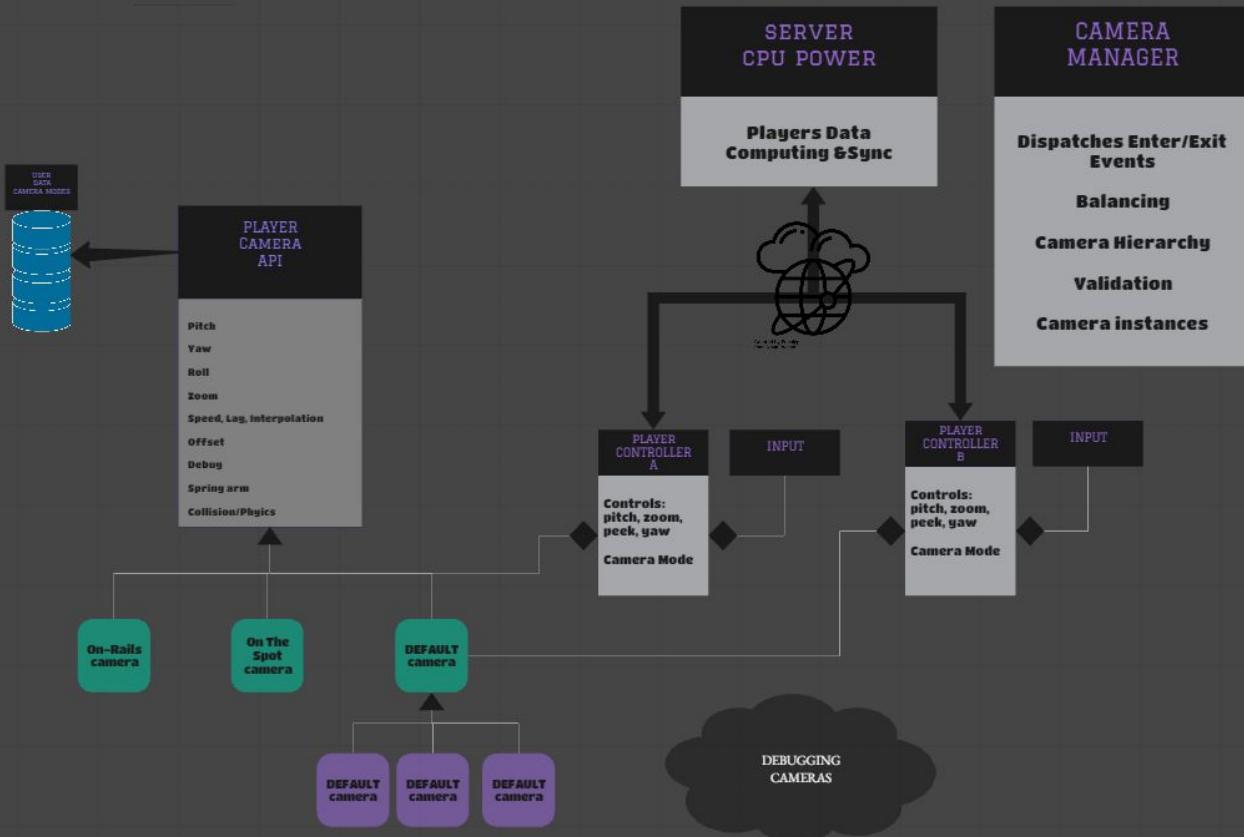


VIDEOJUEGOS: CONSOLIDANDO INGENIERÍA EN TIEMPOS DE IA

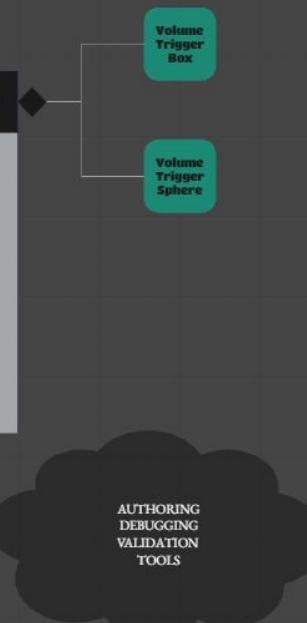
Isaac Vega

Senior Engineer at ELine-Media

RUNTIME



OFF LINE TOOLS



BIOGRAFIA

- Ingeniero en Electrónica esp. Computación UAM-Iztapalapa
- Desarrollo de videojuegos + 18
- Unreal Community Manager CDMX
- Unreal Engine(er) + 14 años
- Sistemas dinámicos de cámaras en tiempo real (los últimos 3 años en el equipo de NA2)
- Emacs, 4coder, vim

TÍTULOS



OTROS TÍTULOS



Cancelled Project
Mexico



Cancelled Project
Germany



Cancelled Project
USA

OBJETIVOS

- Oportunidades laborales dentro de la industria de los videojuegos
- Hábitos de los Ingenieros de Software durante las crisis
- Herramientas para obtener su primer trabajo en la industria

DATOS CURIOSOS - MINECRAFT



DATOS CURIOSOS - MINECRAFT

| Title | Sales | Series | Platform(s) | Initial release date | Developer(s) ^[b] | Publisher(s) ^[b] | Ref. |
|------------------------------|-------------|-------------------------|----------------|----------------------------------|--------------------------------------|-----------------------------|------|
| <i>Minecraft</i> | 300,000,000 | <i>Minecraft</i> | Multi-platform | November 18, 2011 ^[c] | Mojang Studios | Mojang Studios | [4] |
| <i>Grand Theft Auto V</i> | 200,000,000 | <i>Grand Theft Auto</i> | Multi-platform | September 17, 2013 | Rockstar North | Rockstar Games | [5] |
| <i>Tetris (EA)</i> | 100,000,000 | <i>Tetris</i> | Multi-platform | September 12, 2006 | EA Mobile | Electronic Arts | [6] |
| <i>Wii Sports</i> | 82,900,000 | <i>Wii</i> | Wii | November 19, 2006 | Nintendo EAD | Nintendo | [7] |
| <i>PUBG: Battlegrounds</i> | 75,000,000 | <i>PUBG Universe</i> | Multi-platform | December 20, 2017 | PUBG Studios | Krafton | [8] |
| <i>Mario Kart 8 / Deluxe</i> | 71,360,000 | <i>Mario Kart</i> | Wii U / Switch | May 29, 2014 | Nintendo EAD / Nintendo EPD (Deluxe) | Nintendo | [d] |
| <i>Red Dead Redemption 2</i> | 65,000,000 | <i>Red Dead</i> | Multi-platform | October 26, 2018 | Rockstar Games | Rockstar Games | [5] |
| <i>Terraria</i> | 58,700,000 | None | Multi-platform | May 16, 2011 | Re-Logic | Re-Logic / 505 Games | [11] |

DATOS CURIOSOS - IXTLI



DATOS CURIOSOS - CLONARON MI PROYECTO DE TITULACIÓN



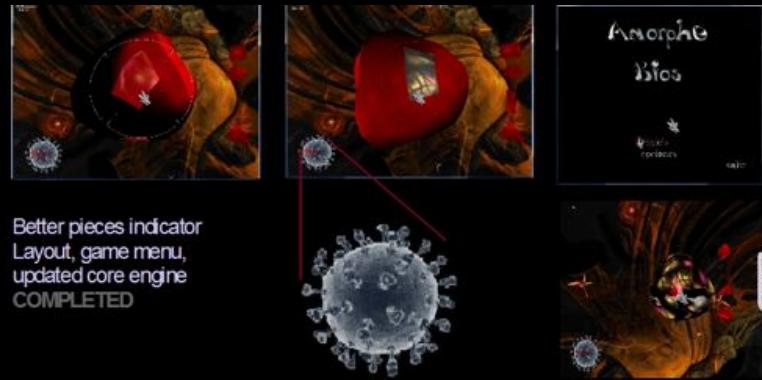
Amorphe Bios



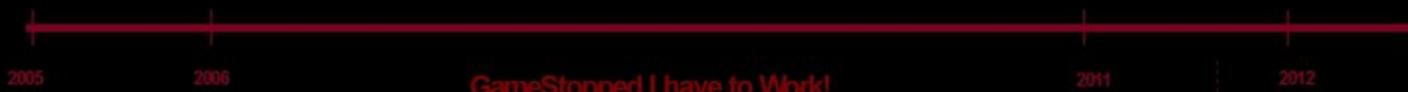
The Birth of Amorphe Bios concept
COMPLETED

Finish basic gameplay mechanics using open source engine (zlib/libpng license);
3D geometric puzzle using a soft and intuitive arcball interface
COMPLETED

AI corrupting the entity, use to another game mode "spacial" FPS, time limited missions
COMPLETED



Better pieces indicator Layout, game menu, updated core engine
COMPLETED

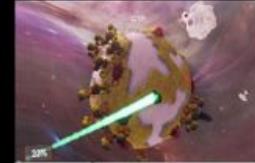


GameStopped I have to Work!

2011

2012

The Birth of Stella concept
UNKNOWN



Bring life to your planet by rotating it and letting it collide with meteors carrying life spores
UNCOMPLETED

Use your mouse to change your planet's rotation.
UNCOMPLETE MECHANICS!

GAME DEVELOPMENT DIFFICULTY TIERS (v2.0)

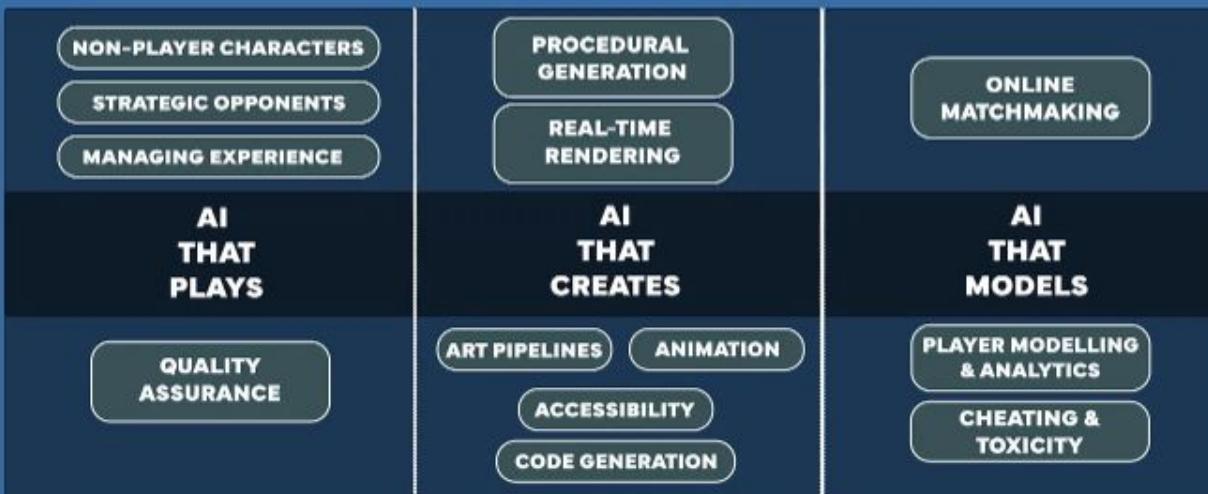
| | | | | |
|----|------------------------------|--------------------|--|----------------------------|
| S+ | FINAL BOSSSES | Funding | Finishing | Work/Life Balance |
| S | @!#?@! alphabetical order | Art | Animation | Business Development |
| | | Level Design | Localization | Marketing |
| | | Programming | Quality Assurance | Sound Design |
| | | Tech Art | | User Experience |
| A | BRAIN MELTERS | Online Multiplayer | Elevators | Moving Platforms |
| | | | Doors | Ladders |
| | | | Stairs | |
| B | EXTREMELY DIFFICULT | Starting | Configurable Gamepads | FPS Optimization |
| | | | Tutorials | Quaternions |
| C | HARD | Good Ideas | | |
| D | EASY | Ideas | From the author of <i>How to Make a Video Game All By Yourself</i> | |
| | | | The #1 Amazon bestseller! | Get the paperback or eBook |

HOW ARTIFICIAL INTELLIGENCE IS USED IN VIDEO GAMES

2024 EDITION



AI FOR THE PLAYER EXPERIENCE



AI FOR GAME PRODUCTION

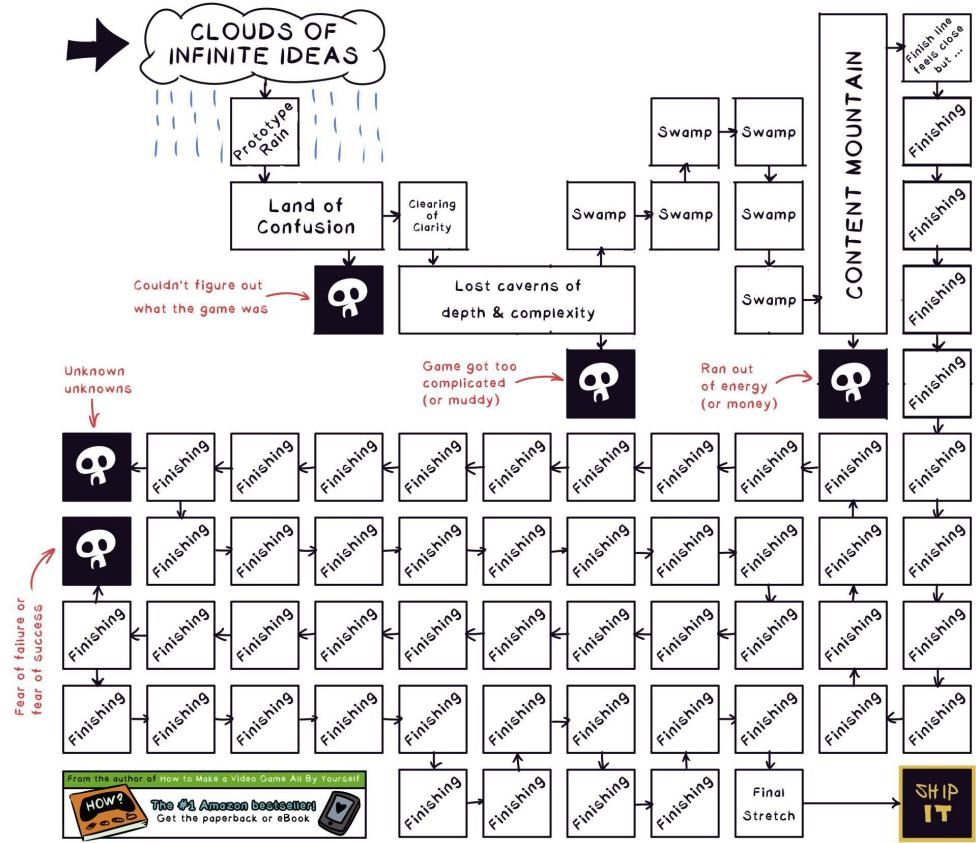


AI AND GAMES

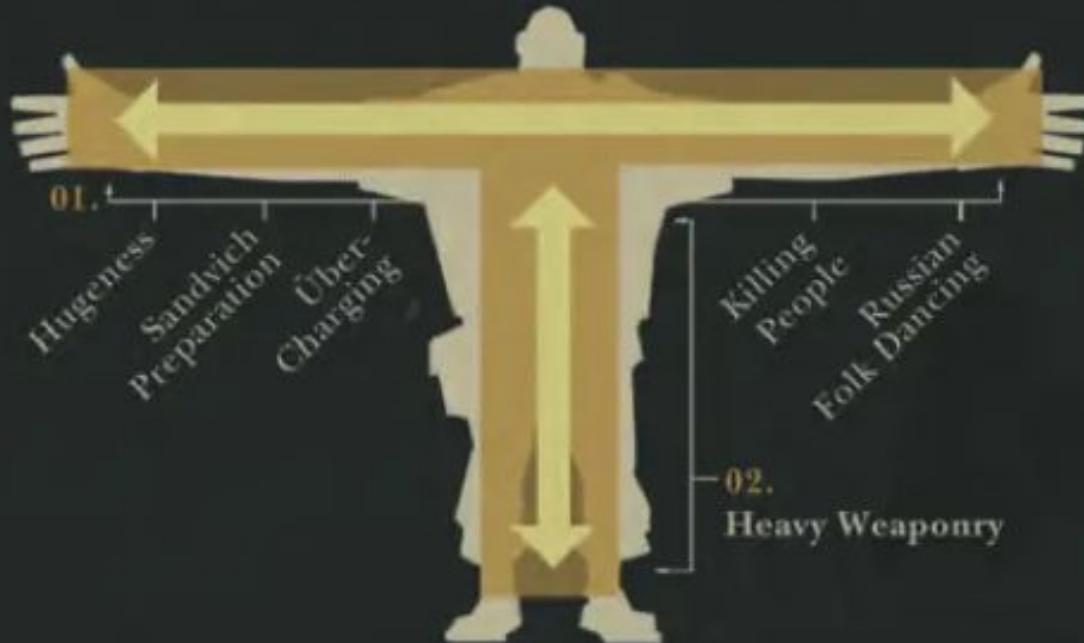
AI AND GAMES CREATES ACCESSIBLE INFORMATION
ON HOW ARTIFICIAL INTELLIGENCE IS USED IN VIDEO GAMES

GAME DEVELOPMENT MAP

rough sketch v2



T-SHAPED MODEL: EMPLOYEE



01. Broad-range generalist

02. Deep expertise in one area

First Law of Software Quality

errors = (more code)²

$$e = mc^2$$

ORACLE

redhat

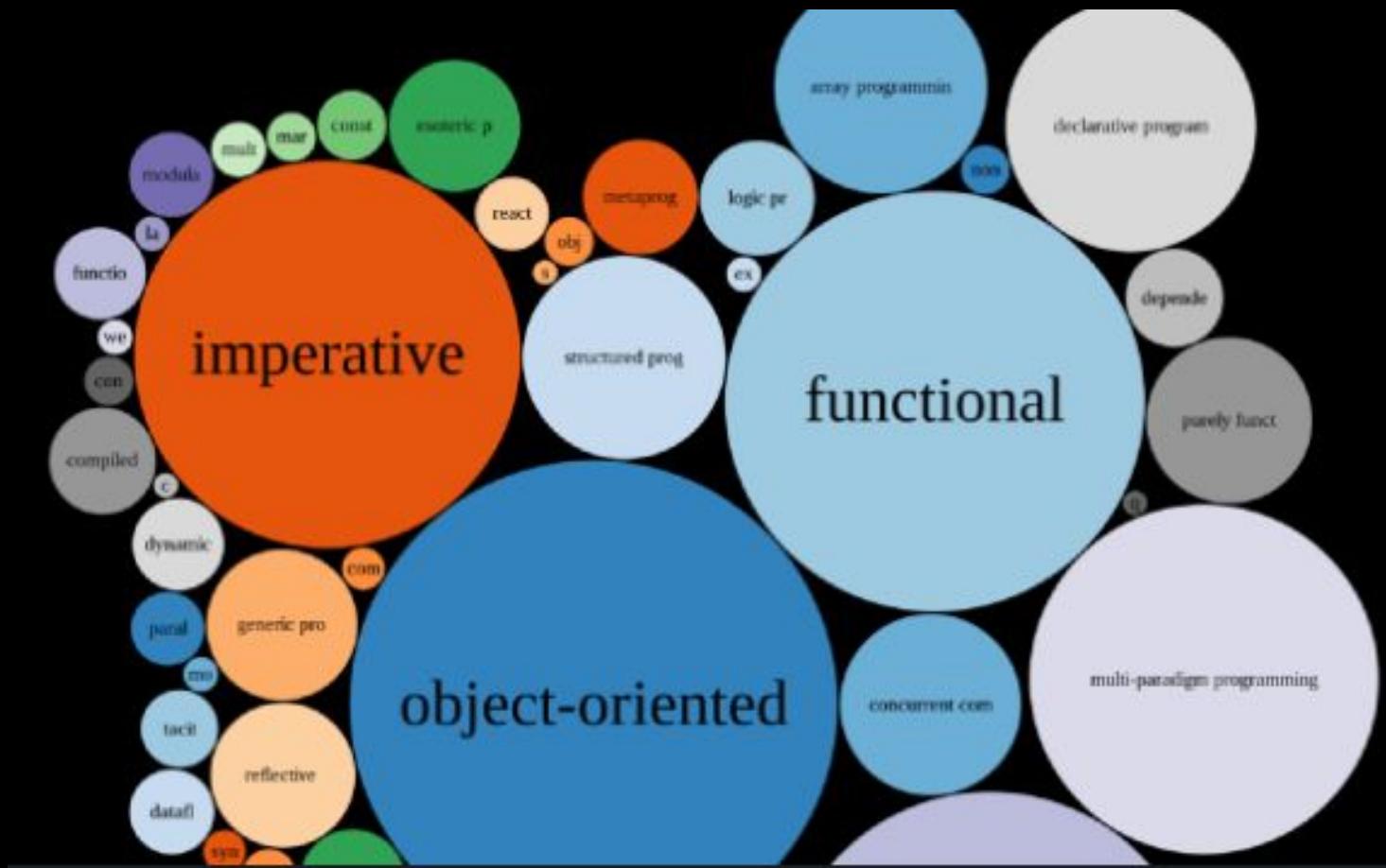
ING

Google



The Stack





Required for any path

Git - Version Control

Learn to Research

Communication Skills

Github

Create your profile. Explore the relevant opensource projects. Make it your habit to look under the hood for the projects you like. Create and contribute to opensource projects.

Question/Answer and Search

If you encounter problems while programming, you can look up information on MSDN, Google, or various reference sites, or ask questions at Stackoverflow, Gamedev. When you ask a question, you have to be clear about what the problem is, what kind of attempt you made, and which part has been encountered. That way you can clearly hear the answer you want.

Game Developer in 2018

Legends

Personal Recommendation!

Possibilities

Pick any!

Now build something

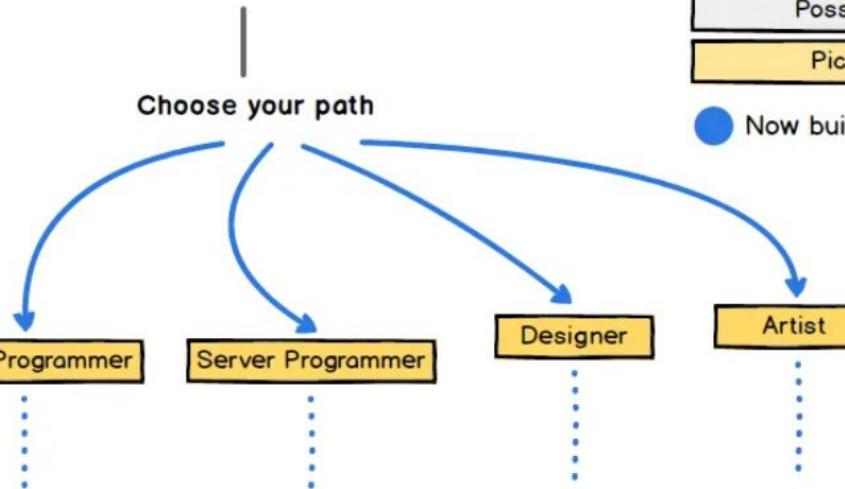
Choose your path

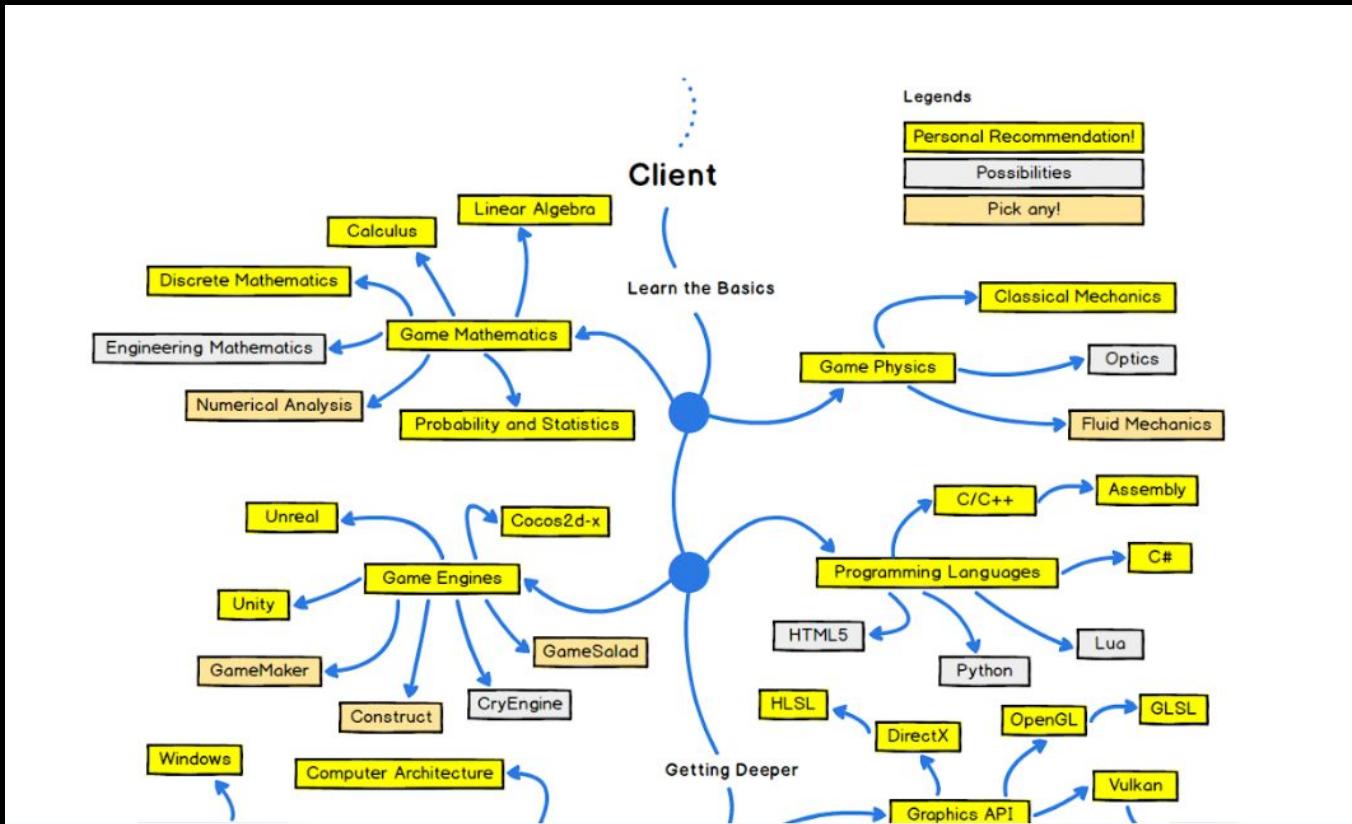
Client Programmer

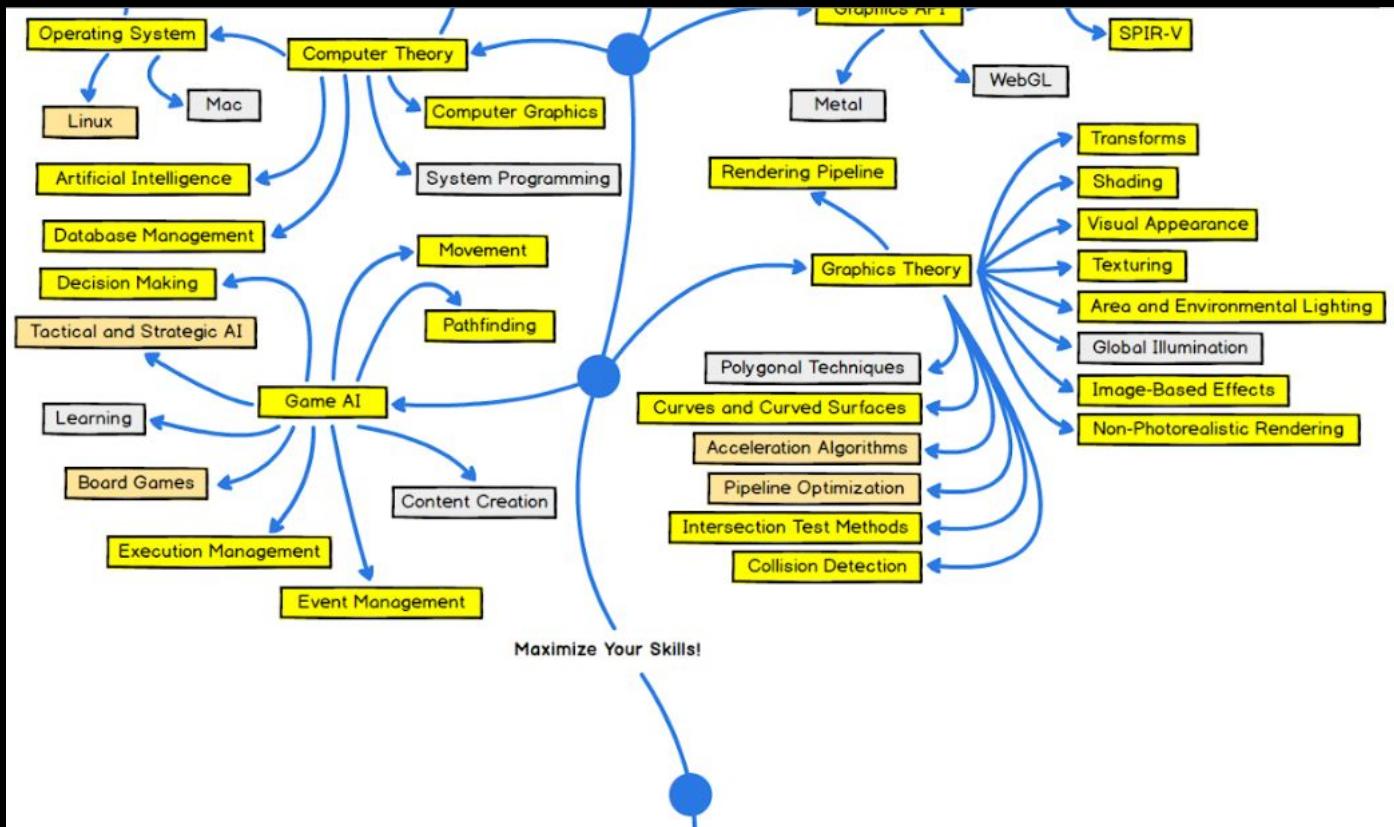
Server Programmer

Designer

Artist







PROBLEMAS TÍPICOS

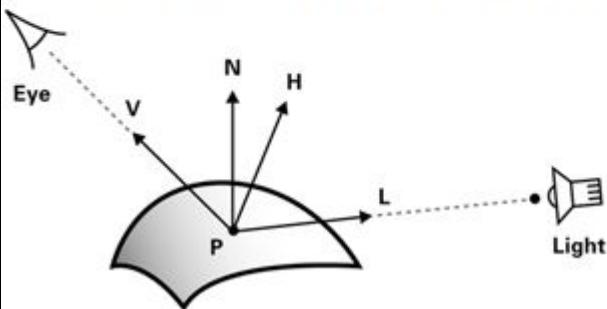
```
float Q_rsqrt(float number) {
    long i;
    float x2, y;
    const float threehalfs = 1.5F;

    x2 = number * 0.5F;
    y = number;
    i = *(long*)&y;           // evil floating point bit level hacking
    i = 0x5f3759df - ( i >> 1 ); // what the fuck?
    y = *(float*)&i;
    y = y * ( threehalfs - ( x2 * y * y ) ); // 1st iteration
    // y = y * ( threehalfs - ( x2 * y * y ) ); // 2nd iteration, this can be removed
    return y;
}
```

$$\text{specular} = K_s \times \text{lightColor} \times \text{facing} \times (\max(N \cdot H, 0))^{\text{shininess}}$$

where:

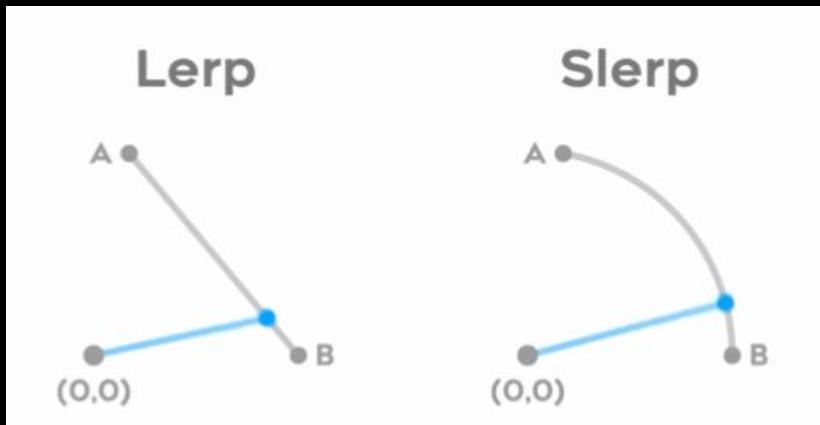
- K_s is the material's specular color,
- lightColor is the color of the incoming specular light,
- N is the normalized surface normal,
- V is the normalized vector toward the viewpoint,
- L is the normalized vector toward the light source,
- H is the normalized vector that is halfway between V and L ,
- P is the point being shaded, and
- facing is 1 if $N \cdot L$ is greater than 0, and 0 otherwise.



emissive + ambient + diffuse + specular

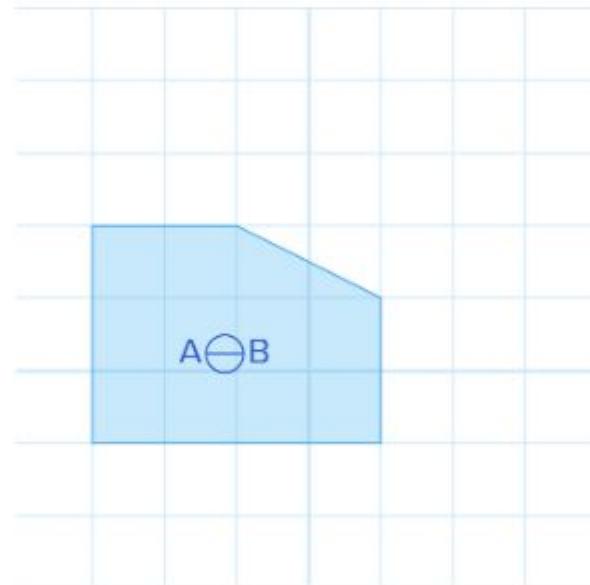
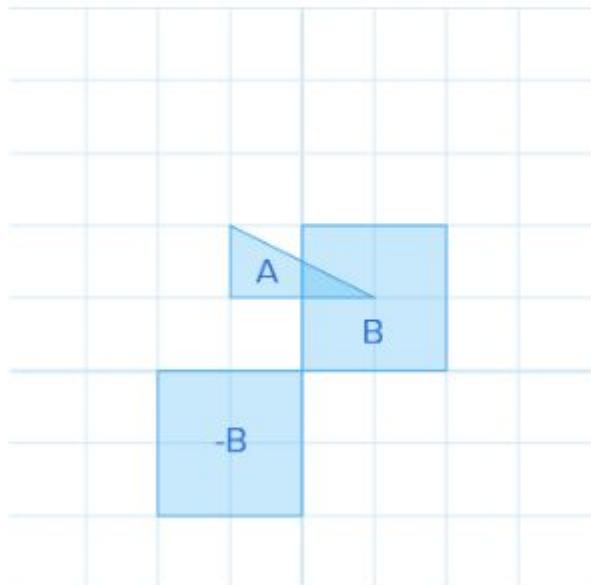
$$\mathbf{B}(t) = \mathbf{P}_0 + t(\mathbf{P}_1 - \mathbf{P}_0) = (1-t)\mathbf{P}_0 + t\mathbf{P}_1, \quad 0 \leq t \leq 1$$

$$\mathbf{q}(t) = (1-t)\mathbf{q}_1 + t\mathbf{q}_2.$$



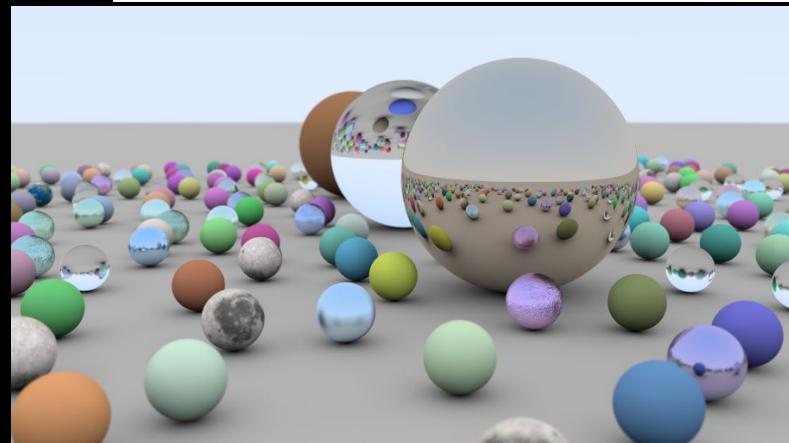
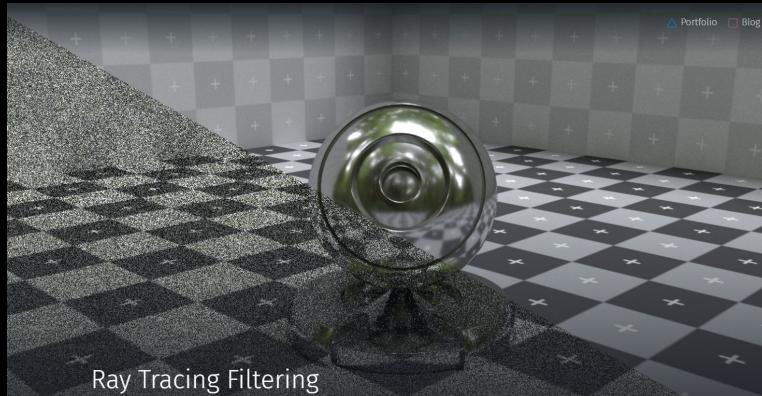
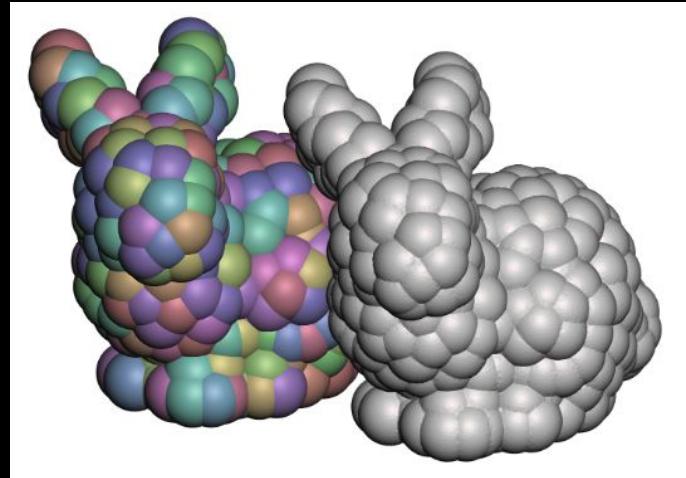
$$q = q_0 + \mathbf{q} = \cos\left(\frac{\alpha}{2}\right) + \sin\left(\frac{\alpha}{2}\right)\mathbf{u}$$

$$A \ominus B = A \oplus (-B)$$



$$L_{\text{o}}(\mathbf{x}, \omega_{\text{o}}, \lambda, t) = L_{\text{e}}(\mathbf{x}, \omega_{\text{o}}, \lambda, t) + L_{\text{r}}(\mathbf{x}, \omega_{\text{o}}, \lambda, t)$$

$$L_{\text{r}}(\mathbf{x}, \omega_{\text{o}}, \lambda, t) = \int_{\Omega} f_{\text{r}}(\mathbf{x}, \omega_{\text{i}}, \omega_{\text{o}}, \lambda, t) L_{\text{i}}(\mathbf{x}, \omega_{\text{i}}, \lambda, t) (\omega_{\text{i}} \cdot \mathbf{n}) \, \text{d} \omega_{\text{i}}$$



DESPLIEGUE PUBLICITARIO (HYPE)





Isaac Vega 06:46

Poll. Do you use any AI tools to deliver your professional work?

- They are part of my pipeline, extensively use of them
- Only use them for initial sketches, final work is a traditionally polished version
- I rarely use them and never for professional work
- What you are talking about?

6

3

2



[21 replies](#) Last reply 3 days ago

An important thing to realize about the grandest conversations surrounding AI is that, most of the time, everyone is making things up. This isn't to say that people have no idea what they're talking about or that leaders are lying.

Sam Altman
CEO of OpenAI

FIEBRE DE ORO

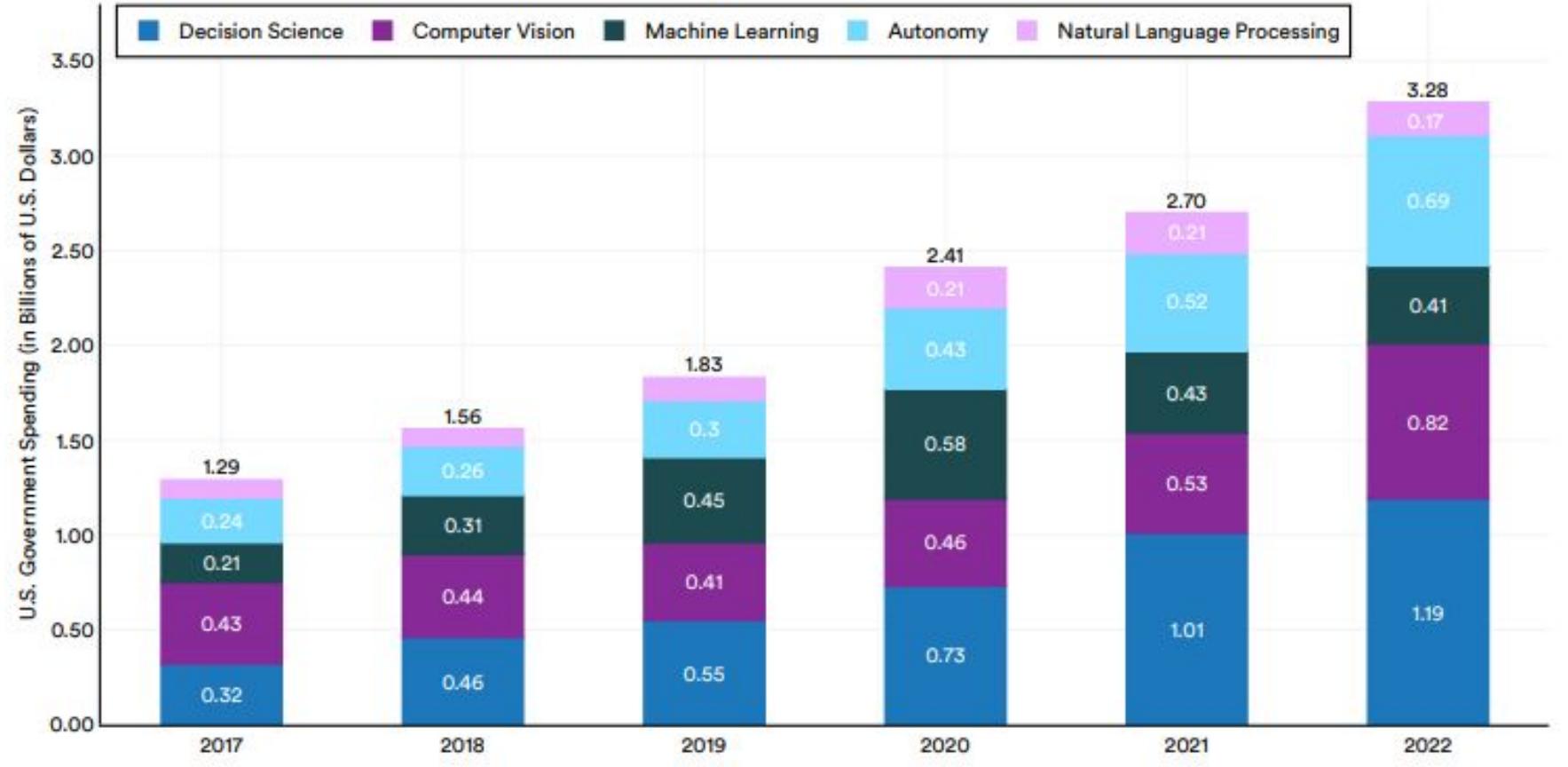


Decoding Nvidia CEO's Views on "No Programming" And Future of AI Code



U.S. Government Spending by Segment, FY 2017–22

Source: Govini, 2022 | Chart: 2023 AI Index Report



PRECISIÓN

Accuracy of ChatGPT changes over time

GPT-4 and 3.5 were tested a few months apart. Their accuracy changed markedly

GPT-4

GPT-3.5

March 2023

83.8

40.1

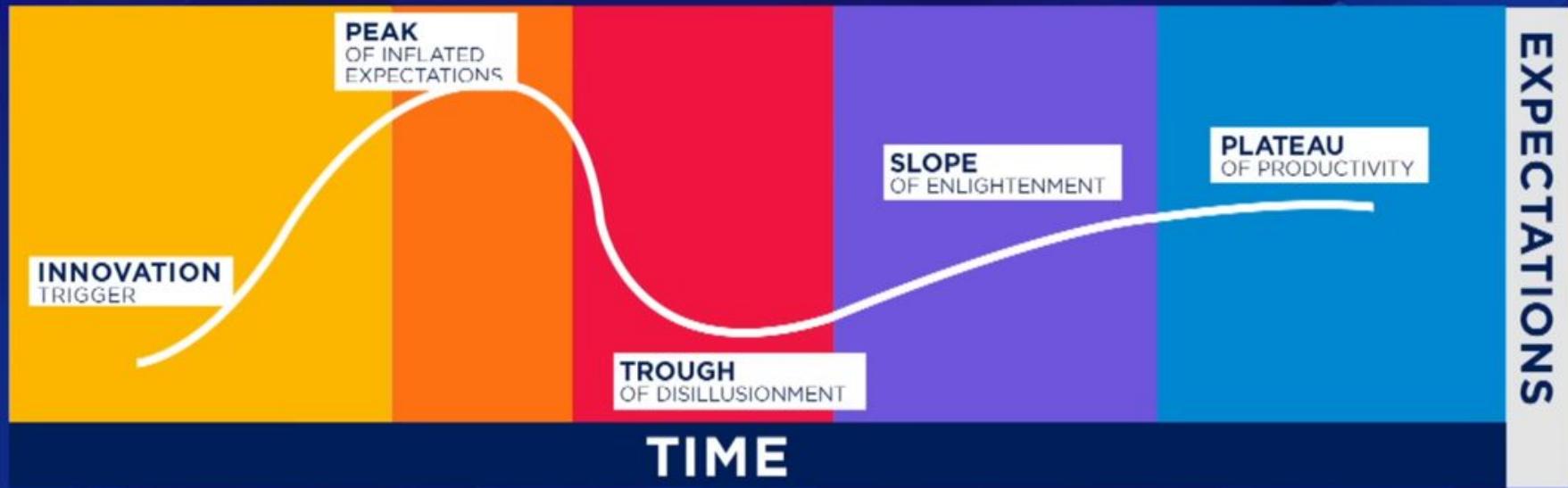
June 2023

43.15

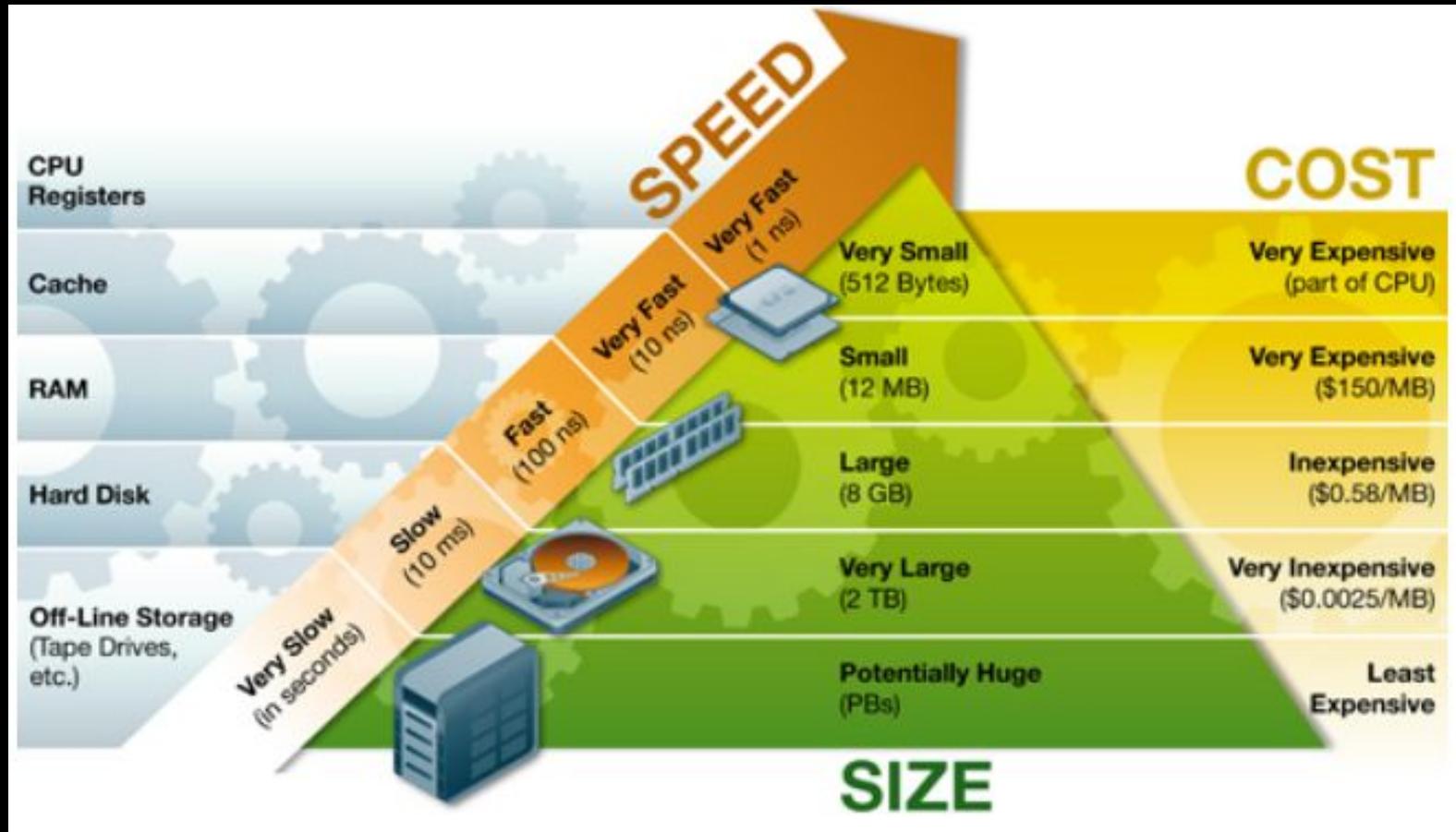
62.2

Figures are the average of results from two math tests from the *linked study*

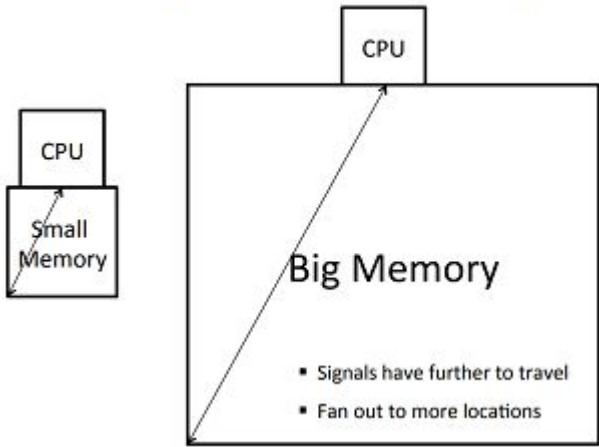
THE GARTNER HYPE CYCLE



99.9%



Physical Size Affects Latency



Task Manager

File Options View

Processes Performance App history Startup Users Details Services

CPU

% Utilization

CPU

5% 2.10 GHz

Memory 28.5/63.9 GB (45%)

Disk 0 (D:) HDD 0%

Disk 1 (E:) HDD 0%

Disk 2 (C:) HDD 0%

Board | Memory | SPD | Graphics | Bench | About

Intel Core i9 9900K

Coffee Lake Max TDP 95.0 W

Socket 1151 LGA

Speed 2.10 GHz

Base speed: 3.60 GHz

Sockets: 1

Cores: 8

Logical processors: 16

Threads Handles 7765 246548

Virtualization: Enabled

L1 cache: 512 KB

L2 cache: 2.0 MB

L3 cache: 16.0 MB

30

Package Technology 14 nm Core Voltage 0.600 V

Specification Intel® Core™ i9-9900K CPU @ 3.60GHz

Family 6 Model E Stepping D

Ext. Family 6 Ext. Model 9E Revision R0

Instructions MMX, SSE, SSE2, SSE3, SSSE3, SSE4.1, SSE4.2, EM64T, AES, AVX, AVX2, FMA3, TSX

Clocks (Core #0)

Core Speed 4700.00 MHz

Multiplier x47.0 (8.0 - 50.0)

Bus Speed 100.000 MHz

Rated FSB

Cache

L1 Data 8 x 32 KBytes 8-way

L1 Inst. 8 x 32 KBytes 8-way

Level 2 8 x 256 KBytes 4-way

Level 3 16 MBytes 16-way

Selection Socket #1 Cores 8 Threads 16

CPU-Z Ver. 2.10.0.x64 Tools Validate Close

10X

99.9% → 99.99%

- Sistema Distribuidos
- Sorting algorithms
- Real time rendering
- Real numbers as fixed or floating precision

... AI necesita sobrepasar a los humanos

ESPECULACIÓN

- No hay pruebas, ni evidencia de que la IA reemplazará Ingenieros de Software (los seniors)
- Juego de azar: inversiones arriesgan su capital en tecnologia IA

EN PAR DE DIAS O SEMANAS



UN PAR DE OCASIONES



**Edward Zitron**

"Lo hacen como una forma de vender un nuevo producto, uno que, si bien no es particularmente útil, también significa que pueden cobrar mucho por los servicios de cómputo en la nube en los que se ejecuta, creando demanda por un producto que les paga dinero solo por existir, lo que les permite ampliar enormemente las ubicaciones de sus centros de datos físicos, reforzando aún más sus monopolios sobre la industria del almacenamiento en la nube."



Edward Zitron

"Microsoft, Google, Meta y Amazon crearon una nueva forma de convertir dinero en más dinero: invertir en una tecnología que requería pagarles a todos ellos una gran cantidad de dinero por los servicios de cómputo en la nube para ejecutarla. El problema, al parecer, fue que ninguno de ellos estaba dispuesto a considerar un mundo en el que estas cosas nunca se convirtieran en más que desechos."



"El estado actual de las cosas efectivamente traspasa los límites del buen sentido, la lógica y la razón, una herida grotesca y derrochadora en el costado de la industria tecnológica (...) Las grandes empresas tecnológicas financiaron un producto dependiente de la nube que cuesta mucho más que cualquier otra cosa en el mercado basándose en exageraciones engañosas sobre lo que puede lograr la inteligencia artificial."

Edward Zitron

**Edward Zitron**

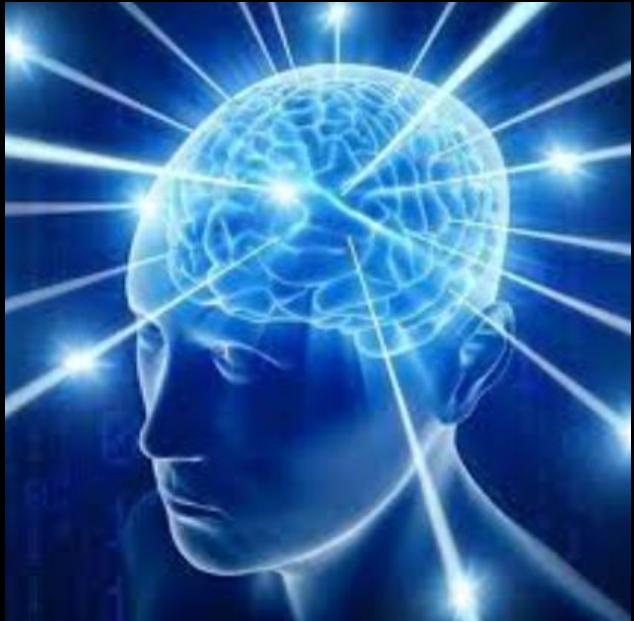
"Y la falta de creatividad en las torres más altas de Silicon Valley y Redmond ha permitido que los hombres más ricos de la industria sean estafados por una máquina fraudulenta que pierde miles de millones de dólares. Para ser claros: a primera vista, no hay nada malo con la IA generativa. Hace cosas interesantes con ciertos contenidos (...) Mi problema son los grandes modelos lingüísticos derrochadores: aquellos que lo roban todo, que requieren tanta energía y crean tan poco a cambio."

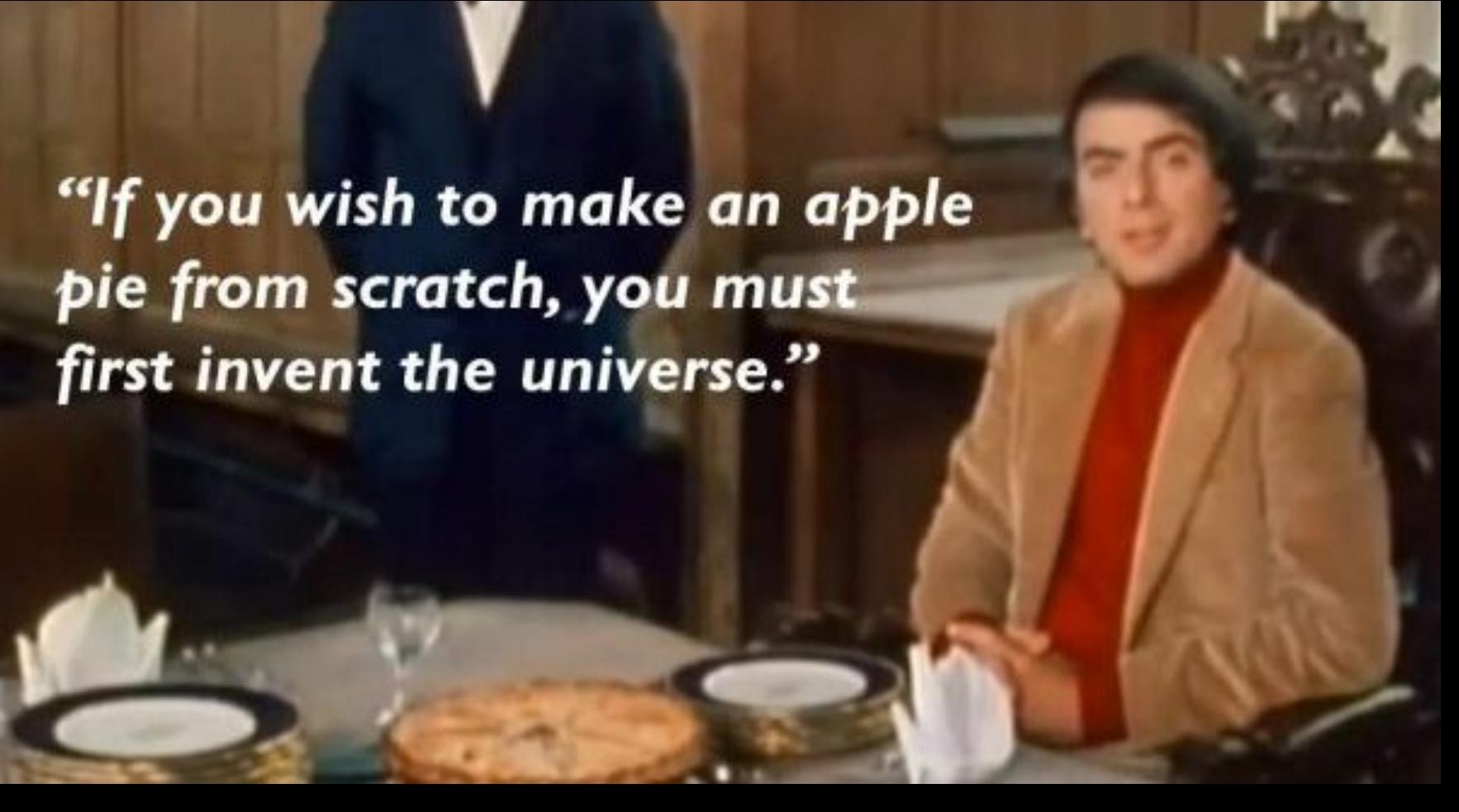




MINIMUM PIPELINE USING AI

- Runtime Engine/Offline Editor
- Tools
- 3D Modelling/Rigging/Animation
- SFX/Tracks
- UI/Font/Color composing/2D Textures
- VFX
- The Game (mechanics, AI, Network, optimization)





***If you wish to make an apple
pie from scratch, you must
first invent the universe.***

RECOMENDACIONES - MENTORÍA

Mentor/Maestro, Ms, Phd

Voluntariado

Prácticas como pasante

Diplomados



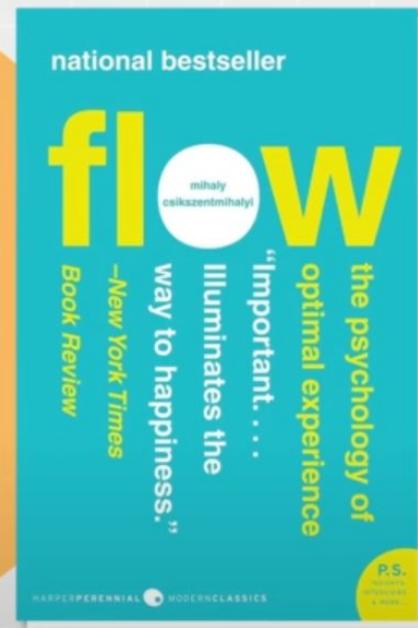
The image is an advertisement for the 2024 Global Summer Internship Program at Blizzard Entertainment. The background is dark blue. At the top, the Blizzard logo and the text "EARLY CAREERS" are visible. Below that is the "BLIZZTEENS" logo featuring a stylized dragon. The main text "2024 GLOBAL SUMMER INTERNSHIP PROGRAM" is in large, bold, white letters, followed by "APPLY NOW" in large, bold, yellow letters. Below this, the text "INTERNSHIP OPPORTUNITIES" is in white. A grid of 18 rectangular boxes lists various internship categories: ANIMATION, GAME ENGINEERING, SPARK SOPHOMORE PROGRAM; CHARACTER ART, LIGHTING, TECH ART; COMPUTER GRAPHICS, MOTION CAPTURE, UI ART; CYBER SECURITY, NARRATIVE DESIGN, UI/UX DESIGN; ENVIRONMENT ART, PRODUCTION, USER RESEARCH; GAME DESIGN, SOFTWARE ENGINEERING, VISUAL EFFECTS (VFX). At the bottom, the URL "CAREERS.BLIZZARD.COM/GLOBAL/EN/STUDENTS" is provided in white text.

RECOMENDACIONES - MENTORÍA

STATE 1

CHALLENGE > SKILL

Depressed
Frustrated
Disappointed



STATE 2

SKILL > CHALLENGE

Lethargic
Procrastinate
Complacent

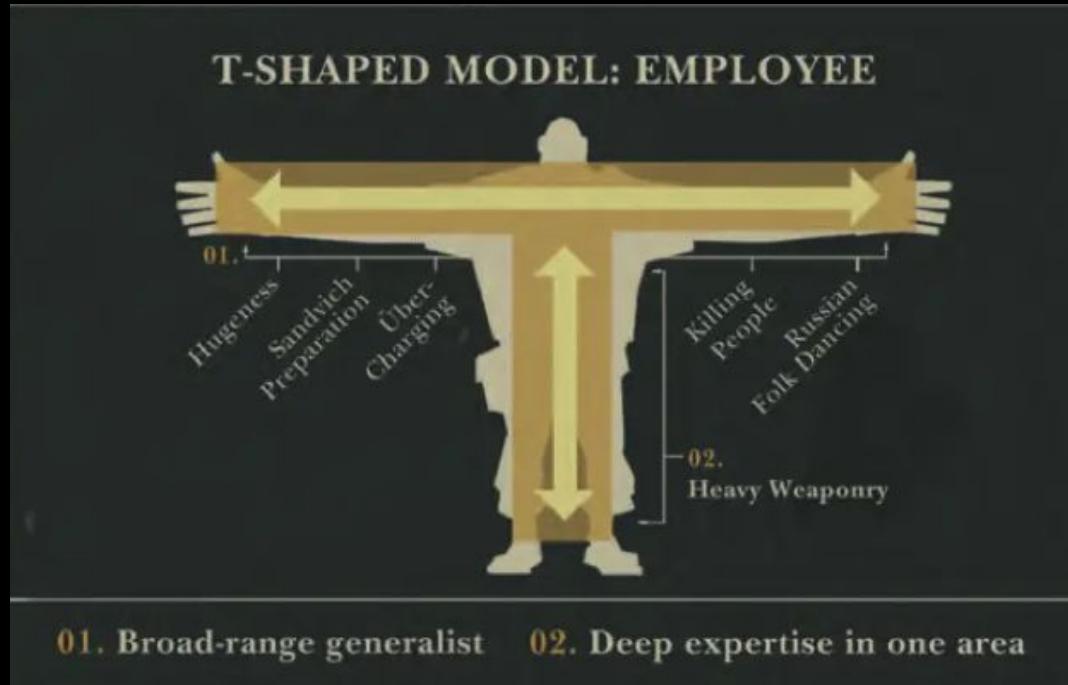
RECOMENDACIONES - BILINGÜE



RECOMENDACIONES - GAME JAMS!

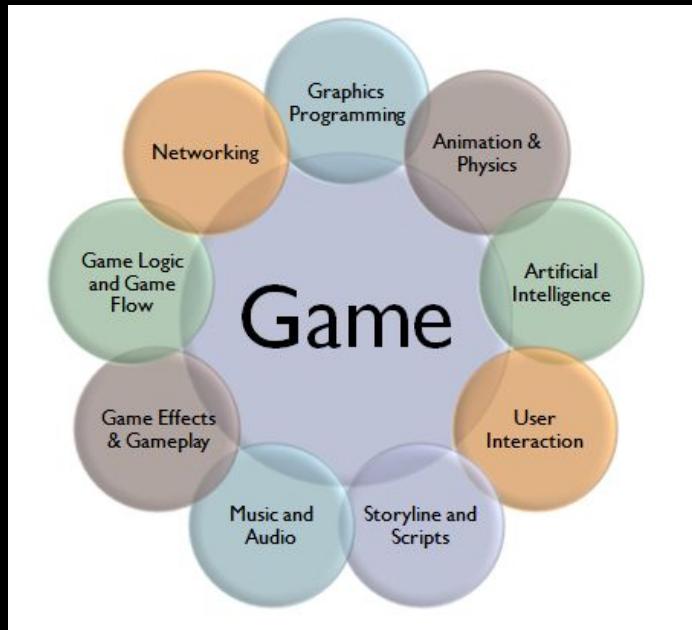


RECOMENDACIONES - MODELO IDEAL

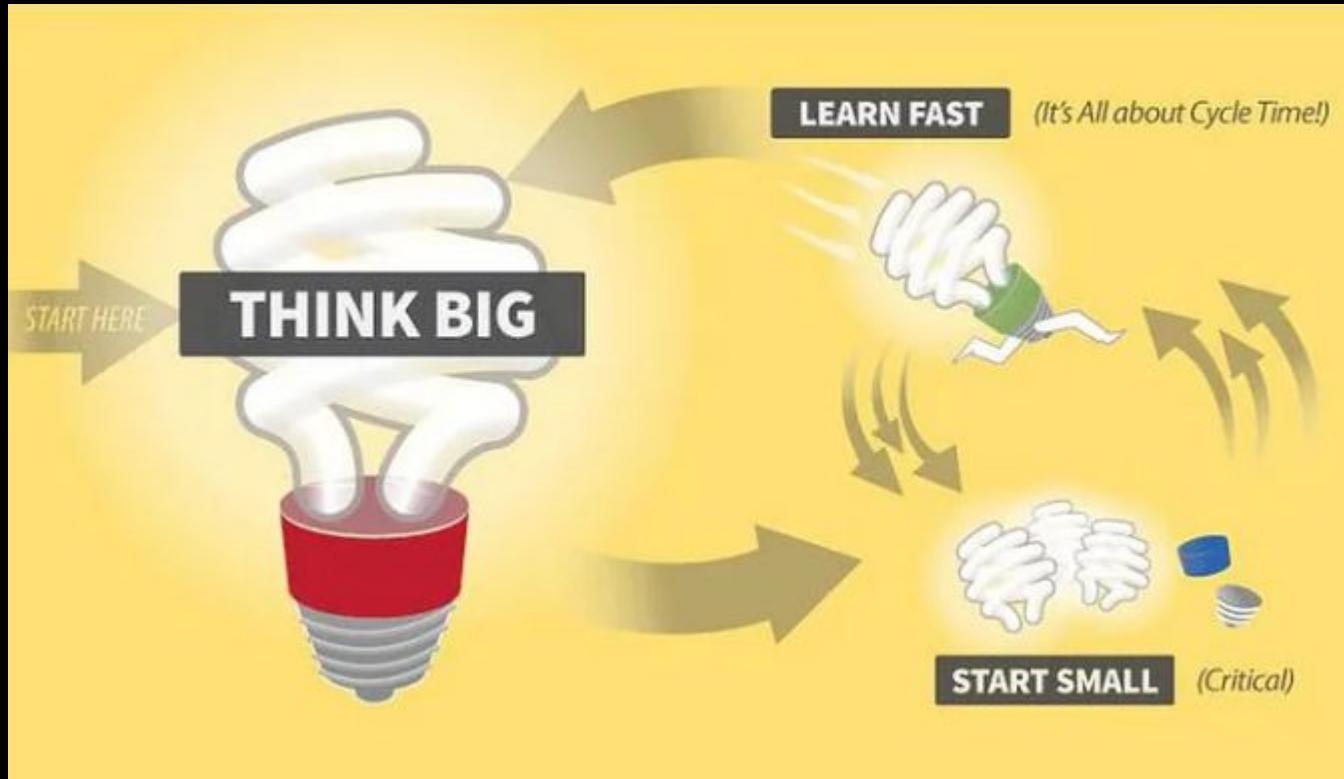


RECOMENDACIONES - ALIANZAS

Alianzas con
otras disciplinas
(arte, game design)



RECOMENDACIONES - EL MÉTODO



CONTACTO

<https://github.com/itzjac>

@dagonmeister

The Byte Cave
Discord



LINKS

<https://github.com/itzjac>

<https://elinemedia.com>

<https://www.vgchartz.com>

<https://www.statista.com>

<https://ec.europa.eu/eurostat>

<https://iqda.org>

<https://newzoo.com>

LINKS

https://en.wikipedia.org/wiki/List_of_largest_video_game_companies_by_revenue

<https://www.siggraph.org/>

<https://gdconf.com/>

<https://www.workwithindies.com/>

Pagina 288

https://aiindex.stanford.edu/wp-content/uploads/2023/04/HAI_AI-Index-Report_2023.pdf

<https://www.linkedin.com/pulse/why-its-better-selling-shovels-than-digging-gold-sam-kothari/>

LINKS

<https://www.cpuid.com/>

https://steamcdn-a.akamaihd.net/apps/valve/Valve_NewEmployeeHandbook.pdf

<https://goodgamestudios.com/company/press-releases/goodgame-studios-unveils-the-4th-floor-its-pc-client-initiative/>

<https://www.theatlantic.com/technology/archive/2024/07/thrive-ai-health-huffington-altman-faith/678984/>

<https://www.smartinsights.com/managing-digital-marketing/marketing-innovation/technology-for-innovation-in-marketing/>

LINKS

<https://www.wheresyoured.at/burst-damage/>

https://techwontsave.us/episode/211_silicon_valley_deserves_your_anger_w_ed_zitron

<https://www.aiandgames.com/p/how-ai-is-actually-used-in-the-video>

https://en.wikipedia.org/wiki/B%C3%A9zier_curve

https://box2d.org/files/ErinCatto_GJK_GDC2010.pdf

<https://inworld.ai/blog/game-jam-calendar-best-upcoming-game-jams>

<https://careers.blizzard.com/global/en/earlycareers>

LINKS

<https://www.youtube.com/@InternetOfBugs>

https://en.wikipedia.org/wiki/List_of_best-selling_video_games

<https://johnkazart.gumroad.com/l/csdf>

<https://repo-sam.inria.fr/fungraph/3d-gaussian-splatting/>

<https://www.amazon.com.mx/Flow-Psychology-Mihaly-Csikszentmihalyi-PhD/dp/0061339202>

<https://gmtk.itch.io/>