# Pokémon Battle Simulation Tool Documentation

1. Introduction

The Pokémon Battle Simulation Tool is an MCP tool designed to allow LLMs to simulate **Pokémon battles** with realistic mechanics. It integrates canonical elements from the Pokémon games, including **type effectiveness, damage calculation, turn order, and status effects**. The simulator is exposed as an MCP tool, making it directly callable by any LLM supporting MCP.

1. Design Goals

* **Accuracy**: Implement core battle rules while keeping computation lightweight.
* **Generality**: Support any Pokémon, even custom ones, as long as they follow the schema.
* **Extensibility**: Design modular functions that can be extended later with abilities, items, or weather effects.
* **Reproducibility**: Introduce an optional random seed in battles for deterministic replays.

1. Core Mechanics Implemented
   1. Type Effectiveness – Complete type chart applied per defender’s type.
   2. Damage Formula – Includes STAB, type effectiveness, critical hits, random factor, burn.
   3. Turn Order – Determined by Speed, modified by paralysis.
   4. Status Effects – Paralysis, Burn, Poison implemented.
   5. Move Accuracy – Accuracy check before applying damage.
   6. Battle Resolution – Ends when one Pokémon faints or max turns reached.
2. Implementation Details

* **Type Chart** – Dictionary mapping move types to defender type multipliers.
* **Damage Calculation** – Implemented in compute\_damage().
* **Status Effects** – Flags track conditions per Pokémon.
* **Battle Loop** – Determines turn order, applies actions, logs results.
* **Randomness** – Seed-based reproducibility.

1. MCP Integration

Endpoint: /mcp/tools/battle/simulate

Input Schema (BattleRequest): pokemon\_a, pokemon\_b, options (max\_turns, seed) Output Schema (BattleResult): battle\_log, winner, turns, final\_states

1. Example Battle

Input: { 'pokemon\_a': {'name': 'Pikachu','level': 50}, 'pokemon\_b': {'name': 'Squirtle','level': 50}, 'options': {'max\_turns': 50, 'seed': 12345}}

Output: { 'battle\_log': ['--- Turn 1 ---','Pikachu used Thunder Punch → 36 dmg. It’s super effective!','Squirtle used Headbutt → 19 dmg.'], 'winner': 'pokemon\_a', 'turns': 2 }

1. Example LLM Queries

* “Simulate a battle between Pikachu and Charizard at level 50.”
* “Run a 10-turn max battle between Bulbasaur and Charmander, show logs.”