Traditional skill ratings are not suitable for new types of games. We developed a general skill rating framework for games which do not discriminate players based on their skill. This class of games is widely present in the world. We use Bayesian statistics to convert aggregate data about the player's performance to a percentile rank describing his skill. The system is applicable to both single-player and multiplayer games with binary and non-binary endings. The rating formulas do not contain any arbitrary constants. We have tested the system in simulations and on real game data, and we outline its possible applications.