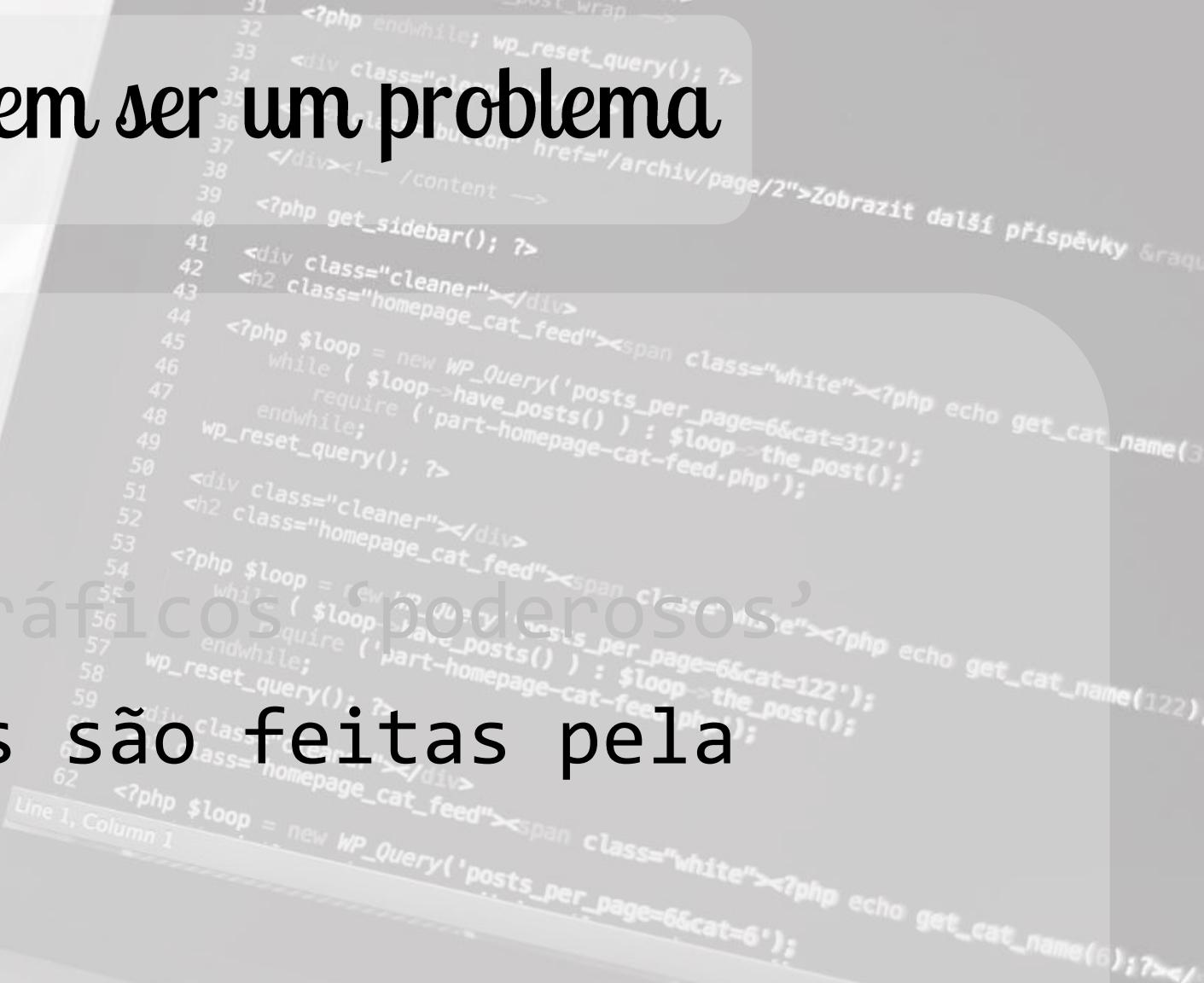
- Tecnologia antiga
- Poucos recursos gráficos ‘poderosos’

ggplot2

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <a href="/archiv/page/2">Zobrazit další příspěvky &raquo;
34 </div><!-- /content -->
35 <?php get_sidebar(); ?>
36 <div class="cleaner"></div>
37 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(312); ?>
38 <?php $loop = new WP_Query('posts_per_page=6&cat=312'); ?>
39 while ($loop->have_posts() ) : $loop->the_post();
40 require ('part-homepage-cat-feed.php');
41 endwhile;
42 wp_reset_query(); ?>
43 <div class="cleaner"></div>
44 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122); ?>
45 <?php $loop = new WP_Query('posts_per_page=6&cat=122'); ?>
46 while ($loop->have_posts() ) : $loop->the_post();
47 require ('part-homepage-cat-feed.php');
48 endwhile;
49 wp_reset_query(); ?>
50 <div class="cleaner"></div>
51 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6); ?>
52 <?php $loop = new WP_Query('posts_per_page=6&cat=6'); ?>
53 while ($loop->have_posts() ) : $loop->the_post();
54 require ('part-homepage-cat-feed.php');
55 endwhile;
56 wp_reset_query(); ?>
57 <div class="cleaner"></div>
58 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?>
59 <?php $loop = new WP_Query('posts_per_page=6&cat=1'); ?>
60 while ($loop->have_posts() ) : $loop->the_post();
61 require ('part-homepage-cat-feed.php');
62 endwhile;
63 <div class="cleaner"></div>
```

Alguns aspectos que podem ser um problema

- Tecnologia antiga
- Poucos recursos gráficos ‘poderosos’
- As funcionalidades são feitas pela comunidade



A blurred screenshot of a computer monitor showing a web browser with PHP code and a WordPress admin interface. The code is displayed in a monospaced font, with line numbers from 31 to 62 visible on the left. The code includes HTML tags like <div>, <h2>, and , and PHP functions like <?php echo get_cat_name()>. In the background, the WordPress dashboard is visible with sections for 'Posts', 'Media', 'Pages', 'Comments', 'Users', and 'Appearance'. A specific post titled 'Zobrazit další příspěvky »' is shown in the list.

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <div class="button" href="/archiv/page/2">Zobrazit další příspěvky &raquo;
34 </div><!-- /content -->
35 <?php get_sidebar(); ?>
36 <div class="cleaner"></div>
37 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(312); ?>
38 <?php $loop = new WP_Query('posts_per_page=6&cat=312'); ?>
39 while ($loop->have_posts()) : $loop->the_post();
40 require ('part-homepage-cat-feed.php');
41 endwhile;
42 wp_reset_query(); ?>
43 <div class="cleaner"></div>
44 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122); ?>
45 <?php $loop = new WP_Query('posts_per_page=6&cat=122'); ?>
46 while ($loop->have_posts()) : $loop->the_post();
47 require ('part-homepage-cat-feed.php');
48 endwhile;
49 wp_reset_query(); ?>
50 <div class="cleaner"></div>
51 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6); ?>
52 <?php $loop = new WP_Query('posts_per_page=6&cat=6'); ?>
53 while ($loop->have_posts()) : $loop->the_post();
54 require ('part-homepage-cat-feed.php');
55 endwhile;
56 wp_reset_query(); ?>
57 <div class="cleaner"></div>
58 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?>
59 <?php $loop = new WP_Query('posts_per_page=6&cat=1'); ?>
60 while ($loop->have_posts()) : $loop->the_post();
61 require ('part-homepage-cat-feed.php');
62 endwhile;
63 <div class="cleaner"></div>
```

Line 1, Column 1

Alguns aspectos que podem ser um problema

- Tecnologia antiga
- Poucos recursos gráficos ‘poderosos’
- As funcionalidades são feitas pela comunidade
- Armazenagem de objetos

The watermark displays a snippet of PHP code from a WordPress theme file. The code defines a loop for homepage category feeds, using `WP_Query` with specific parameters like `'posts_per_page=6&cat=312'` or `'posts_per_page=6&cat=122'`. It includes conditional logic for displaying content and sidebar, and requires a custom template part named `'part-homepage-cat-feed.php'`.

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <a href="/archiv/page/2" class="button" style="float: right;">Zobrazit další příspěvky &rarr;
34 </div><!-- /content -->
35 <?php get_sidebar(); ?>
36 <div class="cleaner"></div>
37 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(312); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=312'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
38 <div class="cleaner"></div>
39 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=122'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
40 <div class="cleaner"></div>
41 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=6'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
42 <div class="cleaner"></div>
43 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
44 <div class="cleaner"></div>
45 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
46 <div class="cleaner"></div>
47 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
48 <div class="cleaner"></div>
49 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
50 <div class="cleaner"></div>
51 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
52 <div class="cleaner"></div>
53 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
54 <div class="cleaner"></div>
55 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
56 <div class="cleaner"></div>
57 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
58 <div class="cleaner"></div>
59 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
60 <div class="cleaner"></div>
61 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(1); ?></span> <?php $loop = new WP_Query('posts_per_page=6&cat=1'); while ($loop->have_posts() ) : $loop->the_post(); require ('part-homepage-cat-feed.php'); endwhile; wp_reset_query(); ?></h2>
62 <div class="cleaner"></div>
```

Line 1, Column 1

Alguns aspectos que podem ser um problema

- Tecnologia antiga
- Poucos recursos gráficos ‘poderosos’
- As funcionalidades são feitas pela comunidade
- Armazenagem de objetos
datatable, integração com sql

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <a href="/archiv/page/2">Zobrazit další příspěvky &raquo;
34 </div><!-- /content -->
35 <?php get_sidebar(); ?>
36 <div class="cleaner"></div>
37 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(31) ?>
38 <?php $loop = new WP_Query('posts_per_page=6&cat=31'); ?>
39 while ($loop->have_posts()) : $loop->the_post();
40 require ('part-homepage-cat-feed.php');
41 endwhile;
42 wp_reset_query(); ?>
43 <div class="cleaner"></div>
44 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122) ?>
45 <?php $loop = new WP_Query('posts_per_page=6&cat=122'); ?>
46 while ($loop->have_posts()) : $loop->the_post();
47 require ('part-homepage-cat-feed.php');
48 endwhile;
49 wp_reset_query(); ?>
50 <div class="cleaner"></div>
51 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6) ?>
52 <?php $loop = new WP_Query('posts_per_page=6&cat=6'); ?>
53 while ($loop->have_posts()) : $loop->the_post();
54 require ('part-homepage-cat-feed.php');
55 endwhile;
56 wp_reset_query(); ?>
57 <div class="cleaner"></div>
58 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122) ?>
59 <?php $loop = new WP_Query('posts_per_page=6&cat=122'); ?>
60 while ($loop->have_posts()) : $loop->the_post();
61 require ('part-homepage-cat-feed.php');
62 endwhile;
63 wp_reset_query(); ?>
```

Se você não sabe estatística/econometria/ou que você quer modelar, o R **não** pode te ajudar.

```
31 <?php endwhile; wp_reset_query(); ?>
32 <div class="cleaner"></div>
33 <p><a class="button" href="/archiv/page/2">Zobrazit další příspěvky &raquo;
34 </div><!-- /content -->
35 <?php get_sidebar(); ?>
36 <div class="cleaner"></div>
37 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(31);
38 <?php $loop = new WP_Query('posts_per_page=6&cat=312');
39 while ($loop->have_posts() ) : $loop->the_post();
40 require ('part-homepage-cat-feed.php');
41 endwhile;
42 wp_reset_query(); ?>
43 <div class="cleaner"></div>
44 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122);
45 <?php $loop = new WP_Query('posts_per_page=6&cat=122');
46 while ($loop->have_posts() ) : $loop->the_post();
47 require ('part-homepage-cat-feed.php');
48 endwhile;
49 wp_reset_query(); ?>
50 <div class="cleaner"></div>
51 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6);
52 <?php $loop = new WP_Query('posts_per_page=6&cat=6');
53 while ($loop->have_posts() ) : $loop->the_post();
54 require ('part-homepage-cat-feed.php');
55 endwhile;
56 wp_reset_query(); ?>
57 <div class="cleaner"></div>
58 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(122);
59 <?php $loop = new WP_Query('posts_per_page=6&cat=122');
60 while ($loop->have_posts() ) : $loop->the_post();
61 require ('part-homepage-cat-feed.php');
62 endwhile;
63 wp_reset_query(); ?>
64 <div class="cleaner"></div>
65 <h2 class="homepage_cat_feed"><span class="white"><?php echo get_cat_name(6); ?>
```



Tutoriais de R interativos

TryR:

<http://tryr.codeschool.com/>

DataCamp - Introduction to R:

<https://www.datacamp.com/courses/free-introduction-to-r>

Tutoriais do Swirl:

<http://swirlstats.com/students.html>



Tutoriais de R (não interativos)

Estatística com R (FGV):
<https://www.youtube.com/watch?v=8HQHf5XCS7g>

Página do professor Paulo Justiniano:
<http://www.leg.ufpr.br/~paulojus/embra pa/Rembrapa/>

R Tutorial (sponsored by Datacamp):
<http://www.cyclismo.org/tutorial/R/>

R tutorial:
<http://www.r-tutor.com/r-introduction>



Tutoriais de R (não interativos)

Learn R programming (Tutorials Point):
<http://www.tutorialspoint.com/r/>

Tutorial Fernando Rosa:
<http://www.fernandohrosa.com.br/br/P/aprenda-a-usar-o-r/>

Using R for Data Analysis and Graphics:
<https://cran.r-project.org/doc/contrib/usingR.pdf>



Cursos de R (gratuitos)*

R Programming:

<https://pt.coursera.org/learn/r-programming>

Statistics and R:

<https://www.edx.org/course/statistics-r-harvardx-ph525-1x>

R Basics:

<https://www.udemy.com/r-basics/>

Reference Cards

R Reference Card by Jonathan Baron

<https://cran.r-project.org/doc/contrib/refcard.pdf>

R Reference Card by Tom Short

<https://cran.r-project.org/doc/contrib/Short-refcard.pdf>

A COMUNIDADE DE R

R Brasil - Programadores

<https://www.facebook.com/groups/1410023525939155/>

Listas de e-mail oficiais

<https://www.r-project.org/mail.html>

R-br - lista brasileira oficial

<http://www.leg.ufpr.br/doku.php/software:rbr>

Stack Overflow - R

<http://stackoverflow.com/questions/tagged/r>

<http://pt.stackoverflow.com/questions/tagged/r>

A COMUNIDADE DE R

Cross Validated - R

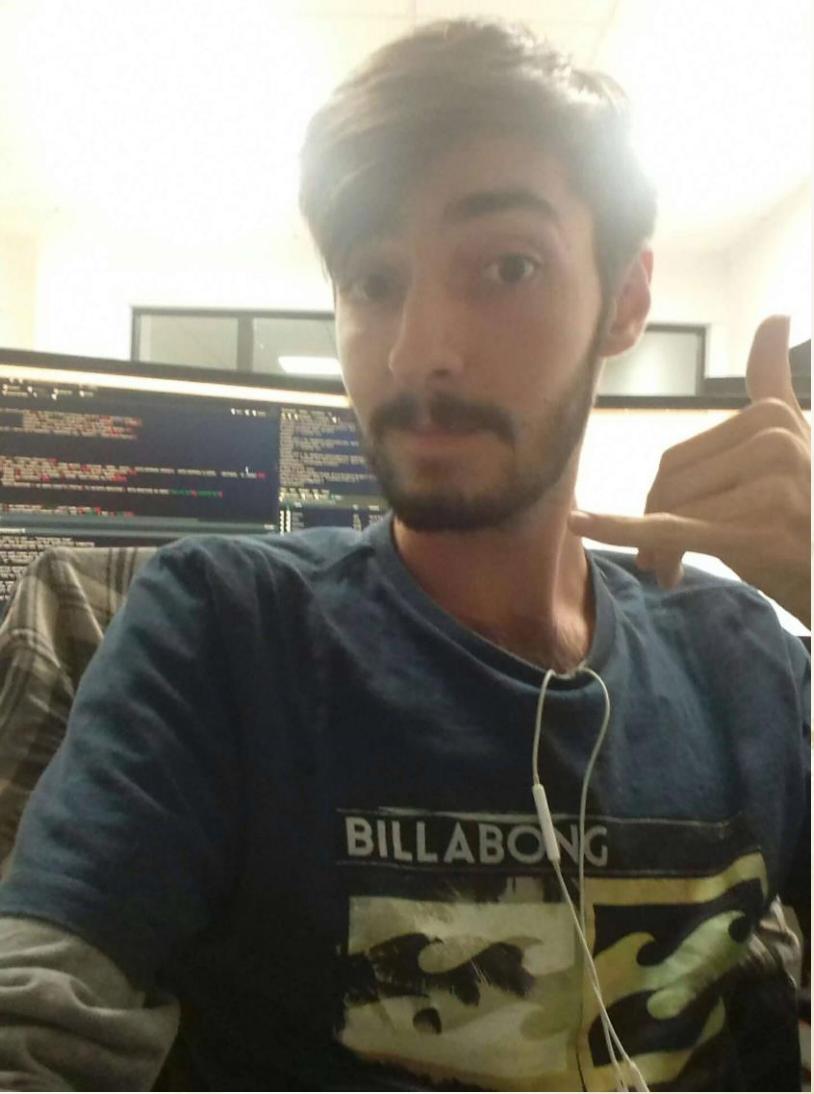
<http://stats.stackexchange.com/questions/tagged/r>

Blog - Dados Aleatórios

<http://www.dadosaleatorios.com.br/>

Vítor Wilher

<http://www.vitorwilher.com/clube-do-codigo/>



Gabriel Toscani, aluno do 7º semestre de Economia da UFSC. Fez o mini curso de R na SAEKO em 2017 e atualmente faz estágio na área de análise de dados.
(veja o relato completo na pasta de materiais do curso)

“Aprendam R (ou python). Usem R (ou python) na graduação pra fazer as coisas. **VAI SER UM SACO**, muito mais difícil que excel no começo, **MAS VALE MUITO A PENA**, vai ajudar muito em qualquer coisa que você queira fazer (...) No fim das contas, **APRENDER PROGRAMAÇÃO É MUITO PARECIDO COM APRENDER OUTRA LÍNGUA QUALQUER**, se você falar errado o computador não entende e se parar de praticar esquece tudo.”

Dúvidas?



