

NEON STRIKERS

A 2D Physics-Based Arena Game

CIS 4951: Capstone 2 | Spring 2026

Knight Foundation School of Computing and Information Sciences

Florida International University

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BRIDGING THE GAP BETWEEN PROTOTYPE AND POLISHED GAMEPLAY

MOTIVATION

Born from a desire to explore real-time game systems within a structured Agile environment, aiming to deliver a genuinely fun, competitive multiplayer experience that demonstrates proficiency in Unity and C#.

PROBLEM STATEMENT

How do we design and deliver a complete, locally, playable 2-player physics-based arena game with proper Agile process discipline within the constraints of a 7-sprint academic capstone?

KEY PROJECT GOALS

1

DELIVER A FULLY PLAYABLE BUILD

2

COMPLETE 7 AGILE SPRINTS WITH DOCUMENTATION

3

ACHIEVE BALANCED, POLISHED PHYSICS GAMEPLAY

A COMPONENT-BASED ARCHITECTURE FOR SCALABLE GAME LOGIC

TECHNICAL STACK

Unity 6000.4.0f1

C# / .NET / Mono

GitHub / Version Control

VS Code / IDE

Scrum / Methodology

SYSTEM DESIGN

PLAYERCONTROLLER

Handles input, movement, and dash mechanics via Rigidbody2D.

COMBAT SYSTEM

Manages hitboxes, damage calculation, and ball knockback forces.

GAME MANAGER

State machine controlling the global flow: Lobby → Match → Results.

ARENA MANAGER

Controls arena selection, ball spawning, and goal detection triggers.

UI MANAGER

Drives the HUD, live score display, and all menu interfaces.

ITERATIVE DEVELOPMENT ACROSS 7 SPRINTS

DEVELOPMENT ROADMAP

Sprints 1-2

Core movement, collision detection, basic arena layout, and player setup.

Sprints 3-4

Physics ball mechanics, goal system, HUD/UI, and 2-player local multiplayer implementation.

Sprints 5-7

Polish, balance tuning, extensive playtesting, and final documentation delivery.

CODING CONVENTIONS

NAMING STANDARDS

PascalCase for classes/public members; camelCase for private fields.

INSPECTOR EXPOSURE

All tunable values (kick power, dash force) exposed via [SerializeField].

ASYNCHRONOUS LOGIC

Coroutines used for timed effects like CameraShake and GoalSlowMotion.

PERFORMANCE OPTIMIZATION

Cached references in Awake()/Start() to avoid expensive Find() calls in Update().

LIVE DEMO — COMPETITIVE 2-PLAYER LOCAL COMBAT

CONTROLS REFERENCE

ACTION	PLAYER 1 (BLUE)	PLAYER 2 (RED)
Move	A / D	← / →
Jump	W	↑
Kick	Space	Enter
Dash	Space (Hold)	Enter (Hold)

GAMEPLAY LOOP

- 1 Select Character: Choose from 2 distinct physics profiles
- 2 Choose Arena: 3 maps with unique layouts and hazards
- 3 Kick Off: Use physics-based mechanics to outmaneuver
- 4 Score: First to reach the score limit (3 goals) wins

DATA-DRIVEN TUNING FOR RESPONSIVE GAMEPLAY

TESTING STRATEGY

UNIT TESTING

Verified physics interactions in isolated test scenes before integration.

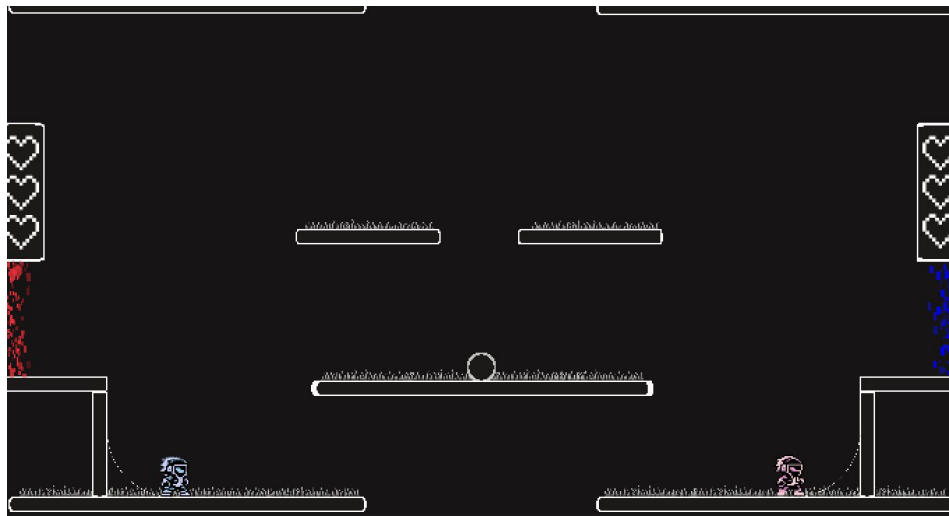
INTEGRATION TESTING

End-to-end validation of goal detection, match flow, and scene transitions.

PLAYTESTING

3 structured sessions with 6 external testers across Sprints 5, 6, and 7.

PLAYTESTING RESULTS (SPRINT 5 VS FINAL)



- ✓ 100% Goal Detection Accuracy
- ✓ Zero Game-Breaking Bugs in Final Build / besides audio cut out
- ✓ Stable 2-Player Local Input Performance

AGILE RESILIENCE IN THE FACE OF TEAM AND TECHNICAL HURDLES

CHALLENGES

TEAM CONTINUITY

Mid-project departure of project owner.

PHYSICS TUNING

Initial movement felt "floaty" and unresponsive.

MULTIPLAYER SYNC

Input latency in local split-screen modes.

SCOPE CONTROL

Ambitious feature list vs. 7-sprint deadline.

SOLUTIONS

AGILE ADAPTATION

Redistributed tasks and adjusted backlog without schedule delay.

ITERATIVE REFINEMENT

Multiple playtesting passes refined velocity, friction, and knockback.

TECHNICAL OPTIMIZATION

Implemented deterministic input buffering to reduce perceived latency.

STRATEGIC DEFERRAL

Deferred online matchmaking to ensure core local loop was polished.

EXPANDING THE NEON STRIKERS UNIVERSE

NEAR-TERM (0–6 MONTHS)

Standalone Build: Executable for Windows, Mac, and Linux.

WebGL Support: Browser-based build for zero-install access.

Audio Implementation: Sound effects and background music.

Content Expansion: 2 additional characters with distinct physics.

LONG-TERM VISION

- **Online Multiplayer:** Via Unity Netcode for GameObjects.
- **4-Player Support:** 2v2 matches with dynamic arena scaling.
- **Mobile Integration:** Smartphones as wireless controllers.
- **Accessibility:** Colorblind mode and open-source release.

THANK YOU

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Project Repository: github.com/I0fI0/neon-strikers

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