

ARPIT SHARMA

3441 S Oakley Ave, McKinley Park, Chicago, IL, USA
(+1) 616-796-5295 | Arpit.Develops@gmail.com | Arcaids.github.io/Portfolio/

EDUCATION

MS in Game Programming from **DePaul University**, Chicago, Illinois. Jan 2021- Nov 2022

Cumulative GPA so far: **3.97/4.0**.

Bachelor's in computer science engineering from Doon Valley Institute of Engineering & Technology, Kurukshetra University, Karnal, Haryana, India. 2013 - 2017

USA Equivalent GPA: **3.81/4.0**

ACADEMIC PROJECTS

Game Engine Development C++, OpenGL, GLSL, GL3W, Win32, Google-ProtoBuffers, SIMD

An OpenGL based game engine which we worked on over several quarters, adding different functionalities iteratively.

Libraries created:

Math:

- A Math library for Trigonometry (for double precision avoidance), Vectors and Matrices operations.
- Optimized for performance using SIMD, proxy technique and return value optimization.

Memory System:

- Developed a Heap based Memory Allocator for efficient allocation memory management.
- Overloaded new and delete for memory assignment and cleaning up.
- Support for tracking the memory usage and leaks.

Data structures and File System:

- Static libraries for PCS (Parent-Child-Sibling) Tree and Pooled Double Linked List, both with iterators.
- File system to write and read files using Win32 library.

Functionalities:

- 3D models in multiple shading styles (Lit, flat, wireframe etc.),
- 2D sprites and UI text with multiple camera rendering support.
- Collision detection for frustum culling.
- Developed CMD-line tool to convert .glb files to custom proto buffer files.
- Animated skinned 3D models on GPU using Compute shaders.
- Blending between different animations on GPU.

Particle System Research C++, SIMD, OpenGL, Component System

Description: Optimized a particle system with 15,000 particles by **7x** faster frame times.

- Updated data alignments and structures for improved caching and memory usage.
- Optimized Math library using SIMD instruction set for Vectors and Matrix Math.
- Avoided unnecessary memory allocations during game loop and general logic improvements.
- Implemented Load-in-Place for cache and data initialization improvements.

Performance Optimization C++, SIMD

Description: Optimized a particle system with 15,000 particles by **7x** faster frame times.

- Updated data alignments and structures for improved caching and memory usage.
- Optimized Math library using SIMD instruction set for Vectors and Matrix Math.
- Avoided unnecessary memory allocations during game loop and general logic improvements.
- Implemented Load-in-Place for cache and data initialization improvements.

Multiplayer Networking for Games C++, C#, Lidgren

Description: Added networked multiplayer to an existing physics based local multiplayer game.

- Created a Client-Server architecture over UDP Network to handle messages.
- Managed Serialization and Deserialization of the custom payloads.
- Included data driven queue system to handle incoming and outgoing messages.
- Implemented both Client-Side-Prediction and Dead Reckoning to compensate for network lag(simulated).

DirectX3D 11 Graphics Library C++, DX3D11, HLSL

Description: Implemented a 3D graphics Engine using DX11 + HLSL and created a Demo scene with dynamic lighting and imported 3D models.

- Multiple HLSL shaders: Flat Color, Textured, Lit Texture, Toon etc.
 - In-built primitive 3D Models: Plane, Sphere, Cube, Cylinder and Cone.
 - A Terrain system generation by reading a height map texture.
 - Dynamic Phong lighting with multi-lights support, a mirror effect using multi pass rendering and fog effect.
-

Multi-Threaded Audio Engine C++, XAudio2 APIs

Description: Developed Audio Engine within an existing 3D graphics Engine using Microsoft's low level XAudio2 API.

- Data driven Queue system for communicating among different threads.
 - Play, Pause, Stop, Pan (for stereo) features called from main thread to Dedicated Audio Thread.
 - Playlist function to play multiple sounds in succession.
 - Priority system, Callbacks on Aux thread, Async file loading and much more.
-

PROFESSIONAL PROJECTS

Modular Bars

(1 Month, August-September 2019)

Unity3D Asset.

Team Size: 1, Personal Project

Description: A powerful UI Tool for designers to create modular progress bars right from Unity Editor. The tool currently has a 5 star rating in the Unity Store.

- Gives a live preview in editor (without going in play mode).
- Callbacks and Events support.
- Progresses in many ways like Image fill, sprite sheets and shader variable and more.
- Combine multiple bars into single bar.

Individual Role: Everything from design, implementation to publishing.

Project Killecibles (Working title)

(January 2022 – present)

Software: Unreal 5 and ARCore.

Team Size: 6-10

Description: Worked on different designer tools for a 3D RTS Turn based Unreal game Project.

- prototyped spawning 3D models on physical cards using ARCore's image detection on Android devices.
- Implemented a branching spline map tool, for character movement between regions in world map.
- Currently working on a tool for designers to be able to create state machine timelines of Objectives.

Individual Role: AR/Tool Programmer.

Shuffle: The Mobile Deck

(3 months, November 2018 – January 2019)

Software: App for Android mobiles, Made with Unity.

Team Size: 3

Description: Shuffle is a deck of cards simulator I made under Innotal solutions. It worked local online as well as offline. Programmed the gameplay and game networking (using in-House wlan plugin). Despite the small team, we achieved 1k+ downloads.

Individual Role: Designer, Gameplay Programmer.

WORK EXPERIENCE

XR/Game Developer at Innotical solutions, Sector 63, Noida, India

Duration: From May 2018 – July 2019.

- Worked on multiple AR/VR projects for android devices, like AR Fighting game, AR/VR Furniture placement, AR Human Anatomy.
- Collaborated with the team and our clients to develop multiple mobile games.
- Published the following games on the Google Play Store: Shuffle, Face off, Space Attack, Bio Education.

Graduate Assistant, Unreal Game Programmer at DOGS (DePaul Original Games Studio), DePaul Center, Chicago IL

Duration: From January 2022 – Present.

- Employed at University's In-house Studio as a programmer for Project Killectibles.
- Studied ARCore Image recognition in Unreal 5 to spawn characters on cards.
- Developed a tool for designers to make paths for level selection map.
- Created a designer tool to lay down the objectives as a state machine.

TECHNICAL SKILLS

- Software: Unity3D, Unreal, MS Visual Studio
- Languages: *Optimized* C++, C#, GLSL, HLSL
- Others: GitHub, SourceTree, Perforce, Photoshop, Aseprite
- Libraries: OpenGL, DirectX11, Google Proto-buffers, GL3W, Box2D, Windows API
- Software Development Cycles: Agile, Kanban

EXTRACURRICULAR ACTIVITIES

- Board member at DePaul JDE, Game development group for Chicago Game developers.
- Class representative, Doon Valley Institute, Kurukshetra University, Karnal (2013-2014).