Resume – Diogo Costa

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Technical Skills

From personal and professional projects. Most of the links below are to my website/portfolio.

Graphics programming: shader programming (HLSL and CG) for texture synthesis, [resolution and color filters](), custom lighting, post processing effects (using auxiliary buffers and cameras like [sun shafts](), outlines and portals), [skyboxes]()(including a night sky with individually twinkling stars with custom densities, colors, etc.), [ray marching, fractals, reaction-diffusion system](), [cellular automata]() and various visual effects.

Computational Geometry and Linear Algebra: convex hull algorithms (to create 3D [cross-sections of complex 4D polyhedra]()), voronoi diagrams (to create [tilings](), [terrain erosion](), and [others]()), camera and [vehicle controls](), custom [3D modelling tools](),, [Bezier curves]().

Procedural Generation: terrain generation (including simple noise functions as well as custom [erosion]() [based]() algorithms applied on meshes and heightmaps), puzzle generation (using [cellular automata]() as well as SAT (boolean satisfiability) programming), ornament generation (of historical art systems like [Celtic knots](), [Chinese lattice windows](), Islamic star patterns as well as abstract systems using [apollonian gaskets](), [voronoi diagrams](), noise functions, cellular automata or [digital weaving]()).

Tool Development: 3D modeling (used to create buildings and props in [Angkhorror]()), Dialogue Systems (both a simple linear system with animations and text, character and background effects as seen in [The Magic Flute]() as well as a more cRPG focused branching dialogue system with checks and rolls as seen in [Anarchima]()), music sheet synchronizer to an live performance (to streamline level creation in [HarmonyCity]()), among others.

General game programming: variety of [prototypes]() and full games including (among others):

- Diablo-like skill system (with AoE, DoT, simple/sustained attacks, melee, etc.);
- 2D platformers ([energy conserving grappling hook](), [castlevania inspired / dashing based air movement](), [multi-planet gravity system](), etc.);
- [Vehicle movement]() (on dune-like terrain);
- Puzzle and board games (including my own [AmalgamA]()as well as implementations of Akari Light-up, Minesweeper, and networked Shogi).
- Rhythm games (with keyboard/touch and microphone input, mainly for [recorder](), but also [guitar/ukulele](), and more traditional prototypes like [this]() and balinese gamelan);
- Tactical cRPG ([in development]());

Core Tools: Unity, Python, C#, C++, C, HLSL, CG, GameMaker: Studio, HTML/CSS, React, Git.

Professional Experience

October 2018 - October 2019
INESC–ID, Lisbon – *Junior Researcher (Algorithms and Data Structures)*

- Computational Complexity (3-SAT reductions and 2-SAT and Dynamic Programming solutions to pattern matching problems);
- Creation and analysis of algorithms for detection of recombinant bacterial strains using Suffix Trees and de Bruijn graphs (written in C);
- Information Visualization of recombinant bacterial strains (written in Javascript);
- Included one month as a visiting researcher at the University of Chile.

April 2021 - January 2023
Classplash, Lousã – *Programmer/Designer/VFX Artist*

- Full development of The Magic Flute as programmer, designer and visual-effects artist (see [my portfolio](#));
- Launch and post-launch support of [Harmony City](#);
- Maintenance and implementation of Panoramic Mode feature in [Cornelius Composer](#);
- In-house tools development (including: synchronizing a music sheet with a live performance, automatic difficulty assignment of song levels based on chords, dialogue tool to code the story sequences in [The Magic Flute](#), python scripting to automate various processes);

Other

September 2019 - March 2021
Save or Quit – *Game Reviewer*

- Medium-long form game reviews (1800-3500 words per review).
- Focus on game design and how the various threads fit together.

Education

September 2013 - July 2016
Instituto Superior Técnico, Lisbon – *BSc. Computer Science, 16.0/20*

September 2016 - July 2018
Instituto Superior Técnico, Lisbon – *MSc. Computer Science 18.0/20*

- Focus on: Computational Logic and Complexity, Algorithms and Data Structures, and Machine Learning.
- Thesis on Computational Complexity of Modern Games, including multiple new proofs of NP and PSPACE Completeness (including Hexiom and Cut the Rope).