ASAAD AL BARWANI

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EDUCATION

New York University - Bachelors of Arts, Computer Science & Linguistics   Sept 2022 - May 2026

- Relevant Coursework: Honors Linear Algebra, Computer Graphics, Visual Communication, Data Structures & Algorithms, Operating Systems, OOP in C++, Computer Systems Organisation, Discrete Math, Mechanics.

EXPERIENCE & PROJECTS

Software Engineer & HPC Support Assistant | NYU HPC   Aug 2024 - Present

University HPC Department   Unreal Engine | C++ | Python | Bash

- Contributing to CoreLink, an **open-source low latency C++ networking framework** for high speed research
- Improving **usability and functionality** of **C++** and **Unreal Engine** clients, as well as rewriting **documentation**
- Collaborating with **AR/VR** researchers on projects utilizing Corelink and **Unreal Engine**
- Working on **Software Build Automation** utilising **Spack** and **GitLab CI/CD**
- Supporting HPC staff with transition to new HPC cluster, including **system setup and QA testing**

Co-Founder & Gameplay Programmer | Nahar Studios   Dec 2019 - Present

Indie Game Development Studio   Godot Engine | Git | Unreal Engine | C++

- Co-founded *Nahar Studios*, a game studio comprised of diverse and talented designers, programmers, artists, and musicians.
- **Gameplay Programming** involving Player/NPC Movement & Attacks, Physics interactions, Level Environment, etc in **C++ and GDScript**
- **Asset Integration** and collaboration with **artists and designers** (Animations/VFX, SFX, Adaptive Music, UI/UX integration).
- **Finite State Machine** (FSM) systems for player characters and **Non-Player Character (NPC) AI** with associated logic.
- Led and assisted in **Game/Level Design** for 2D platformers, metroidvanias, puzzle, top-down, and mobile games, leading game design on **Unreal Projects**
- Version Control with **Git/GitHub** utilising **Git Flow Branch** Strategy.

Dawn Engine   April 2024-Present

C++ & SDL2 Based 2D Game Engine   C++ | SDL2 | OOP

- Developed a **custom 2D game engine** in C++ which handles collision, graphics, and resources, alongside additional functionality.
- Implemented a **hierarchical scene graph** data structure for organisation & inheritance, allowing for both **ECS & OOP**.
- Implemented recursive **Quadtree** data structure for efficient **collision detection** and resolution, **doubling** time efficiency.
- Managing resources via vector of `unique_ptr's` of children owned by a parent node, as well as using other **STL containers**.

Finalist | SC23 Student Cluster Competition (SCC)   Sept 2023 - Nov 2023

HPC Cluster Competition   Bash | Wireshark | Python

- Led **NYU's first** Student Cluster Competition (SCC) finalist team as **captain** at the 2023 Supercomputing Conference.
- Built and ran an HPC cluster at the conference for the competition, leveraging **SLURM** and **Ansible** for task-management.
- Utilized **Python CM scripts**, **Bash** scripting, **Docker** & Singularity Images, and **Parallel Computing**.
- Taught cluster usage, **sysadmin/security** skills and MLPerf usage to students of the associated Vertically Integrated Project team.

Lab Member | OSIRIS Lab   Aug 2023 - Present

Offensive Cybersecurity Lab   Python | Git | C++

- Developed two game-based CTF (Capture-The-Flag) challenges for NYU's annual CSAW CTF qualifying and final rounds.
- "Impossibrawler!" - challenge involving **binary decompilation** and modifying game code to solve. **180 solves, 1600 teams**.
- "R.C.E!"- Remote Code Execution challenge with an insecure web-hosted leaderboard. **6 solves, 55 teams**.
- Participated in several CTFs, leveraging knowledge of **low-level & cryptographic vulnerabilities** to solve challenges.

LANGUAGES, DEVELOPER TOOLS, AND SKILLS

- **Languages**: C++ / C / C#, Git, Python, Bash, Shell, Java, GDScript, Assembly, Make/CMAKE.
- **Technologies:** Unreal Engine, Godot Engine, GitHub, SDL2, Docker, RHEL, Wireshark, Singularity, OpenGL, SLURM.
- **Concepts:** Software Engineering, Gameplay Programming, Engine Programming, HPC Administration, Offensive Cybersecurity, Game Design, Level Design, Low-Level Development.