ZACHARY DUBÉ-BOULIANE

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Montréal, Qc, Canada | Fully bilingual french/english

EDUCATION

Université de Montréal   Montreal, Qc
Bachelor's degree in Computer Science   *September 2022 – December 2025*
- Key Courses : Data Structures, Software Engineering, Database, Graphics Programming and Machine Learning

CÉGÉP du Vieux-Montréal   Montreal, Qc
College degree in social science with math   *Aug. 2017 – Dec. 2020*

TECHNICAL SKILLS

Languages: Java, Python, C/C++, MySQL, HTML/CSS, Haskell, Bash, JavaScript
Frameworks: JavaFX, THREE.js
Libraries: NumPy, Matplotlib, scikit-learn
Developer Tools: Git, GitHub, VS Code, IntelliJ, CLion, Visual Paradigm (UML)

PROJECTS

NES Emulator | *C++* | github.com/Zachh7/nes_emulator
- Developed a NES emulator in C++, implementing core components such as the CPU and graphics rendering system (PPU).
- Designed a cycle-accurate 6502 CPU emulation with correct instruction set and addressing modes.
- Implemented rendering of tiles and sprites with proper timing integration between CPU and PPU using SDL3.
- Added input handling by mapping keyboard controls to NES controller buttons using SDL3.
- Structured the codebase for modularity and maintainability, using CMake for cross-platform builds.

Raytracer | *C++*
- Designed and implemented a core ray-tracing algorithm in C++ to render 3D scenes in cooperation with a teammate utilizing GitHub for version control.
- Implemented support for geometries such as spheres, cylinder, planes, and triangles (meshes) for realistic lighting and shadows.
- Added support for reflection, refraction, and material properties (e.g., diffuse, specular) to simulate realistic surface interactions.
- Utilized structures like axis-aligned bounding box (AABB) and bounding volume hierarchies (BVH) to accelerate ray-scene intersection tests.
- Simulated point and directional lighting and developed adjustable camera parameters (e.g., field of view, depth of field).

Word Guessing Game Web Application | *JavaScript, PHP, MySQL, REST, DataTables*
- Built a single-page web application where users play a word guessing game with randomly selected multilingual definitions.
- Implemented interactive gameplay logic in JavaScript, including hint systems, real-time suggestions, and time-based scoring mechanisms.
- Developed RESTful services in PHP to handle user authentication, session management, score tracking, and word/definition retrieval.
- Managed a MySQL database with over 7,100 multilingual word-definition pairs, as well as user accounts and game history.
- Created an admin interface using DataTables for managing user profiles, top scores, and definition records with pagination and search.

EXPERIENCE

Floor Clerk   Jun. 2021 – Present
Jean-Coutu Pharmacy   *Montreal, Qc*
- Looking up products in the computer system, and generating labels.
- Place products on the floor.
- Customer service.