\*\*Handball Simulation Codebase Audit Checklist\*\* \*\*Document Purpose:\*\* To verify the implementation of key design principles, rules, and systems within a handball simulation game codebase, based on established best practices derived from sports simulation design (e.g., Football Manager) adapted for handball. \*\*Audience:\*\* Development Team, QA Testers, Technical Designers. \*\*Legend for Verification Methods:\*\* - \*\*CR:\*\* Code Review (Static analysis of source code) - \*\*DRA:\*\* Debugging / Runtime Analysis (Observing variables, states, and execution flow during gameplay) - \*\*TGV:\*\* Testing / Gameplay Validation (Observing emergent behaviour during gameplay, focused testing scenarios) - \*\*DDR:\*\* Design Document Review (Cross-referencing code implementation with design specifications) - \*\*P:\*\* Profiling (Assessing performance and computational cost) \*\*Section 1: Player Movement System\*\* ------------------------------------------------------------------------------- \*\*Checklist Item\*\* \*\*Principle / \*\*Verification \*\*Notes / Rule Methods\*\* Status\*\* Reference\*\* ----------------------------------- --------------- ---------------- ---------- \*\*1.1 Physics Model\*\* 1.1.1 Locomotion uses simplified Avoids full CR, DDR kinematics (vector-based: pos, vel, physics engine acc). overhead 1.1.2 Movement updates via Standard CR numerical integration (e.g., simulation Euler/modified). technique 1.1.3 Movement system is Steering CR, DRA target-based (AI provides target, behaviour movement calc path). approach \*\*1.2 Acceleration, Deceleration, Change of Direction\*\* 1.2.1 Acceleration attribute Attribute CR, DRA, TGV directly scales rate of velocity influence on increase. burst speed 1.2.2 Speed/Pace attribute defines Attribute CR, DRA, TGV maximum velocity magnitude. influence on top speed 1.2.3 Agility attribute directly Attribute CR, DRA, TGV influences turn rate / efficiency. influence on direction change 1.2.4 Agility impacts speed Realistic CR, DRA, TGV maintenance during turns (high movement Agility = less loss). constraints 1.2.5 Inertia/momentum is simulated Plausible CR, TGV (no instant stops/turns). movement feel 1.2.6 Balance attribute influences Attribute CR, DRA, TGV stability during influence on turns/contact/landings. disruption recovery \*\*1.3 Handball-Specific Movement\*\* 1.3.1 Jumping mechanic exists Core handball CR, DRA, TGV (vertical movement state). action 1.3.2 Jump height/power influenced Attribute CR, DRA, TGV by Jumping attribute. influence on verticality 1.3.3 Landing from jump Physical CR, DRA, TGV impacts Balance check/recovery consequence of state. jumping 1.3.4 Movement speed is Dribbling CR, DRA, TGV realistically reduced while in constraint \"dribbling\" state. simulation 1.3.5 \*\*Crucial:\*\* System Handball 3-step CR, DRA, TGV accurately tracks steps taken after rule catch/dribble pickup. 1.3.6 Exceeding step limit Enforcement of CR, DRA, TGV automatically triggers turnover 3-step rule state/event. \*\*1.4 Collision System\*\* 1.4.1 Uses simplified collision Performance CR, DDR shapes (circles/capsules) for optimization players. 1.4.2 Implements spatial Performance CR, P, DDR partitioning (e.g., grid, quadtree) optimization for efficiency. for dense scenarios 1.4.3 Collision response Handball foul CR, DRA, TGV distinguishes legal vs. illegal simulation contact (rules-based). 1.4.4 Outcome of physical contests Attribute CR, DRA, TGV influenced influence on by Strength & Balance comparison. physical interactions 1.4.5 Collision response includes Realistic CR, DRA, TGV pushing/impeding/state changes interaction (e.g., stumble). outcomes 1.4.6 System models ball shielding Realistic ball CR, DRA, TGV during contact. protection mechanic ------------------------------------------------------------------------------- \*\*Section 2: Player AI Decision-Making\*\* 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tactical formation (e.g., 6-0, 5-1). implementation 2.2.5 Defensive AI coordinates Coordinated defense CR, DRA, TGV challenges/stepping out based on simulation role/situation. 2.2.6 Attacking AI seeks gaps, makes Intelligent CR, DRA, TGV timed runs, provides passing options. attacking movement 2.2.7 Attacking AI considers shooting Intelligent shot CR, DRA, TGV angles and blocker positions. preparation 2.2.8 Pivot AI demonstrates specific Role-specific AI CR, DRA, TGV line play behaviour (screens, logic positioning). \*\*2.3 Action Selection & Execution\*\* 2.3.1 Pass/Shoot/Dribble decision uses Plausible CR, DRA, TGV, rational logic (Utility AI or decision-making DDR similar). 2.3.2 Decision factors include: steps Contextual and CR, DRA, TGV left, pressure, angles, attributes, attribute-driven tactics. choices 2.3.3 AI selects appropriate shot Variety and realism CR, DRA, TGV types based on situation/attributes. in finishing 2.3.4 Defensive actions (block, Realistic defensive CR, DRA, TGV impede, steal, foul) chosen options contextually. 2.3.5 AI understands and responds to Handball rule CR, DRA, TGV Passive Play warnings (increased simulation urgency). 2.3.6 AI capable of setting and Handball tactical CR, DRA, TGV utilizing screens effectively. element \*\*2.4 Rule Adherence AI\*\* 2.4.1 AI actively avoids non-GK goal Handball rule CR, DRA, TGV area violations when enforcement attacking/defending. 2.4.2 AI actively avoids double Handball rule CR, DRA, TGV dribble violations. enforcement 2.4.3 AI decision-making considers Tactical CR, DRA, TGV risk of fouls / 2-min suspensions. consequence awareness \*\*2.5 Tactical & Attribute Influence\*\* 2.5.1 Tactical instructions clearly Managerial control CR, DRA, TGV, modify AI positioning & decision over AI DDR thresholds. 2.5.2 Player roles significantly Role-based gameplay CR, DRA, TGV, differentiate AI behaviour priorities. depth DDR 2.5.3 Core Mental Attributes Player CR, DRA, TGV (Anticipation, Decisions, Composure, differentiation etc.) modify AI quality/timing. beyond physicals 2.5.4 Specific Handball Mentals Handball-specific CR, DRA, TGV (Positioning, Teamwork, Work differentiation Rate, Aggression, Discipline) have clear effects. \*\*2.6 Determinism vs. Probabilism\*\* 2.6.1 Core positioning/rule adherence Ensures tactical CR, DRA is largely deterministic. coherence & rule following 2.6.2 Action success (shots, passes, Simulates skill CR, DRA, TGV tackles, saves) is probabilistic. execution variance 2.6.3 Probability influenced by Realistic outcome CR, DRA, TGV relevant attributes, pressure, determination situation. 2.6.4 Element of randomness exists in Avoids robotic CR, DRA, TGV action choice/timing (within limits). predictability, simulates creativity/error \*\*2.7 Goalkeeper AI\*\* 2.7.1 GK AI has dedicated logic for Specialist role CR, DRA, TGV positioning, reaction saves, shot simulation anticipation. 2.7.2 GK AI capable of initiating fast Handball-specific CR, DRA, TGV breaks with throws. GK action -------------------------------------------------------------------------------------- \*\*Section 3: Implementation Quality & Design Philosophy\*\* ---------------------------------------------------------------------------- \*\*Checklist Item\*\* \*\*Principle / Rule \*\*Verification \*\*Notes / Reference\*\* Methods\*\* Status\*\* ----------------------------- ------------------ ---------------- ---------- \*\*3.1 Computational Efficiency\*\* 3.1.1 Movement & Collision Core system P, CR systems are profiled and optimization demonstrate acceptable performance. 3.1.2 AI decision logic uses Performance under P, CR, DDR optimization techniques (LOD, load event-driven updates). 3.1.3 Code avoids obvious Efficient CR, P performance bottlenecks algorithms (e.g., N\^2 checks without partitioning). \*\*3.2 Realism vs. Gameplay Balance\*\* 3.2.1 Gameplay feel reflects Subjective Goal / TGV, DDR handball\'s pace, Design Pillar physicality, and flow. 3.2.2 Scoring frequency feels Core gameplay loop TGV, Data authentic and balanced balance Analysis (Shooter vs GK). 3.2.3 Tactical changes Meaningful TGV, DDR produce noticeable and strategic depth logical effects on gameplay. 3.2.4 Player attributes Attribute TGV, Data provide clear differentiation balancing Analysis without making players feel useless/overpowered. 3.2.5 Rules (steps, passive Rule TGV play, fouls) impact gameplay implementation realistically without being tuning overly punitive/frustrating. \*\*3.3 Code Structure & Maintainability\*\* 3.3.1 Code relating to Maintainability, CR, DDR movement, AI, attributes, testability, tactics is well-organized & future development modular. 3.3.2 Clear separation exists Decoupling systems CR, DDR between simulation logic and animation/presentation layers. ---------------------------------------------------------------------------- \*\*Audit Summary:\*\* - \*\*Overall Adherence Score (Optional):\*\* \[Score / Percentage\] - \*\*Key Strengths:\*\* \[List areas where implementation strongly follows principles\] - \*\*Areas for Improvement / Investigation:\*\* \[List checklist items flagged as needing attention or deviating significantly\] - \*\*Critical Issues (Blocking accurate simulation):\*\* \[List any fundamental flaws identified\]