Tower Defense Mini-System – Design & Technical Report

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1. Introduction

This project implements a small but functional Tower Defense prototype using Unreal Engine 5.4.4. The system includes a Tower powered by a Data Table, an Enemy with health, damage, and destruction logic, a Shooting System, Range Sphere, and dynamic loading of tower mesh.

2. Game Design Overview

Core Idea: Player places towers; tower loads stats from Data Table and shoots enemy.

3. Tower System Design

Components: TowerMesh, RangeSphere, DefaultSceneRoot.

Variables: CurrentDamage, CurrentRange, CurrentFireRate, CurrentAbility, TowerMesh Soft Reference.

Data Table Structure: BaseDamage, Range, FireRate, TowerMesh Soft Reference, Upgrade stats, Ability.

4. Technical Implementation – Tower

BeginPlay Logic: Get Data Table Row → Set variables → Set Sphere Radius → Async Load Mesh → Set Static Mesh.

5. Enemy System Design

Enemy has MaxHealth, CurrentHealth, Bounty, HealthText component. Event AnyDamage subtracts damage, updates text, destroys actor if health <= 0.

6. Shooting Mechanism

ShootTarget event applies damage to TargetEnemy using ApplyDamage.

7. Range Sphere

Optional detection; RangeSphere visually shows attack radius.

8. Visual Scripting

Towers use DataTable, Async Load, Sphere Collision, ApplyDamage.

Enemies use EventAnyDamage, subtract, destroy.

9. Testing & Debugging

Prints, HealthText, Sphere radius checks.

10. Conclusion

Demonstrates data-driven design, clean blueprints, mesh loading, and UE5 gameplay understanding.

11. Future Improvements

Enemy waves, tower types, upgrades, UI, VFX.