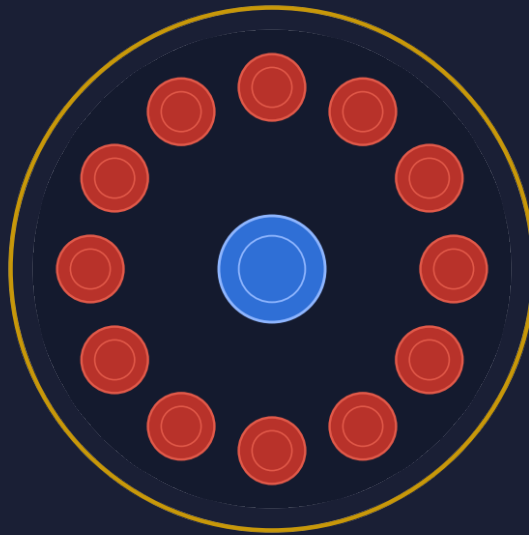


GREGO'S LIMBO MATCH™

Grego's Limbo Nulling System

How every score is checked
before it can count



GLNS · the rules check and the speed check

grego.hu/limbo · in force from 22 September 2026

World championship and tournaments

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What GLNS is

Grego's Limbo Match keeps one record in every category: one champion, one score, one time. A record means something only if a real person played the game that set it. GLNS, Grego's Limbo Nulling System, is the check that stands at the door. Every game submitted to the world championship and to every tournament is examined on the server, before anything is stored, and must answer two questions.

Do the moves give this score? Every submission carries the complete list of its moves. The server plays them again with the game's own rules and counts the points.

Could a human hand have played them this fast? Every move takes time to make. The server works out the fastest those particular moves could have been played, and compares it with the time claimed.

A game that fails either test is refused, quietly. The player is told nothing; the champion keeps the seat; and the refusal is recorded for the game's administrator to see. Everything else in this paper explains how the two tests work, why they are fair to honest players, and what they cannot do.

What it guards against

A record can be falsified in three ways, and GLNS is built for the first two. The third is described plainly at the end of this paper.

Attacker	What it does	Stopped by
A · a forged request	Sends a made-up score, time or list of moves straight to the server, without playing.	the rules check
B · a machine-speed script	Plays the real game, but faster than any hand could.	the speed check
C · a patient script	Reads the board from the page and plays a flawless game at human pace.	not by GLNS — see the end of this paper

The rules check

The game records every tap that changes the state of play: each blue revealed, each red flipped, each clover guess, each Pin, each choice of Limbo. That list travels with the score. On the server, a referee replays it on the submitted board with exactly the rules the game uses, and arrives at a score of its own. **If the replayed score differs from the claimed score by a single point, the game is refused.**

A forged score cannot survive this. Changing the number is easy; building a list of moves that honestly produces it is the same as playing the game. The check also catches faults in the game itself. In September 2026 the game's author found that a quick tap during the celebration of a match could keep the matched blue on the board, so that its red could be matched and paid again. He scored 438 points in a category whose jackpot is 169. The fault was closed in the game at once, and a submission carrying it is now refused as well: replayed under the true rules, those moves are worth 156 points, not 438.

Before it went live, the referee was given every kind of tampering an attacker might try, on a real game from the live store. Only the untouched game passed.

Test submission	Claimed	What the server found	Verdict
a real 6-pair game, untouched	28 points in 24.17 s	moves give 28; floor 3.65 s	accepted
the same game, score raised by one	29 points	moves give 28	refused · rules
the same game, score set to the jackpot	30 points	moves give 28	refused · rules
the same game, time set to half a second	28 points in 0.50 s	floor 3.65 s	refused · speed
the same game, moves removed	28 points	nothing to check	refused · no moves
a board with one red dealt twice	28 points	not a real shuffle	refused · rules
the celebration fault, tap for tap	438 of a 169 jackpot	moves give 156	refused · rules

It also agrees with the game itself, to the point: it reproduces exactly every one of the 47 records held when GLNS was switched on, and every one of 45 test games played on the real game by a random player that used every feature, including Pin, clover guesses, Limbo, misses and celebrations cut short.

The speed check

Each game gets its own floor, computed from its own moves:

floor = (recorded taps – 1) × $\tau(P)$ + 0.5 s × clover guesses

The clock starts at the first tap on a blue and stops when the last matched red moves on, so the time between the first tap and the last is filled by exactly the taps the game recorded. A game claimed faster than its floor is refused.

The human floor

$\tau(P) = 100 + 2(P - 2)$ ms is the shortest interval allowed between two taps, where P is the number of pairs. At the start of a game it is 100 milliseconds, ten taps a second, which assumes two practised hands alternating on the dial. That is faster than a single finger sustains in laboratory tapping tests (Barut and colleagues, 2013). The allowance grows by two milliseconds for every pair, to 138 milliseconds at 21 pairs, because long games tire the hand.

The waits no tap can shorten

Almost every delay in the game can be skipped by a quick player. The celebration of a match ends the moment the matched red is tapped again, so it adds nothing to the floor. One delay cannot be skipped: after a clover guess the game holds the answer back for half a second, and no tap can hurry it. The Pin rotation also takes time, but it is counted as nothing, for the reason below.

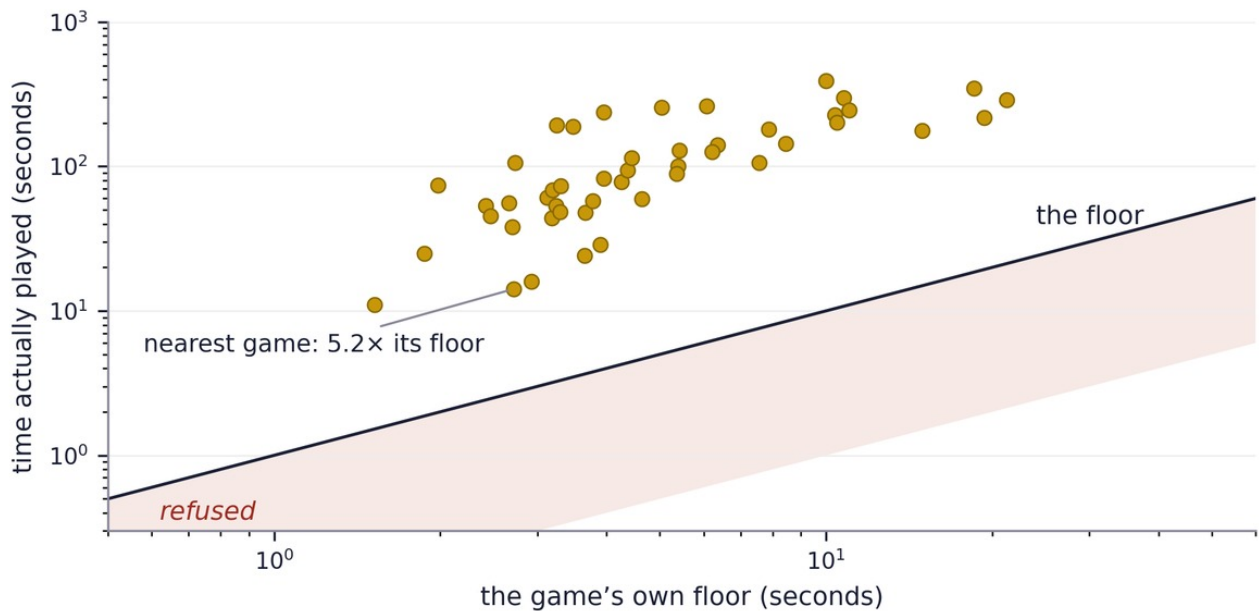
Every error on the player's side

Wherever the floor could be uncertain, it is set lower. Taps the game does not record, such as the tap that moves a matched red on or the taps on the Pin and Clover buttons, are left out. The Pin rotation adds no time. Each choice can only make the floor easier to beat, so an honest game can never be refused for being quick.

The table gives the fastest a flawless game can physically be played, with three taps to each pair: reveal the blue, tap its red, tap the matched red to move on. The floor the server applies is lower still, because the last of those three taps is never recorded.

Pairs	Taps (3P)	$\tau(P)$	Fastest possible
3	9	102 ms	0.8 s
4	12	104 ms	1.1 s
5	15	106 ms	1.5 s
6	18	108 ms	1.8 s
8	24	112 ms	2.6 s
10	30	116 ms	3.4 s
13	39	122 ms	4.6 s
16	48	128 ms	6.0 s
21	63	138 ms	8.6 s

The floor sits far below real play. Every game in the live store is shown against its own floor below: the nearest is more than five times slower, and half of them are nineteen times slower or more.

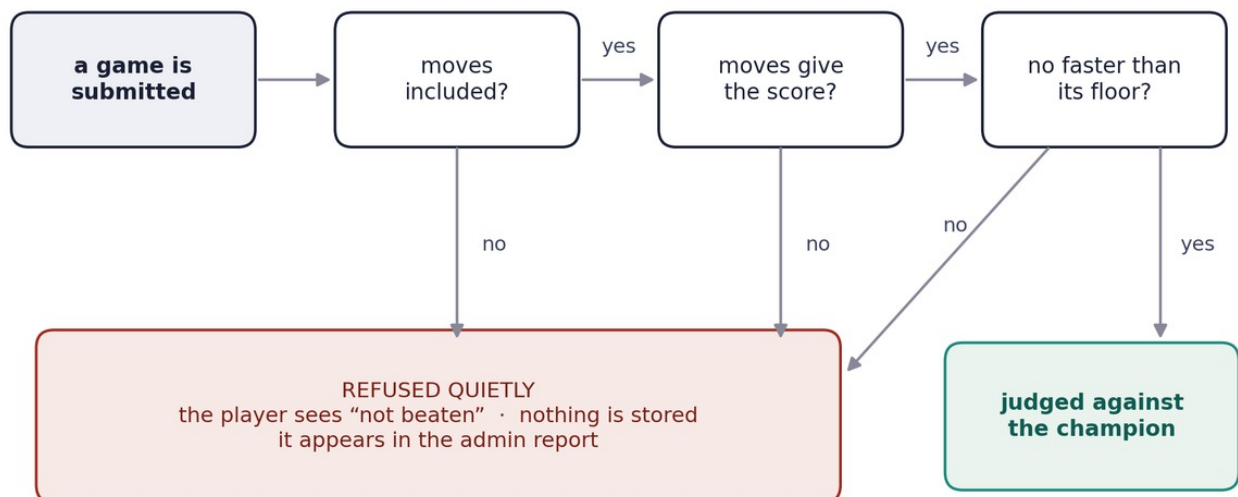


The 47 live records when GLNS was switched on: each game's time against its own floor, on logarithmic scales. The diagonal is the floor; a game below it would be refused.

When it acts, and what the player sees

Both checks run when the score arrives, before anything is stored. The store keeps one record per category, so the order matters: a refused game never replaces anyone, and the champion it tried to beat keeps the seat.

The player is told nothing. The server answers exactly as it does for a game that did not take the seat. In the world championship the game shows its usual message, "Thank you for playing ... Another player just edged you out in this category. Try again!" In a tournament it names the champion who still holds the category. Someone testing the system learns neither which check failed nor by how much. A submission that arrives without its moves is treated in the same way, since there is nothing to check. The counters of games played are left untouched: the attempt happened, only the claim did not.



The path of every submitted game. Only a game that passes both checks goes on to be judged against the champion.

The admin report

Each refusal is written to the administrator's list of rejected submissions, in its own section, with the reason, the nickname, the category, the claimed score and time, and the evidence for the refusal. Tournament refusals carry the tournament's name, and a count at the top shows how many recent games each check has kept out.

Reason	Shown in the report as	The evidence given
rules	the moves do not give this score	the score the moves really give
speed	faster than a human hand	the game's floor, and how far below it the time fell
no moves	sent without its moves	none — there was nothing to check

What GLNS cannot stop

The board is dealt inside the player's own browser, so a program could read where every red lies, play a flawless game at an unhurried human pace, and pass both checks. Its game would be, move for move, a perfect game, and nothing in the submission could tell it from one.

Two answers exist, and neither is needed today. A watch list in the administrator's report could flag players whose games repeatedly land exactly on the best possible line, for a person to look at; it would never refuse anything by itself. The complete answer is to deal the boards on the server, so that the positions of the reds are never in the player's hands. That is a large change to the game, kept for the day the field attracts serious attackers.

How it runs

The checks read only the submission itself, and run before the record store is opened, so many players can submit at the same moment without waiting for each other. Replaying a game of a few hundred moves takes well under a millisecond. In testing, twenty submissions were sent to the real server script at the same instant, half of them forged. All twenty were answered within six tenths of a second, forged and honest alike; no forged game reached the store, and the store stayed whole.



Twenty simultaneous submissions to the real submission script on a test server, each answer timed. The forged games were refused as quickly as the honest ones were judged.

In one sentence: GLNS keeps out every game its own moves cannot explain, and every game played faster than two hands can play it.

Reference: Barut Ç, Kiziltan E, Gelir E, Köktürk F. Advanced analysis of finger-tapping performance: a preliminary study. *Balkan Medical Journal* 2013; 30(2): 167–171. doi:10.5152/balkanmedj.2012.105

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