Luke Bednarek

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Education

Bachelor of Science - Applied Computer Science **Sep 2023 - Dec 2025**
British Columbia Institute of Technology *Burnaby, BC*

Diploma - Computer Systems Technology **Jan 2021 - Dec 2022**
British Columbia Institute of Technology *Burnaby, BC*

Skills

Programming Languages C# | C++ | C | Python | Java | JavaScript | Swift | R

Technologies Unreal Engine 5 | Unity | SceneKit | .NET (Core, ASP.NET) | OpenGL | MERN Stack | Android

Projects

Project Impetus **Sep 2024 - Apr 2025**
Creator *Burnaby, BC*

- Designed and developed a 2D top-down physics puzzle game prototype exploring emergent gameplay through propulsion-based movement and tether mechanics in a zero-gravity environment; served as the capstone project for Bachelor's degree.
- Built in Unreal Engine 5 using a combination of C++ and Blueprints, incorporating Paper2D, Enhanced Input System, Niagara Particle System and Automated Functional Testing systems; managed version control with Git.
- Implemented the state design pattern in C++ for the player character's finite state machine (FSM), and used the observer pattern to trigger system behaviors on events.
- Exposed C++ class variables and functions from low-level systems to Blueprint classes and instances to view and tweak gameplay variables in the editor.
- Engineered a custom 2D pendulum physics system mechanic where the player character acts as the bob constrained to an anchor point. This system simulates torque, angular momentum, damping, gravity projection, and tangential force projection, with player input controlling motor torque to enable responsive swinging, retraction, and bounce mechanics in a zero-gravity puzzle environment.

DK Engine **Sep 2024 - Dec 2024**
Graphics/Game Developer *Burnaby, BC*

- Developed a custom multithreaded C++ game engine featuring rendering, physics, editor UI, input, scripting, and audio systems, with a racing game demo to showcase engine capabilities.
- Utilized OpenGL and integrated libraries including GLFW (window/input), Glad (OpenGL loading), GLM (math/physics), stb image and TinyGLTF (asset loading), ImGui (debug UI), FMOD (audio), and UUID (entity identification in ECS).
- Collaborated with a team of 12 Bachelor of Computer Science students, using Linear for project planning, task delegation, and progress tracking.
- Helped design and implement a material-based rendering pipeline, including mesh objects, buffer management, material abstraction, vertex structures, and default shaders.
- Utilized the custom scripting system to implement gameplay logic such as checkpoints, lap tracking, car selection, and controls for the racing demo.
- Implemented axis-aligned bounding box (AABB) collision detection for entity interactions.

Snactuary **Jan 2024 - Apr 2024**
Game Developer *Burnaby, BC*

- A casual, stress-relieving pick-up and play reverse bullet hell game for all ages and experiences. Players manage adorable pets to get them hit by food to feed them, increasing your score and progressing through levels.
- Made in an Apple develop environment using XCode, Swift, SceneKit, and Metal for custom rendering, with Git for version control.
- Collaborated in a team of 6 using Scrum methodology to plan sprints, communicate and track progress to meet Alpha, Beta, and Release milestones.
- Implemented player movement using pan gesture recognition, dynamically positioning a virtual joystick UI based on gesture states for intuitive touch controls.
- Built progression mechanics to track and accumulate player scores, trigger level transition cutscenes, update level visuals, and scale difficulty elements such as food speed and frequency.

Hakuna Banana **Jan 2024**
Game Developer *Burnaby, BC*

- Designed and developed a competitive local multiplayer tactics game inspired by Worms Armageddon, where players score points by damaging opponents to win rounds. Made on Unity.
- Contributed to gameplay design and implementation in a fast-paced, collaborative game jam environment for a week, focusing on item pickup mechanics and weapon functionality; for the 2024 Vancouver Global Game Jam.