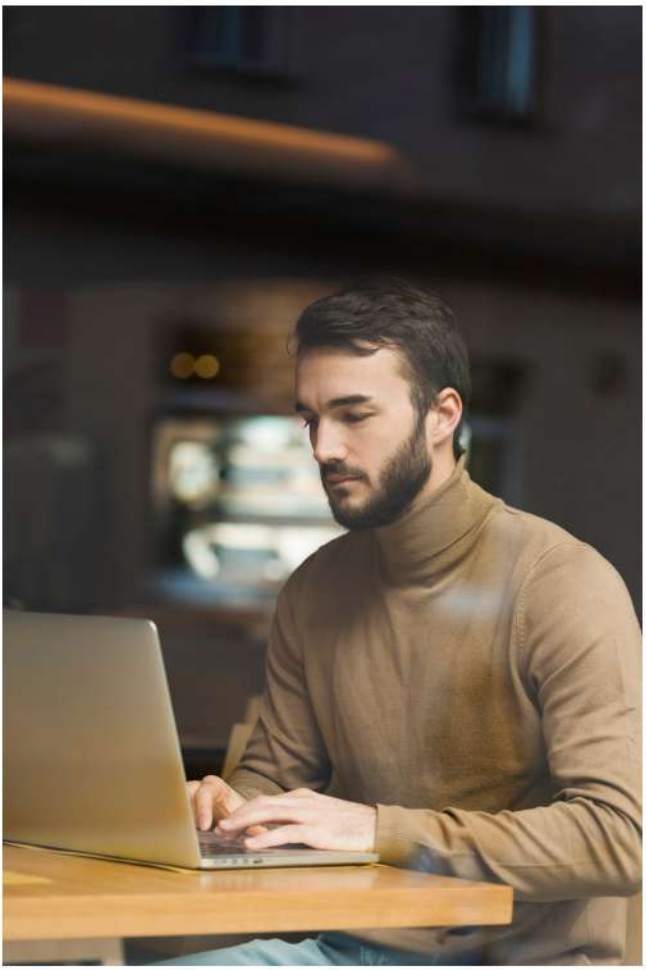
C# Game Programming



E-LEARNING COURSE

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ZETLAN TECHNOLOGIES

COURSE MODULES

Module 1: Introduction to C# and Game Development

- Overview of C# and .NET Framework
- Setting up the development environment
- Understanding game loops and real-time processing
- Intro to Object-Oriented Programming (OOP) concepts in C#
- Working with basic C# data types, control structures, & methds

Module 2: Game Engine Basics

- Introduction to game engines (Unity, Godot, MonoGame)
- Understanding game objects, components, and scenes
- Setting up a simple 2D and 3D game project
- Input handling (keyboard, mouse, and controller support)
- Game loop and frame rate management

Module 3: Graphics and Rendering

- Basics of 2D and 3D rendering
- Sprites, textures, and animations
- Workg with Unity's Sprite Renderer or MonoGame's Texture2D
- Lighting and shading in 3D games
- Particle systems for visual effects

Module 4: Game Physics and Collision Detection

- Intro to physics engines (Unity's Rigidbody, MonoGame's Farseer)
- Collision detection and response
- Gravity, forces, and momentum & Raycasting and hit detection
- Physics-based movement and interactions

Module 5: Game AI and Behavior Programming

- Basics of Artificial Intelligence in games
- Implementing Finite State Machines (FSM) for enemy behavior
- Pathfinding using A* algorithm
- Steering behaviors (flocking, seeking, evasion)
- Procedural content generation for AI-driven environments

Module 6: Sound and Music Integration

- Importing and playing sound effects
- Background music and looping
- Audio mixing and spatial sound
- Implementing 3D positional audio & Optimizing audio performance

Module 7: User Interface (UI) and HUD Development

- Creating menus, buttons, and panels
- Implementing health bars, score counters, and inventory systems
- Using UI events and animations
- Handling user input in UI (clicks, touches, and gestures)
- Loading screens and transitions

Module 8: Game Saving and Data Persistence

- Saving and loading game progress (PlayerPrefs, JSON, XML)
- Implementing local and cloud saves
- Data encryption and security considerations
- Creating a settings menu for game preferences

Module 9: Multiplayer and Networking

- Introduction to multiplayer gaming concepts
- Implementg LAN-based multiplayer (Unity Netcode, Mirror, Photon)
- Client-server architecture and networking basics
- Syncing game states across players
- Handling lag, latency, and cheats

Module 10: Optimization and Performance

- Profiling and debugging games
- Reducing memory and CPU usage
- Object pooling and memory management
- Optimizing game physics and AI
- Best practices for mobile and console performance

Module 11: Publishing and Deployment

- Building games for PC, Web, Mobile, and Consoles
- Exporting and optimizing game assets
- Playtesting and bug fixing
- Publishing on Steam, Play Store, and App Store
- Marketing and monetization strategies