===== GAME 1 =====

==========

GAME 1 NASH EQUILIBRIUM ANALYSIS

==========

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

==========

CURRENT DRAFT STATE

==========

Bans (10): Bard, Neeko, Yunara, Alistar, Renata, Sivir, Ezreal, Yone, Orianna, Azir

KT Rolster (Blue) - Locked Picks:

TOP : Rumble

JUNGLE : Wukong

MID : Ryze

BOT : [OPEN]

SUPPORT : [OPEN]

T1 (Red) - Locked Picks:

TOP : [OPEN]

JUNGLE : XinZhao

MID : Taliyah

BOT : Varus

SUPPORT : Poppy

Available Champions: 71

Ksante, Sion, Ambessa, RekSai, Renekton, Ornn, Mordekaiser, Aatrox, Jax, Camille, Galio, Yorick, Kled, Jayce, Gwen, Gragas, Aurora, Gnar, JarvanIV, Trundle...

==========

INITIALIZING WITH API CALLS ENABLED

==========

Note: Memoization is ENABLED to cache API calls and prevent duplicates

This will speed up calculations significantly after the first run

WARNING: API calls to u.gg can be slow (10s timeout per matchup)

Each team matchup requires ~10 API calls (5 lanes ├ù 2 directions)

First run will take time, but results are cached for future runs

If it hangs, press Ctrl+C and set skip_api_calls=True for faster testing

==========

Loading player comfort data from database...

Loaded comfort data for 10 players

Player comfort data loaded - will use database instead of OP.GG scraping

==========

RUNNING NASH EQUILIBRIUM ANALYSIS

==========

Finding optimal picks using backward induction...

(This may take a few minutes)

Starting fresh SPNE calculation...

Beam width: 1000 (set high to prevent pruning - we only have ~126 Blue combinations)

Fast heuristic: False

Memoization: True

Available champions: 71

Max depth: 3 (Blue picks 2, Red picks 1)

Available TOP champions for Red: 18

Available BOT champions for Blue: 14

Available SUPPORT champions for Blue: 9

Total combinations Blue can pick: 126

Expected calculations: ~2268 (all combinations)

NOTE: With beam_width=1000, all 126 Blue combinations should be explored

Top champions: Ksante, Sion, Ambessa, RekSai, Renekton, Ornn, Mordekaiser, Aatrox, Jax, Camille...

==========

STEP 1: BLUE'S OPTIMAL PICKS (USING MINIMAX)

==========

Optimal picks will be determined in STEP 1.5 using minimax calculation...

==========

STEP 1.5: VERIFYING BLUE'S OPTIMAL PICKS

==========

Testing ALL Blue combinations (BOT + SUPPORT) to verify optimal picks...

Found 14 valid BOT champions (scenario pool)

Found 9 valid SUPPORT champions (scenario pool)

Total combinations to test: 126

Cache status: 0 entries (will reuse to avoid duplicate API calls)

Pre-calculating locked role matchups...

Clearing matchup cache to force fresh API calls...

Cache size before clearing: 0

Cleared entire matchup cache (now: 0)

Pre-calculating jungle: Wukong vs XinZhao... 50.32%

Pre-calculating mid: Ryze vs Taliyah... 49.03%

Pre-calculated 2 locked role matchups

Matchup cache now has 2 entries

Pre-calculating Rumble vs all possible Red TOP champions...

Found 18 valid TOP champions for Red (scenario pool)

Pre-calculating Rumble vs all 18 Red TOP champions...

This will make 18 API calls upfront, but save 3978 redundant calls later

Pre-calculated 18/18 Rumble vs TOP matchups (cache now has 20 entries)

Pre-calculating Varus vs all 14 Blue ADC champions...

This will make 14 API calls, then we'll invert for ADC vs Varus

Pre-calculated 14/14 Varus vs ADC matchups (cache now has 34 entries)

Pre-calculating Poppy vs all 9 Blue SUPPORT champions...

Cache will automatically handle SUPPORT vs Poppy (no manual inversion needed)

Pre-calculated 9/9 Poppy vs SUPPORT matchups (cache now has 43 entries)

Matchup cache now has 43 entries

Verifying cache integration...

Γ£ô Rumble vs Ksante (TOP): CACHE HIT

Γ£ô Corki vs Varus (ADC): CACHE HIT (inverted)

Γ£ô Rakan vs Poppy (SUPPORT): CACHE HIT (inverted)

Γ£ô All pre-calculated matchups are properly cached and will be reused!

Total calculations needed: 2268

(14 BOT ├ù 9 SUPPORT ├ù 18 TOP)

Expected cache hits: All Rumble vs TOP, all ADC vs Varus (inverted), all SUPPORT vs Poppy (inverted)

Expected new API calls: Only for any new matchups not pre-calculated

==========

ALL BLUE COMBINATIONS (BOT + SUPPORT):

==========

Calculating 126 Blue combinations ├ù 18 Red TOP picks...

Total calculations: 2268

Cache will prevent duplicate API calls for same team matchups

BOT	SUPPORT	Payoff	KT Win%	Red Best TOP	Status
Ashe	Braum	-0.0907	48.23%	Renekton	[SPNE]
Kalista	Braum	-0.0916	48.21%	Renekton	
MissFortune	Braum	-0.0919	48.20%	Renekton	
Caitlyn	Braum	-0.0935	48.16%	Renekton	
Draven	Braum	-0.0945	48.14%	Renekton	
Lucian	Braum	-0.0949	48.13%	Renekton	
KaiSa	Braum	-0.0954	48.12%	Renekton	
Smolder	Braum	-0.0995	48.01%	Renekton	
Ashe	Nautilus	-0.0997	48.01%	Kled	
Xayah	Braum	-0.1004	47.99%	Renekton	
Kalista	Nautilus	-0.1006	47.99%	Kled	
Jinx	Braum	-0.1007	47.98%	Renekton	
Vayne	Braum	-0.1007	47.98%	Renekton	
MissFortune	Rakan	-0.1009	47.98%	Ambessa	
MissFortune	Nautilus	-0.1009	47.98%	Kled	
Caitlyn	Rakan	-0.1025	47.94%	Ambessa	
Caitlyn	Nautilus	-0.1025	47.94%	Kled	
Draven	Rakan	-0.1034	47.92%	Ambessa	
Draven	Nautilus	-0.1035	47.91%	Kled	
Lucian	Rakan	-0.1039	47.90%	Ambessa	
Lucian	Nautilus	-0.1039	47.90%	Kled	
Jhin	Braum	-0.1044	47.89%	Kled	
KaiSa	Nautilus	-0.1044	47.89%	Kled	
Jhin	Nautilus	-0.1055	47.86%	Kled	

Jhin	Leona	-0.1058	47.86% Kled
Jhin	Rell	-0.1061	47.85% Kled
Ashe	Leona	-0.1062	47.85% Kled
Ashe	Rell	-0.1065	47.84% Kled
Kalista	Leona	-0.1071	47.82% Kled
MissFortune	Leona	-0.1074	47.82% Kled
Kalista	Rell	-0.1074	47.82% Kled
Smolder	Rakan	-0.1085	47.79% Ambessa
Smolder	Nautilus	-0.1085	47.79% Kled
Corki	Karma	-0.1088	47.78% Ambessa
Caitlyn	Leona	-0.1090	47.78% Kled
Caitlyn	Rell	-0.1094	47.77% Kled
Xayah	Rakan	-0.1094	47.77% Ambessa
Xayah	Nautilus	-0.1094	47.77% Kled
MissFortune	Rell	-0.1095	47.76% Kled
Jinx	Rakan	-0.1097	47.76% Ambessa
Jinx	Nautilus	-0.1097	47.76% Kled
Vayne	Rakan	-0.1097	47.76% Ambessa
Vayne	Nautilus	-0.1097	47.76% Kled
KaiSa	Rakan	-0.1098	47.76% Ambessa
Draven	Leona	-0.1100	47.75% Kled
Draven	Rell	-0.1103	47.74% Kled
Lucian	Leona	-0.1104	47.74% Kled
Lucian	Rell	-0.1108	47.73% Kled
KaiSa	Leona	-0.1109	47.73% Kled
KaiSa	Rell	-0.1112	47.72% Kled

Jhin	Lulu	-0.1113	47.72% Kled
Ashe	Lulu	-0.1117	47.71% Kled
Ashe	Rakan	-0.1123	47.70% Ambessa
Kalista	Lulu	-0.1126	47.69% Kled
Jhin	Nami	-0.1127	47.68% Kled
MissFortune	Lulu	-0.1129	47.68% Kled
Ashe	Nami	-0.1131	47.67% Kled
Kalista	Rakan	-0.1132	47.67% Ambessa
Kalista	Nami	-0.1140	47.65% Kled
MissFortune	Nami	-0.1143	47.64% Kled
Caitlyn	Lulu	-0.1146	47.64% Kled
Jhin	Karma	-0.1148	47.63% Kled
Smolder	Leona	-0.1150	47.63% Kled
Smolder	Rell	-0.1153	47.62% Kled
Draven	Lulu	-0.1155	47.61% Kled
Caitlyn	Nami	-0.1159	47.60% Kled
Xayah	Leona	-0.1160	47.60% Kled
Lucian	Lulu	-0.1160	47.60% Kled
Jinx	Leona	-0.1162	47.60% Kled
Vayne	Leona	-0.1162	47.60% Kled
Xayah	Rell	-0.1163	47.60% Kled
KaiSa	Lulu	-0.1164	47.59% Kled
Jinx	Rell	-0.1165	47.59% Kled
Vayne	Rell	-0.1165	47.59% Kled
Draven	Nami	-0.1169	47.58% Kled
Lucian	Nami	-0.1173	47.57% Kled

Corki	Braum	-0.1177	47.56%	Renekton
KaiSa	Nami	-0.1178	47.56%	Kled
Caitlyn	Karma	-0.1181	47.55%	Kled
Corki	Nautilus	-0.1189	47.53%	Renekton
Ziggs	Braum	-0.1197	47.51%	Renekton
Smolder	Lulu	-0.1205	47.49%	Kled
Ziggs	Karma	-0.1209	47.48%	Kled
Xayah	Lulu	-0.1215	47.46%	Kled
Jinx	Lulu	-0.1217	47.46%	Kled
Vayne	Lulu	-0.1218	47.46%	Kled
Jhin	Rakan	-0.1219	47.46%	Kled
Smolder	Nami	-0.1219	47.45%	Kled
Corki	Rakan	-0.1226	47.44%	Renekton
Xayah	Nami	-0.1229	47.43%	Kled
Jinx	Nami	-0.1231	47.42%	Kled
Vayne	Nami	-0.1231	47.42%	Kled
Smolder	Karma	-0.1240	47.40%	Kled
Ziggs	Rakan	-0.1287	47.28%	Ambessa
Corki	Lulu	-0.1287	47.28%	Ambessa
Ziggs	Nautilus	-0.1287	47.28%	Kled
Corki	Nami	-0.1301	47.25%	Ambessa
Jhin	TahmKench	-0.1316	47.21%	Kled
Ashe	TahmKench	-0.1320	47.20%	Kled
Kalista	TahmKench	-0.1329	47.18%	Kled
MissFortune	TahmKench	-0.1332	47.17%	Kled
Corki	Leona	-0.1332	47.17%	Kled

Corki	Rell	-0.1336	47.16% Kled
Corki	TahmKench	-0.1346	47.14% Ambessa
Caitlyn	TahmKench	-0.1349	47.13% Kled
Ashe	Karma	-0.1350	47.13% Kled
Ziggs	Leona	-0.1352	47.12% Kled
Ziggs	Rell	-0.1356	47.11% Kled
Draven	TahmKench	-0.1358	47.11% Kled
Kalista	Karma	-0.1359	47.11% Kled
MissFortune	Karma	-0.1362	47.10% Kled
Lucian	TahmKench	-0.1363	47.10% Kled
KaiSa	TahmKench	-0.1367	47.09% Kled
Draven	Karma	-0.1388	47.03% Kled
Lucian	Karma	-0.1392	47.02% Kled
KaiSa	Karma	-0.1397	47.01% Kled
Ziggs	Lulu	-0.1408	46.98% Kled
Smolder	TahmKench	-0.1408	46.98% Kled
Xayah	TahmKench	-0.1418	46.96% Kled
Jinx	TahmKench	-0.1420	46.95% Kled
Vayne	TahmKench	-0.1421	46.95% Kled
Ziggs	Nami	-0.1422	46.95% Kled
Xayah	Karma	-0.1448	46.88% Kled
Jinx	Karma	-0.1450	46.88% Kled
Vayne	Karma	-0.1450	46.88% Kled
Ziggs	TahmKench	-0.1467	46.84% Kled

==========

STEP 1 RESULT: SPNE

==========

SPNE (tests ALL 126 combinations):

Optimal Blue picks: BOT=Ashe, SUPPORT=Braum, Payoff=-0.0907 [SPNE]

Red's best response: Renekton

KT Win Rate: 48.23%

==========

KT Rolster (Blue) - Optimal Picks (from Minimax):

TOP : Rumble

JUNGLE : Wukong

MID : Ryze

BOT : Ashe [OPTIMAL]

SUPPORT : Braum [OPTIMAL]

T1 (Red) - Optimal Response (from Minimax):

TOP : Renekton [OPTIMAL]

JUNGLE : XinZhao

MID : Taliyah

BOT : Varus

SUPPORT : Poppy

==========

SUMMARY - TOP 10 BEST COMBINATIONS FOR BLUE:

==========

1. BOT=Ashe SUP=Braum Payoff= -0.0907 (Red advantage), KT Win=48.23%, Red TOP=Renekton [SPNE]

2. BOT=Kalista SUP=Braum Payoff= -0.0916 (Red advantage), KT Win=48.21%, Red TOP=Renekton

3. BOT=MissFortune SUP=Braum Payoff= -0.0919 (Red advantage), KT Win=48.20%, Red TOP=Renekton

4. BOT=Caitlyn SUP=Braum Payoff= -0.0935 (Red advantage), KT Win=48.16%, Red TOP=Renekton

5. BOT=Draven SUP=Braum Payoff= -0.0945 (Red advantage), KT Win=48.14%, Red TOP=Renekton

6. BOT=Lucian SUP=Braum Payoff= -0.0949 (Red advantage), KT Win=48.13%, Red TOP=Renekton

7. BOT=KaiSa SUP=Braum Payoff= -0.0954 (Red advantage), KT Win=48.12%, Red TOP=Renekton

8. BOT=Smolder SUP=Braum Payoff= -0.0995 (Red advantage), KT Win=48.01%, Red TOP=Renekton

9. BOT=Ashe SUP=Nautilus Payoff= -0.0997 (Red advantage), KT Win=48.01%, Red TOP=Kled

10. BOT=Xayah SUP=Braum Payoff= -0.1004 (Red advantage), KT Win=47.99%, Red TOP=Renekton

==========

BLUE'S BEST COMBINATION (SPNE): BOT=Ashe, SUPPORT=Braum

Red's optimal TOP response: Renekton

Payoff: -0.0907

KT Win Rate: 48.23%

==========

Total calculations for Blue combinations: 2,268

Formula: 14 BOT ├ù 9 SUPPORT ├ù 18 TOP = 2268 total

==========

STEP 2: BLUE'S ACTUAL PICKS

==========

Loaded 86 champion names from lolchampiontags.db

KT Rolster (Blue) - Actual Picks:

BOT: Ashe

SUPPORT: Braum

==========

SCENARIO COMPARISONS

==========

Scenario	Payoff	KT Win%	T1 Win%
Optimal (Ashe, Braum) vs Optimal (Renekton)	-0.0907	48.2%	51.8%
Actual (Ashe, Braum) vs Actual (Ambessa)	-0.0857	48.4%	51.6%
Optimal (Ashe, Braum) vs Actual (Ambessa)	-0.0857	48.4%	51.6%
Actual (Ashe, Braum) vs Optimal (Renekton)	-0.0907	48.2%	51.8%

==========

DETAILED COMPARISON

==========

KT Rolster (Blue) Last Picks:

BOT: Actual=Ashe, Optimal=Ashe, Match=True

SUPPORT: Actual=Braum, Optimal=Braum, Match=True

T1 (Red) Last Pick:

TOP: Actual=Ambessa, Optimal=Renekton, Match=False

==========

ANALYSIS

==========

1. Optimal (Ashe, Braum) vs Optimal (Renekton) (SPNE):

Payoff: -0.0907, KT: 48.2%, T1: 51.8%

2. Actual (Ashe, Braum) vs Actual (Ambessa) (What happened):

Payoff: -0.0857, KT: 48.4%, T1: 51.6%

-> Actual outcome matches optimal outcome!

3. Optimal (Ashe, Braum) vs Actual (Ambessa) (If Blue optimal, Red actual):

Payoff: -0.0857, KT: 48.4%, T1: 51.6%

-> Shows value of Blue's optimal picks when Red doesn't respond optimally

4. Actual (Ashe, Braum) vs Optimal (Renekton) (If Blue actual, Red optimal response):

Payoff: -0.0907, KT: 48.2%, T1: 51.8%

-> Shows how Red's optimal response performs against Blue's actual picks

==========

STEP 3: RED'S BEST RESPONSE TO BLUE'S OPTIMAL PICKS

==========

Cache status: 2268 entries (will reuse to avoid duplicate API calls)

==========

ALL CALCULATIONS:

==========

Champion	Payoff	T1 Win%	Status
Aatrox	-0.0690	51.23%	
Ambessa	-0.0857	51.64%	
Aurora	-0.0791	51.48%	
Camille	-0.0689	51.22%	
Galio	-0.0616	51.04%	
Gnar	-0.0819	51.55%	
Gragas	-0.0753	51.38%	
Gwen	-0.0748	51.37%	
Jax	-0.0643	51.11%	
Jayce	-0.0713	51.28%	
Kled	-0.0853	51.63%	
Ksante	-0.0574	50.93%	
Mordekaiser	-0.0777	51.44%	
Ornn	-0.0645	51.11%	
Poppy	-0.0570	50.92%	
RekSai	-0.0703	51.26%	
Renekton	-0.0907	51.77%	[SPNE]

Sion -0.0200 50.00%

Yorick -0.0537 50.84%

==========

RED'S BEST RESPONSE: Renekton

Payoff: -0.0907 (Red advantage)

T1 Win Rate: 51.77%

==========

Total calculations performed: 2,269

==========

STEP 4: RED'S BEST RESPONSE TO BLUE'S ACTUAL PICKS

==========

Cache status: 2269 entries (will reuse to avoid duplicate API calls)

Top 5 responses:

1. Renekton: Payoff=-0.0907, T1 Win=51.8% [BEST]
2. Ambessa: Payoff=-0.0857, T1 Win=51.6% [ACTUAL]
3. Kled: Payoff=-0.0853, T1 Win=51.6%
4. Gnar: Payoff=-0.0819, T1 Win=51.5%
5. Aurora: Payoff=-0.0791, T1 Win=51.5%

Calculations performed: 2,269

==========

STEP 5: COMPARISON OF ALL SCENARIOS

```
======================================================================
Cache status: 2269 entries (will reuse to avoid duplicate API calls)

Scenario                          Payoff    KT Win%    T1 Win%
----------------------------------------------------------------------
Optimal Blue (Ashe, Braum) vs SPNE Red (Renekton)    -0.0907    48.2%    51.8%
Optimal Blue (Ashe, Braum) vs Best Response (Renekton)    -0.0907    48.2%    51.8%
Actual Blue (Ashe, Braum) vs Best Response (Renekton)    -0.0907    48.2%    51.8%
Actual Blue (Ashe, Braum) vs Actual Red (Ambessa)    -0.0857    48.4%    51.6%

Total calculations for scenarios: 2,269

======================================================================
KEY FINDINGS
======================================================================

1. Blue's Optimal Picks (Ashe, Braum): BOT=Ashe, SUPPORT=Braum
  Red's SPNE response (Renekton): Renekton
    -> Payoff: -0.0907 (T1 win: 51.8%)
  Red's best response (Renekton): Renekton
    -> Payoff: -0.0907 (T1 win: 51.8%)
  [OK] SPNE pick (Renekton) matches best response (Renekton)!

2. Blue's Actual Picks (Ashe, Braum): BOT=Ashe, SUPPORT=Braum
  Red's best response (Renekton): Renekton
    -> Payoff: -0.0907 (T1 win: 51.8%)
```

Red's actual pick (Ambessa): Ambessa

-> Payoff: -0.0857 (T1 win: 51.6%)

[INFO] Red's actual pick differs from best response

Actual pick has payoff +0.0049 MORE POSITIVE (worse for Red)

Win rate difference: -0.1%

==========

SPNE VERIFICATION

==========

SPNE Definition:

In a Subgame Perfect Nash Equilibrium, each player's strategy must be

a best response to the other player's strategy at EVERY subgame.

If Blue picks optimally (Ashe, Braum), then

Red's SPNE pick (Renekton) MUST be the best response (minimum payoff).

[OK] SPNE VERIFIED: The SPNE pick (Renekton) IS the best response (Renekton)!

Payoff: -0.0907 (minimum = best for Red)

===== GAME 2 =====

==========

GAME 2 NASH EQUILIBRIUM ANALYSIS

==========

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

==========

CURRENT DRAFT STATE

==========

Bans (20): Rumble, Ambessa, Wukong, XinZhao, Ryze, Taliyah, Varus, Poppy, Ashe, Braum, Bard, Galio, Alistar, Caitlyn, Trundle, Yunara, Yone, Orianna, Azir, KaiSa

KT Rolster (Blue) - Locked Picks:

TOP : RekSai

JUNGLE : Vi

MID : [OPEN]

BOT : [OPEN]

SUPPORT : Neeko

T1 (Red) - Locked Picks:

TOP : Sion

JUNGLE : JarvanIV

MID : [OPEN]

BOT : Sivir

SUPPORT : Lulu

Available Champions: 60

Ksante, Renekton, Ornn, Mordekaiser, Aatrox, Jax, Camille, Yorick, Kled, Jayce, Gwen, Gragas, Aurora, Gnar, Qiyana, Pantheon, Naafiri, DrMundo, Nocturne, Sejuani...

==========

INITIALIZING WITH API CALLS ENABLED

==========

Note: Memoization is ENABLED to cache API calls and prevent duplicates

This will speed up calculations significantly after the first run

WARNING: API calls to u.gg can be slow (10s timeout per matchup)

Each team matchup requires ~10 API calls (5 lanes ├ù 2 directions)

First run will take time, but results are cached for future runs

If it hangs, press Ctrl+C and set skip_api_calls=True for faster testing

==========

Loading player comfort data from database...

Loaded comfort data for 10 players

Player comfort data loaded - will use database instead of OP.GG scraping

==========

RUNNING NASH EQUILIBRIUM ANALYSIS

==========

Finding optimal picks using backward induction...

(This may take a few minutes)

Starting fresh SPNE calculation...

Beam width: 1000 (set high to prevent pruning - we only have ~192 Blue combinations)

Fast heuristic: False

Memoization: True

Available champions: 60

Max depth: 3 (Blue picks 2, Red picks 1)

Available MID champions for Red: 16

Available MID champions for Blue: 16

Available BOT champions for Blue: 12

Total combinations Blue can pick: 192

Expected calculations: ~3072 (all combinations)

NOTE: With beam_width=1000, all 192 Blue combinations should be explored

Mid champions: Aurora, Cassiopeia, Viktor, Akali, Annie, Sylas, Anivia, LeBlanc, Hwei, Syndra...

==========

STEP 1: BLUE'S OPTIMAL PICKS (USING MINIMAX)

==========

Optimal picks will be determined in STEP 1.5 using minimax calculation...

==========

STEP 1.5: VERIFYING BLUE'S OPTIMAL PICKS

==========

Testing ALL Blue combinations (MID + BOT) to verify optimal picks...

Found 16 valid MID champions (scenario pool)

Found 12 valid BOT champions (scenario pool)

Total combinations to test: 192

Cache status: 0 entries (will reuse to avoid duplicate API calls)

Pre-calculating locked role matchups...

Clearing matchup cache to force fresh API calls...

Cache size before clearing: 0

Cleared entire matchup cache (now: 0)

Pre-calculating top: RekSai vs Sion... 66.67%

Pre-calculating jungle: Vi vs JarvanIV... 47.23%

Pre-calculating support: Neeko vs Lulu... 48.43%

Pre-calculated 3 locked role matchups

Matchup cache now has 3 entries

Pre-calculating Sivir vs all 12 Blue BOT champions...

This will make 12 API calls, then we'll invert for BOT vs Sivir

Pre-calculated 12/12 Sivir vs BOT matchups (cache now has 15 entries)

Found 16 valid MID champions for Red (scenario pool)

Verifying cache integration...

Γ£ô Corki vs Sivir (BOT): CACHE HIT (inverted)

Γ£ô All pre-calculated matchups are properly cached and will be reused!

Total calculations needed: 3072

(16 MID ├ù 12 BOT ├ù 16 MID)

Expected cache hits: All locked roles (TOP, JUNGLE, SUPPORT), all BOT vs Sivir (inverted)

Expected new API calls: MID vs MID matchups (both sides are variable, cannot pre-calc)

==========

ALL BLUE COMBINATIONS (MID + BOT):

==========

Calculating 190 Blue combinations ├ù 16 Red MID picks...

Total calculations: 3040

Cache will prevent duplicate API calls for same team matchups

MID	BOT	Payoff	KT Win%	Red Best MID	Status
Swain	Ezreal	+0.0531	51.83%	Sylas	[SPNE]
Sylas	Ezreal	+0.0278	51.20%	Zoe	
Aurora	Ezreal	+0.0173	50.93%	Viktor	
Akali	Ezreal	+0.0065	50.66%	Viktor	
Swain	Draven	+0.0029	50.57%	Sylas	
Swain	Lucian	+0.0022	50.56%	Sylas	
Swain	Corki	-0.0012	50.47%	Sylas	
Swain	Vayne	-0.0022	50.45%	Sylas	
Swain	Jinx	-0.0027	50.43%	Sylas	
Swain	Smolder	-0.0043	50.39%	Sylas	
Swain	Xayah	-0.0046	50.39%	Sylas	
Swain	Kalista	-0.0084	50.29%	Sylas	
Aurora	Corki	-0.0136	50.16%	Viktor	
Sylas	Vayne	-0.0202	50.00%	Zoe	
Sylas	Jinx	-0.0208	49.98%	Zoe	
Sylas	Draven	-0.0223	49.94%	Zoe	
Sylas	Smolder	-0.0224	49.94%	Zoe	

Sylas	Xayah	-0.0226	49.94% Zoe
Sylas	Lucian	-0.0230	49.92% Zoe
Sylas	MissFortune	-0.0252	49.87% Zoe
Sylas	Corki	-0.0264	49.84% Zoe
Swain	Ziggs	-0.0268	49.83% Sylas
Swain	MissFortune	-0.0288	49.78% Sylas
Aurora	Vayne	-0.0307	49.73% Viktor
Aurora	Jinx	-0.0313	49.72% Viktor
Aurora	Draven	-0.0329	49.68% Viktor
Aurora	Smolder	-0.0329	49.68% Viktor
Aurora	Xayah	-0.0331	49.67% Viktor
Aurora	Lucian	-0.0336	49.66% Viktor
Zoe	Ezreal	-0.0336	49.66% Viktor
Sylas	Kalista	-0.0336	49.66% Zoe
Hwei	Ezreal	-0.0346	49.63% Viktor
Aurora	MissFortune	-0.0358	49.61% Viktor
Mel	Ezreal	-0.0386	49.54% Viktor
Aurora	Ziggs	-0.0392	49.52% Viktor
Smolder	Ezreal	-0.0402	49.49% Viktor
Akali	Vayne	-0.0415	49.46% Viktor
Akali	Jinx	-0.0421	49.45% Viktor
Swain	Jhin	-0.0427	49.43% Sylas
Akali	MissFortune	-0.0430	49.43% Viktor
Akali	Draven	-0.0436	49.41% Viktor
Akali	Smolder	-0.0437	49.41% Viktor
Syndra	Ezreal	-0.0438	49.40% Sylas

Akali	Xayah	-0.0439	49.40%	Viktor
Aurora	Kalista	-0.0442	49.40%	Viktor
LeBlanc	Ezreal	-0.0442	49.39%	Viktor
Akali	Lucian	-0.0443	49.39%	Viktor
Akali	Kalista	-0.0477	49.31%	Viktor
Akali	Corki	-0.0478	49.31%	Viktor
Cassiopeia	Ezreal	-0.0492	49.27%	Viktor
Sylas	Ziggs	-0.0520	49.20%	Zoe
Anivia	Ezreal	-0.0550	49.13%	Viktor
Ziggs	Ezreal	-0.0566	49.09%	Sylas
Viktor	Ezreal	-0.0582	49.04%	Sylas
Zoe	Corki	-0.0645	48.89%	Viktor
Hwei	Corki	-0.0655	48.86%	Viktor
Sylas	Jhin	-0.0680	48.80%	Zoe
Mel	Corki	-0.0694	48.76%	Viktor
Smolder	Corki	-0.0711	48.72%	Viktor
Syndra	Corki	-0.0747	48.63%	Sylas
LeBlanc	Corki	-0.0751	48.62%	Viktor
Aurora	Jhin	-0.0785	48.54%	Viktor
Cassiopeia	Corki	-0.0800	48.50%	Viktor
Akali	Ziggs	-0.0805	48.49%	Viktor
Ahri	Ezreal	-0.0806	48.48%	Viktor
Akali	Jhin	-0.0821	48.45%	Viktor
Annie	Ezreal	-0.0847	48.38%	Viktor
Anivia	Corki	-0.0859	48.35%	Viktor
Ziggs	Corki	-0.0874	48.31%	Sylas

Viktor	Corki	-0.0891	48.27%	Sylas
Zoe	Ziggs	-0.0900	48.25%	Viktor
Zoe	Smolder	-0.0910	48.23%	Viktor
Hwei	Ziggs	-0.0911	48.22%	Viktor
Hwei	Smolder	-0.0920	48.20%	Viktor
LeBlanc	Smolder	-0.0944	48.14%	Viktor
Mel	Ziggs	-0.0950	48.13%	Viktor
Mel	Smolder	-0.0959	48.10%	Viktor
Smolder	Ziggs	-0.0967	48.08%	Viktor
Ziggs	Smolder	-0.0967	48.08%	Viktor
Cassiopeia	Draven	-0.0993	48.02%	Viktor
Cassiopeia	Lucian	-0.1000	48.00%	Viktor
Syndra	Ziggs	-0.1003	47.99%	Sylas
Syndra	Smolder	-0.1012	47.97%	Sylas
Cassiopeia	MissFortune	-0.1022	47.95%	Viktor
Smolder	MissFortune	-0.1023	47.94%	Viktor
Zoe	MissFortune	-0.1029	47.93%	Viktor
Zoe	Draven	-0.1035	47.91%	Viktor
Hwei	MissFortune	-0.1039	47.90%	Viktor
Zoe	Lucian	-0.1042	47.90%	Viktor
Cassiopeia	Vayne	-0.1044	47.89%	Viktor
Hwei	Draven	-0.1046	47.89%	Viktor
Cassiopeia	Jinx	-0.1050	47.88%	Viktor
Anivia	Draven	-0.1051	47.87%	Viktor
Hwei	Lucian	-0.1053	47.87%	Viktor
Cassiopeia	Ziggs	-0.1056	47.86%	Viktor

Anivia	Lucian	-0.1058	47.86%	Viktor
Cassiopeia	Smolder	-0.1066	47.84%	Viktor
Cassiopeia	Xayah	-0.1068	47.83%	Viktor
Mel	MissFortune	-0.1078	47.81%	Viktor
LeBlanc	Ziggs	-0.1079	47.80%	Viktor
Anivia	MissFortune	-0.1081	47.80%	Viktor
Viktor	Draven	-0.1084	47.79%	Sylas
Mel	Draven	-0.1085	47.79%	Viktor
Zoe	Vayne	-0.1086	47.79%	Viktor
Viktor	Lucian	-0.1091	47.77%	Sylas
Mel	Lucian	-0.1092	47.77%	Viktor
Zoe	Jinx	-0.1092	47.77%	Viktor
Anivia	Kalista	-0.1092	47.77%	Viktor
Hwei	Vayne	-0.1097	47.76%	Viktor
Anivia	Vayne	-0.1102	47.75%	Viktor
Hwei	Jinx	-0.1102	47.75%	Viktor
Cassiopeia	Kalista	-0.1106	47.74%	Viktor
Anivia	Jinx	-0.1108	47.73%	Viktor
Zoe	Xayah	-0.1110	47.73%	Viktor
Viktor	MissFortune	-0.1113	47.72%	Sylas
Ahri	Corki	-0.1115	47.71%	Viktor
Smolder	Draven	-0.1120	47.70%	Viktor
LeBlanc	Vayne	-0.1121	47.70%	Viktor
Hwei	Xayah	-0.1121	47.70%	Viktor
Anivia	Smolder	-0.1124	47.69%	Viktor
Anivia	Xayah	-0.1126	47.69%	Viktor

LeBlanc	Jinx	-0.1126	47.69%	Viktor
Smolder	Lucian	-0.1127	47.68%	Viktor
Syndra	MissFortune	-0.1131	47.67%	Sylas
Viktor	Vayne	-0.1134	47.67%	Sylas
LeBlanc	MissFortune	-0.1135	47.66%	Viktor
Mel	Vayne	-0.1136	47.66%	Viktor
Syndra	Draven	-0.1138	47.66%	Sylas
Viktor	Jinx	-0.1140	47.65%	Sylas
Mel	Jinx	-0.1141	47.65%	Viktor
LeBlanc	Draven	-0.1142	47.65%	Viktor
Syndra	Lucian	-0.1145	47.64%	Sylas
LeBlanc	Xayah	-0.1145	47.64%	Viktor
Viktor	Ziggs	-0.1147	47.64%	Sylas
Zoe	Kalista	-0.1148	47.63%	Viktor
LeBlanc	Lucian	-0.1149	47.63%	Viktor
Annie	Corki	-0.1155	47.61%	Viktor
Viktor	Smolder	-0.1156	47.61%	Sylas
Viktor	Xayah	-0.1158	47.61%	Sylas
Hwei	Kalista	-0.1159	47.60%	Viktor
Mel	Xayah	-0.1160	47.60%	Viktor
Smolder	Vayne	-0.1171	47.58%	Viktor
Smolder	Jinx	-0.1176	47.56%	Viktor
LeBlanc	Kalista	-0.1183	47.54%	Viktor
Anivia	Ziggs	-0.1186	47.54%	Viktor
Syndra	Vayne	-0.1188	47.53%	Sylas
Syndra	Jinx	-0.1194	47.52%	Sylas

Smolder	Xayah	-0.1195	47.52%	Viktor
Viktor	Kalista	-0.1197	47.51%	Sylas
Mel	Kalista	-0.1198	47.51%	Viktor
Syndra	Xayah	-0.1212	47.47%	Sylas
Smolder	Kalista	-0.1233	47.42%	Viktor
Syndra	Kalista	-0.1251	47.38%	Sylas
Ziggs	MissFortune	-0.1258	47.36%	Sylas
Ziggs	Draven	-0.1265	47.34%	Sylas
Ziggs	Lucian	-0.1272	47.32%	Sylas
Ahri	Vayne	-0.1287	47.29%	Viktor
Smolder	Jhin	-0.1289	47.28%	Viktor
Ahri	Jinx	-0.1292	47.27%	Viktor
Zoe	Jhin	-0.1294	47.27%	Viktor
Ahri	MissFortune	-0.1301	47.25%	Viktor
Hwei	Jhin	-0.1305	47.24%	Viktor
Ahri	Draven	-0.1308	47.23%	Viktor
Ahri	Smolder	-0.1308	47.23%	Viktor
Ahri	Xayah	-0.1311	47.23%	Viktor
Ahri	Lucian	-0.1315	47.22%	Viktor
Ziggs	Vayne	-0.1316	47.21%	Sylas
Ziggs	Jinx	-0.1322	47.20%	Sylas
Annie	Vayne	-0.1327	47.19%	Viktor
LeBlanc	Jhin	-0.1329	47.18%	Viktor
Annie	Jinx	-0.1332	47.17%	Viktor
Ziggs	Xayah	-0.1340	47.15%	Sylas
Mel	Jhin	-0.1344	47.14%	Viktor

Annie	Draven	-0.1348	47.13% Viktor
Annie	Smolder	-0.1348	47.13% Viktor
Ahri	Kalista	-0.1349	47.13% Viktor
Annie	Xayah	-0.1351	47.13% Viktor
Annie	Lucian	-0.1355	47.12% Viktor
Annie	MissFortune	-0.1377	47.06% Viktor
Annie	Kalista	-0.1389	47.03% Viktor
Syndra	Jhin	-0.1396	47.01% Sylas
Anivia	Jhin	-0.1436	46.91% Viktor
Ahri	Ziggs	-0.1443	46.90% Viktor
Cassiopeia	Jhin	-0.1450	46.88% Viktor
Ziggs	Kalista	-0.1450	46.88% Sylas
Annie	Ziggs	-0.1483	46.80% Viktor
Viktor	Jhin	-0.1540	46.65% Sylas
Ziggs	Jhin	-0.1596	46.52% Sylas
Ahri	Jhin	-0.1692	46.28% Viktor
Annie	Jhin	-0.1733	46.18% Viktor

==========

STEP 1 RESULT: SPNE

==========

SPNE (tests ALL 190 combinations):

Optimal Blue picks: MID=Swain, BOT=Ezreal, Payoff=+0.0531 [SPNE]

Red's best response: Sylas

KT Win Rate: 51.83%

==========

KT Rolster (Blue) - Optimal Picks (from Minimax):

TOP : RekSai

JUNGLE : Vi

MID : Swain [OPTIMAL]

BOT : Ezreal [OPTIMAL]

SUPPORT : Neeko

T1 (Red) - Optimal Response (from Minimax):

TOP : Sion

JUNGLE : JarvanIV

MID : Sylas [OPTIMAL]

BOT : Sivir

SUPPORT : Lulu

==========

SUMMARY - TOP 10 BEST COMBINATIONS FOR BLUE:

==========

1. MID=Swain BOT=Ezreal Payoff= +0.0531 (Blue advantage), KT Win=51.83%, Red MID=Sylas [SPNE]

2. MID=Sylas BOT=Ezreal Payoff= +0.0278 (Blue advantage), KT Win=51.20%, Red MID=Zoe

3. MID=Aurora BOT=Ezreal Payoff= +0.0173 (Blue advantage), KT Win=50.93%, Red MID=Viktor

4. MID=Akali BOT=Ezreal Payoff= +0.0065 (Blue advantage), KT Win=50.66%, Red MID=Viktor

5. MID=Swain BOT=Draven Payoff= +0.0029 (Blue advantage), KT Win=50.57%, Red MID=Sylas

6. MID=Swain BOT=Lucian Payoff= +0.0022 (Blue advantage), KT Win=50.56%, Red MID=Sylas

7. MID=Swain BOT=Corki Payoff= -0.0012 (Red advantage), KT Win=50.47%, Red MID=Sylas

8. MID=Swain BOT=Vayne Payoff= -0.0022 (Red advantage), KT Win=50.45%, Red MID=Sylas

9. MID=Swain BOT=Jinx Payoff= -0.0027 (Red advantage), KT Win=50.43%, Red MID=Sylas

10. MID=Swain BOT=Smolder Payoff= -0.0043 (Red advantage), KT Win=50.39%, Red MID=Sylas

==========

BLUE'S BEST COMBINATION (SPNE): MID=Swain, BOT=Ezreal

Red's optimal MID response: Sylas

Payoff: +0.0531

KT Win Rate: 51.83%

==========

Total calculations for Blue combinations: 2,806

Formula: 16 MID ├ù 12 BOT ├ù 16 MID = 3072 total

==========

STEP 2: BLUE'S ACTUAL PICKS

==========

Loaded 86 champion names from lolchampiontags.db

KT Rolster (Blue) - Actual Picks:

MID: Mel

BOT: Ezreal

==========

SCENARIO COMPARISONS

==========

Scenario	Payoff	KT Win%	T1 Win%
Optimal (Swain, Ezreal) vs Optimal (Sylas)	+0.0531	51.8%	48.2%
Actual (Mel, Ezreal) vs Actual (Sylas)	-0.0249	49.9%	50.1%
Optimal (Swain, Ezreal) vs Actual (Sylas)	+0.0531	51.8%	48.2%
Actual (Mel, Ezreal) vs Optimal (Sylas)	-0.0249	49.9%	50.1%

==========

DETAILED COMPARISON

==========

KT Rolster (Blue) Last Picks:

MID: Actual=Mel, Optimal=Swain, Match=False

BOT: Actual=Ezreal, Optimal=Ezreal, Match=True

T1 (Red) Last Pick:

MID: Actual=Sylas, Optimal=Sylas, Match=True

==========

ANALYSIS

==========

1. Optimal (Swain, Ezreal) vs Optimal (Sylas) (SPNE):

  Payoff: +0.0531, KT: 51.8%, T1: 48.2%

2. Actual (Mel, Ezreal) vs Actual (Sylas) (What happened):

  Payoff: -0.0249, KT: 49.9%, T1: 50.1%

  -> Optimal would be +0.0780 better for KT than actual

3. Optimal (Swain, Ezreal) vs Actual (Sylas) (If Blue optimal, Red actual):

  Payoff: +0.0531, KT: 51.8%, T1: 48.2%

  -> Shows value of Blue's optimal picks when Red doesn't respond optimally

4. Actual (Mel, Ezreal) vs Optimal (Sylas) (If Blue actual, Red optimal response):

  Payoff: -0.0249, KT: 49.9%, T1: 50.1%

  -> Shows how Red's optimal response performs against Blue's actual picks

==========

STEP 3: RED'S BEST RESPONSE TO BLUE'S OPTIMAL PICKS

==========

Cache status: 2806 entries (will reuse to avoid duplicate API calls)

==========

ALL CALCULATIONS:

==========

Champion	Payoff	T1 Win%	Status
Ahri	+0.0967	47.09%	
Akali	+0.1007	46.99%	
Anivia	+0.0915	47.22%	
Annie	+0.0953	47.12%	
Aurora	+0.1468	45.84%	
Cassiopeia	+0.0760	47.60%	
Hwei	+0.0810	47.48%	
LeBlanc	+0.0987	47.04%	
Mel	+0.0836	47.41%	
Smolder	+0.1538	45.67%	
Sylas	+0.0531	48.17%	[SPNE]
Syndra	+0.0782	47.55%	
Viktor	+0.0558	48.10%	
Ziggs	+0.0893	47.27%	
Zoe	+0.0816	47.46%	

==========

RED'S BEST RESPONSE: Sylas

Payoff: +0.0531 (Blue advantage)

T1 Win Rate: 48.17%

==========

Total calculations performed: 2,806

==========

STEP 4: RED'S BEST RESPONSE TO BLUE'S ACTUAL PICKS

==========

Cache status: 2806 entries (will reuse to avoid duplicate API calls)

Top 5 responses:

1. Viktor: Payoff=-0.0386, T1 Win=50.5% [BEST]
2. Sylas: Payoff=-0.0249, T1 Win=50.1% [ACTUAL]
3. Swain: Payoff=-0.0093, T1 Win=49.7%
4. Cassiopeia: Payoff=-0.0022, T1 Win=49.6%
5. Syndra: Payoff=+0.0022, T1 Win=49.4%

Calculations performed: 2,806

==========

STEP 5: COMPARISON OF ALL SCENARIOS

==========

Cache status: 2806 entries (will reuse to avoid duplicate API calls)

Scenario	Payoff	KT Win%	T1 Win%
Optimal Blue (Swain, Ezreal) vs SPNE Red (Sylas)	+0.0531	51.8%	48.2%
Optimal Blue (Swain, Ezreal) vs Best Response (Sylas)	+0.0531	51.8%	48.2%
Actual Blue (Mel, Ezreal) vs Best Response (Viktor)	-0.0386	49.5%	50.5%
Actual Blue (Mel, Ezreal) vs Actual Red (Sylas)	-0.0249	49.9%	50.1%

Total calculations for scenarios: 2,806

==========

KEY FINDINGS

==========

1. Blue's Optimal Picks (Swain, Ezreal): MID=Swain, BOT=Ezreal

  Red's SPNE response (Sylas): Sylas

    -> Payoff: +0.0531 (T1 win: 48.2%)

  Red's best response (Sylas): Sylas

    -> Payoff: +0.0531 (T1 win: 48.2%)

  [OK] SPNE pick (Sylas) matches best response (Sylas)!

2. Blue's Actual Picks (Mel, Ezreal): MID=Mel, BOT=Ezreal

  Red's best response (Viktor): Viktor

    -> Payoff: -0.0386 (T1 win: 50.5%)

  Red's actual pick (Sylas): Sylas

    -> Payoff: -0.0249 (T1 win: 50.1%)

  [INFO] Red's actual pick differs from best response

  Actual pick has payoff +0.0137 MORE POSITIVE (worse for Red)

  Win rate difference: -0.3%

==========

SPNE VERIFICATION

==========

SPNE Definition:

In a Subgame Perfect Nash Equilibrium, each player's strategy must be

a best response to the other player's strategy at EVERY subgame.

If Blue picks optimally (Swain, Ezreal), then

Red's SPNE pick (Sylas) MUST be the best response (minimum payoff).

[OK] SPNE VERIFIED: The SPNE pick (Sylas) IS the best response (Sylas)!

Payoff: +0.0531 (minimum = best for Red)

===== GAME 3 =====

==========

GAME 3 NASH EQUILIBRIUM ANALYSIS

==========

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

==========

CURRENT DRAFT STATE

==========

Bans (30): Rumble, Ambessa, Wukong, XinZhao, Ryze, Taliyah, Varus, Poppy, Ashe, Braum, Sion, RekSai, Vi, JarvanIV, Mel, Sylas, Ezreal, Sivir, Neeko, Lulu, Yone, Azir, Orianna, Cassiopeia, Zoe, Galio, Trundle, Pantheon, Bard, Lillia

T1 (Blue/T1) - Locked Picks:

TOP : Renekton

JUNGLE : [OPEN]

MID : [OPEN]

BOT : Yunara

SUPPORT : Rakan

KT Rolster (Red/KT) - Locked Picks:

TOP : Ksante

JUNGLE : DrMundo

MID : [OPEN]

BOT : Corki

SUPPORT : Alistar

Available Champions: 51

Ornn, Mordekaiser, Aatrox, Jax, Camille, Yorick, Kled, Jayce, Gwen, Gragas, Aurora, Gnar, Qiyana, Naafiri, Nocturne, Sejuani, Skarner, Viego, Maokai, Nidalee...

==========

INITIALIZING WITH API CALLS ENABLED

==========

Note: Memoization is ENABLED to cache API calls and prevent duplicates

This will speed up calculations significantly after the first run

WARNING: API calls to u.gg can be slow (10s timeout per matchup)

Each team matchup requires ~10 API calls (5 lanes ├ù 2 directions)

First run will take time, but results are cached for future runs

If it hangs, press Ctrl+C and set skip_api_calls=True for faster testing

==========

Loading player comfort data from database...

Loaded comfort data for 10 players

Player comfort data loaded - will use database instead of OP.GG scraping

==========

RUNNING NASH EQUILIBRIUM ANALYSIS

==========

Finding optimal picks using backward induction...

(This may take a few minutes)

Starting fresh SPNE calculation...

Beam width: 1000 (set high to prevent pruning - we only have ~12 Blue MID choices)

Fast heuristic: False

Memoization: True

Available champions: 51

Max depth: 3 (Blue picks 2, Red picks 1)

Available MID champions for Red: 12

Available JUNGLE champions for Blue: 8

Available MID champions for Blue: 12

Total combinations Blue can pick (MID only): 12

Expected calculations: ~144 (all combinations)

NOTE: With beam_width=1000, all 12 Blue MID choices should be explored

Mid champions (Red): Aurora, Viktor, Akali, Annie, Anivia, LeBlanc, Hwei, Syndra, Ziggs, Smolder...

```
================================================================
STEP 1: BLUE'S OPTIMAL PICKS (USING MINIMAX)
================================================================
Optimal picks will be determined in STEP 1.5 using minimax calculation...

================================================================
STEP 1.5: VERIFYING BLUE'S OPTIMAL PICKS
================================================================
Testing ALL Blue combinations (JUNGLE + MID) to verify optimal picks...

Found 8 valid JUNGLE champions
Found 12 valid MID champions (scenario pool)
Total combinations to test (MID only): 12

Cache status: 0 entries (will reuse to avoid duplicate API calls)

Pre-calculating locked role matchups...
  Clearing matchup cache to force fresh API calls...
    Cache size before clearing: 0
    Cleared entire matchup cache (now: 0)
  Pre-calculating top: Renekton vs Ksante... 49.42%
  Pre-calculating adc: Yunara vs Corki... 51.18%
  Pre-calculating support: Rakan vs Alistar... 51.12%
Pre-calculated 3 locked role matchups
Matchup cache now has 3 entries
```

Pre-calculating DrMundo vs all 8 Blue JUNGLE champions...

This will make 8 API calls, then we'll invert for JUNGLE vs DrMundo

Pre-calculated 8/8 DrMundo vs JUNGLE matchups (cache now has 11 entries)

Found 12 valid MID champions for Red (scenario pool)

Verifying cache integration...

Γ£ô Gragas vs DrMundo (JUNGLE): CACHE HIT (inverted)

Γ£ô All pre-calculated matchups are properly cached and will be reused!

Total calculations needed: 144

(12 MID ├ù 12 MID)

Expected cache hits: All locked roles (TOP, BOT, SUPPORT), all JUNGLE vs DrMundo (inverted)

Expected new API calls: MID vs MID matchups (both sides are variable, cannot pre-calc)

==========

ALL BLUE COMBINATIONS (MID only):

==========

Calculating 12 Blue MID choices ├ù 12 Red MID picks...

Total calculations: 144

Cache will prevent duplicate API calls for same team matchups

JUNGLE	MID	Payoff	T1 Win%	Red Best MID	Status

Viego	Viktor	+0.1131	53.32% LeBlanc	[SPNE]
Viego	Swain	+0.1005	53.01% LeBlanc	
Viego	LeBlanc	+0.0888	52.72% Aurora	
Viego	Annie	+0.0753	52.38% LeBlanc	
Viego	Anivia	+0.0706	52.26% LeBlanc	
Viego	Hwei	+0.0704	52.26% LeBlanc	
Viego	Syndra	+0.0700	52.25% LeBlanc	
Viego	Akali	+0.0689	52.22% LeBlanc	
Viego	Ahri	+0.0683	52.21% LeBlanc	
Viego	Ziggs	+0.0660	52.15% LeBlanc	
Viego	Aurora	+0.0125	50.81% LeBlanc	
Viego	Smolder	-0.0055	50.36% LeBlanc	

==========

STEP 1 RESULT: SPNE

==========

SPNE (tests ALL 12 combinations):

Optimal Blue picks: JUNGLE=Viego, MID=Viktor, Payoff=+0.1131 [SPNE]

Red's best response: LeBlanc

T1 Win Rate: 53.32%

==========

T1 (Blue/T1) - Optimal Picks (from Minimax):

TOP : Renekton

JUNGLE : Viego [OPTIMAL]

MID : Viktor [OPTIMAL]

BOT : Yunara

SUPPORT : Rakan

KT Rolster (Red/KT) - Optimal Response (from Minimax):

TOP : Ksante

JUNGLE : DrMundo

MID : LeBlanc [OPTIMAL]

BOT : Corki

SUPPORT : Alistar

==========

SUMMARY - TOP 10 BEST COMBINATIONS FOR BLUE:

==========

1. JUNGLE=Viego MID=Viktor Payoff= +0.1131 (Blue advantage), T1 Win=53.32%, Red MID=LeBlanc [SPNE]

2. JUNGLE=Viego MID=Swain Payoff= +0.1005 (Blue advantage), T1 Win=53.01%, Red MID=LeBlanc

3. JUNGLE=Viego MID=LeBlanc Payoff= +0.0888 (Blue advantage), T1 Win=52.72%, Red MID=Aurora

4. JUNGLE=Viego MID=Annie Payoff= +0.0753 (Blue advantage), T1 Win=52.38%, Red MID=LeBlanc

5. JUNGLE=Viego MID=Anivia Payoff= +0.0706 (Blue advantage), T1 Win=52.26%, Red MID=LeBlanc

6. JUNGLE=Viego MID=Hwei Payoff= +0.0704 (Blue advantage), T1 Win=52.26%, Red MID=LeBlanc

7. JUNGLE=Viego MID=Syndra Payoff= +0.0700 (Blue advantage), T1 Win=52.25%, Red MID=LeBlanc

8. JUNGLE=Viego MID=Akali Payoff= +0.0689 (Blue advantage), T1 Win=52.22%, Red MID=LeBlanc

9. JUNGLE=Viego MID=Ahri Payoff= +0.0683 (Blue advantage), T1 Win=52.21%, Red MID=LeBlanc

10. JUNGLE=Viego MID=Ziggs Payoff= +0.0660 (Blue advantage), T1 Win=52.15%, Red MID=LeBlanc

==========

BLUE'S BEST COMBINATION (SPNE): JUNGLE=Viego, MID=Viktor

Red's optimal MID response: LeBlanc

Payoff: +0.1131

T1 Win Rate: 53.32%

==========

Total calculations for Blue combinations: 132

Formula: 8 JUNGLE ├ù 12 MID ├ù 12 MID = 1152 total

==========

STEP 2: BLUE'S ACTUAL PICKS

==========

Loaded 86 champion names from lolchampiontags.db

T1 (Blue/T1) - Actual Picks:

JUNGLE: Viego

MID: Viktor

==========

SCENARIO COMPARISONS

==========

Scenario	Payoff	T1 Win%	KT Win%
Optimal (Viego, Viktor) vs Optimal (LeBlanc)	+0.1131	53.3%	46.7%
Actual (Viego, Viktor) vs Actual (Syndra)	+0.1462	54.1%	45.9%
Optimal (Viego, Viktor) vs Actual (Syndra)	+0.1462	54.1%	45.9%
Actual (Viego, Viktor) vs Optimal (LeBlanc)	+0.1131	53.3%	46.7%

==========

DETAILED COMPARISON

==========

T1 (Blue/T1) Last Picks:

JUNGLE: Actual=Viego, Optimal=Viego, Match=True

MID: Actual=Viktor, Optimal=Viktor, Match=True

KT Rolster (Red/KT) Last Pick:

MID: Actual=Syndra, Optimal=LeBlanc, Match=False

==========

ANALYSIS

==========

1. Optimal (Viego, Viktor) vs Optimal (LeBlanc) (SPNE):

Payoff: +0.1131, T1: 53.3%, KT: 46.7%

2. Actual (Viego, Viktor) vs Actual (Syndra) (What happened):

Payoff: +0.1462, T1: 54.1%, KT: 45.9%

-> Actual outcome is +0.0331 better for T1 than optimal

3. Optimal (Viego, Viktor) vs Actual (Syndra) (If Blue optimal, Red actual):

Payoff: +0.1462, T1: 54.1%, KT: 45.9%

-> Shows value of Blue's optimal picks when Red doesn't respond optimally

4. Actual (Viego, Viktor) vs Optimal (LeBlanc) (If Blue actual, Red optimal response):

Payoff: +0.1131, T1: 53.3%, KT: 46.7%

-> Shows how Red's optimal response performs against Blue's actual picks

==========

STEP 3: RED'S BEST RESPONSE TO BLUE'S OPTIMAL PICKS

==========

Cache status: 132 entries (will reuse to avoid duplicate API calls)

==========

ALL CALCULATIONS:

==========

Champion	Payoff	KT Win%	Status
Ahri	+0.1495	45.77%	
Akali	+0.1326	46.19%	
Anivia	+0.1419	45.96%	

Annie +0.1517 45.72%

Aurora +0.1308 46.24%

Hwei +0.1467 45.84%

LeBlanc +0.1131 46.68% [SPNE]

Smolder +0.1559 45.61%

Swain +0.1444 45.90%

Syndra +0.1462 45.85%

Ziggs +0.1515 45.72%

==========

RED'S BEST RESPONSE: LeBlanc

Payoff: +0.1131 (Blue advantage)

KT Win Rate: 46.68%

==========

Total calculations performed: 132

==========

STEP 4: RED'S BEST RESPONSE TO BLUE'S ACTUAL PICKS

==========

Cache status: 132 entries (will reuse to avoid duplicate API calls)

Top 5 responses:

1. LeBlanc: Payoff=+0.1131, KT Win=46.7% [BEST]
2. Aurora: Payoff=+0.1308, KT Win=46.2%
3. Akali: Payoff=+0.1326, KT Win=46.2%
4. Anivia: Payoff=+0.1419, KT Win=46.0%

5. Swain: Payoff=+0.1444, KT Win=45.9%

Calculations performed: 132

==========

STEP 5: COMPARISON OF ALL SCENARIOS

==========

Cache status: 132 entries (will reuse to avoid duplicate API calls)

Scenario	Payoff	T1 Win%	KT Win%
Optimal Blue (Viego, Viktor) vs SPNE Red (LeBlanc)	+0.1131	53.3%	46.7%
Optimal Blue (Viego, Viktor) vs Best Response (LeBlanc)	+0.1131	53.3%	46.7%
Actual Blue (Viego, Viktor) vs Best Response (LeBlanc)	+0.1131	53.3%	46.7%
Actual Blue (Viego, Viktor) vs Actual Red (Syndra)	+0.1462	54.1%	45.9%

Total calculations for scenarios: 132

==========

KEY FINDINGS

==========

1. Blue's Optimal Picks (Viego, Viktor): JUNGLE=Viego, MID=Viktor

  Red's SPNE response (LeBlanc): LeBlanc

    -> Payoff: +0.1131 (T1 win: 53.3%, KT win: 46.7%)

  Red's best response (LeBlanc): LeBlanc

-> Payoff: +0.1131 (T1 win: 53.3%, KT win: 46.7%)

[OK] SPNE pick (LeBlanc) matches best response (LeBlanc)!

2. Blue's Actual Picks (Viego, Viktor): JUNGLE=Viego, MID=Viktor

Red's best response (LeBlanc): LeBlanc

-> Payoff: +0.1131 (T1 win: 53.3%, KT win: 46.7%)

Red's actual pick (Syndra): Syndra

-> Payoff: +0.1462 (T1 win: 54.1%, KT win: 45.9%)

[INFO] Red's actual pick differs from best response

Actual pick has payoff +0.0331 MORE POSITIVE (worse for Red)

Win rate difference: -0.8%

==========

SPNE VERIFICATION

==========

SPNE Definition:

In a Subgame Perfect Nash Equilibrium, each player's strategy must be

a best response to the other player's strategy at EVERY subgame.

If Blue picks optimally (Viego, Viktor), then

Red's SPNE pick (LeBlanc) MUST be the best response (minimum payoff).

[OK] SPNE VERIFIED: The SPNE pick (LeBlanc) IS the best response (LeBlanc)!

Payoff: +0.1131 (minimum = best for Red)

===== GAME 4 =====

==========

GAME 4 NASH EQUILIBRIUM ANALYSIS

==========

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

==========

CURRENT DRAFT STATE

==========

Bans (40): Rumble, Ambessa, Wukong, XinZhao, Ryze, Taliyah, Varus, Poppy, Ashe, Braum, Sion, RekSai, Vi, JarvanIV, Mel, Sylas, Ezreal, Sivir, Neeko, Lulu, Ksante, Renekton, DrMundo, Viego, Viktor, Syndra, Yunara, Corki, Alistar, Rakan, Yone, Azir, Orianna, Hwei, Ziggs, Galio, Ornn, Pantheon, Bard, Yorick

T1 (Blue/T1) - Locked Picks:

TOP : [OPEN]

JUNGLE : Nocturne

MID : [OPEN]

BOT : Kalista

SUPPORT : Renata

KT Rolster (Red/KT) - Locked Picks:

TOP : [OPEN]

JUNGLE : Trundle

MID : Cassiopeia

BOT : Caitlyn

SUPPORT : TahmKench

Available Champions: 39

Mordekaiser, Aatrox, Jax, Camille, Kled, Jayce, Gwen, Gragas, Aurora, Gnar, Qiyana, Naafiri, Sejuani, Skarner, Maokai, Nidalee, Aurora, Akali, Annie, Anivia...

==========

INITIALIZING WITH API CALLS ENABLED

==========

Note: Memoization is ENABLED to cache API calls and prevent duplicates

This will speed up calculations significantly after the first run

WARNING: API calls to u.gg can be slow (10s timeout per matchup)

Each team matchup requires ~10 API calls (5 lanes ├ù 2 directions)

First run will take time, but results are cached for future runs

If it hangs, press Ctrl+C and set skip_api_calls=True for faster testing

==========

Loading player comfort data from database...

Loaded comfort data for 10 players

Player comfort data loaded - will use database instead of OP.GG scraping

==========

RUNNING NASH EQUILIBRIUM ANALYSIS

==========

Finding optimal picks using backward induction...

(This may take a few minutes)

Starting fresh SPNE calculation...

Beam width: 1000 (set high to prevent pruning - we only have ~90 Blue TOP+MID combinations)

Fast heuristic: False

Memoization: True

Available champions: 39

Max depth: 3 (Blue picks 2, Red picks 1)

Available TOP champions for Blue: 10

Available MID champions for Blue: 9

Available TOP champions for Red: 10

Total combinations Blue can pick: 90

Expected calculations: ~900 (all combinations)

NOTE: With beam_width=1000, all 90 Blue TOP+MID combinations should be explored

==========

STEP 1: BLUE'S OPTIMAL PICKS (USING MINIMAX)

==========

Optimal picks will be determined in STEP 1.5 using minimax calculation...

==========

STEP 1.5: VERIFYING BLUE'S OPTIMAL PICKS

==========

Testing ALL Blue combinations (TOP + MID) to verify optimal picks...

Found 10 valid TOP champions (scenario pool)

Found 9 valid MID champions (scenario pool)

Total combinations to test: 90

Cache status: 0 entries (will reuse to avoid duplicate API calls)

Pre-calculating locked role matchups...

Clearing matchup cache to force fresh API calls...

Cache size before clearing: 0

Cleared entire matchup cache (now: 0)

Pre-calculating jungle: Nocturne vs Trundle... 47.47%

Pre-calculating adc: Kalista vs Caitlyn... 50.05%

Pre-calculating support: Renata vs TahmKench... 46.20%

Pre-calculated 3 locked role matchups

Matchup cache now has 3 entries

Pre-calculating Cassiopeia vs all 9 Blue MID champions...

This will make 9 API calls for MID vs Cassiopeia

Pre-calculated 9/9 MID vs Cassio matchups (cache now has 12 entries)

Found 10 valid TOP champions for Red (scenario pool)

Verifying cache integration...

Γ£ô Aurora vs Cassiopeia (MID): CACHE HIT

Γ£ô All pre-calculated matchups are properly cached and will be reused!

Total calculations needed: 900

(10 TOP ├ù 9 MID ├ù 10 TOP)

Expected cache hits: All locked roles (JUNGLE, BOT, SUPPORT), all MID vs Cassiopeia

Expected new API calls: TOP vs TOP matchups across all combinations

==========

ALL BLUE COMBINATIONS (TOP + MID):

==========

Calculating 89 Blue TOP+MID choices ├ù 10 Red TOP picks...

Total calculations: 890

Cache will prevent duplicate API calls for same team matchups

JUNGLE	MID	Payoff	T1 Win%	Red Best MID	Status
Jayce	Smolder	+0.1345	53.85%	Gwen	[SPNE]
Jayce	Aurora	+0.1310	53.77%	Gwen	
Jayce	LeBlanc	+0.1221	53.55%	Gwen	
Jayce	Zoe	+0.1199	53.49%	Gwen	
Gwen	Swain	+0.1152	53.37%	Jayce	
Jayce	Swain	+0.1117	53.29%	Gwen	
Gwen	Aurora	+0.1111	53.27%	Jayce	
Gwen	Annie	+0.1096	53.24%	Jayce	
Gwen	Anivia	+0.1093	53.23%	Jayce	
Gwen	Ahri	+0.1079	53.19%	Jayce	
Jayce	Annie	+0.1061	53.15%	Gwen	

Jayce	Anivia	+0.1058	53.14% Gwen
Gwen	LeBlanc	+0.1057	53.14% Jayce
Gwen	Akali	+0.1052	53.13% Jayce
Jayce	Ahri	+0.1044	53.11% Gwen
Gwen	Zoe	+0.1036	53.09% Jayce
Jayce	Akali	+0.1017	53.04% Gwen
Gwen	Smolder	+0.0947	52.87% Jayce
Aatrox	Swain	+0.0927	52.81% Jayce
Gnar	Swain	+0.0918	52.79% Jayce
Kled	Swain	+0.0885	52.71% Jayce
Aatrox	Anivia	+0.0868	52.67% Jayce
Gnar	Anivia	+0.0859	52.65% Jayce
Aatrox	Zoe	+0.0847	52.62% Jayce
Gnar	Zoe	+0.0838	52.59% Jayce
Mordekaiser	Swain	+0.0831	52.58% Jayce
Aurora	Swain	+0.0830	52.57% Jayce
Aatrox	Ahri	+0.0817	52.54% Jayce
Aatrox	Aurora	+0.0814	52.53% Jayce
Gnar	Ahri	+0.0808	52.52% Jayce
Gnar	Aurora	+0.0804	52.51% Jayce
Aatrox	Annie	+0.0799	52.50% Jayce
Aatrox	LeBlanc	+0.0796	52.49% Jayce
Aatrox	Akali	+0.0791	52.48% Jayce
Gnar	Annie	+0.0790	52.47% Jayce
Gnar	LeBlanc	+0.0787	52.47% Jayce
Gnar	Akali	+0.0782	52.45% Jayce

Mordekaiser	Anivia	+0.0773	52.43%	Jayce
Aatrox	Smolder	+0.0758	52.39%	Jayce
Gnar	Smolder	+0.0749	52.37%	Jayce
Gragas	Aurora	+0.0729	52.32%	Jayce
Mordekaiser	Aurora	+0.0718	52.29%	Jayce
Mordekaiser	Zoe	+0.0716	52.29%	Jayce
Camille	Swain	+0.0706	52.26%	Jayce
Mordekaiser	Annie	+0.0704	52.26%	Jayce
Mordekaiser	Ahri	+0.0686	52.21%	Jayce
Kled	Anivia	+0.0682	52.20%	Jayce
Gragas	Smolder	+0.0674	52.18%	Jayce
Mordekaiser	LeBlanc	+0.0665	52.16%	Jayce
Jax	Swain	+0.0664	52.16%	Jayce
Mordekaiser	Akali	+0.0660	52.15%	Jayce
Kled	Aurora	+0.0628	52.07%	Jayce
Aurora	Anivia	+0.0627	52.07%	Jayce
Mordekaiser	Smolder	+0.0627	52.07%	Jayce
Kled	Zoe	+0.0625	52.06%	Jayce
Kled	Annie	+0.0613	52.03%	Jayce
Gragas	Swain	+0.0608	52.02%	Jayce
Aurora	Zoe	+0.0606	52.01%	Jayce
Kled	Ahri	+0.0596	51.99%	Jayce
Aurora	Ahri	+0.0577	51.94%	Jayce
Kled	LeBlanc	+0.0574	51.93%	Jayce
Kled	Akali	+0.0569	51.92%	Jayce
Aurora	Annie	+0.0558	51.89%	Jayce

Aurora	LeBlanc	+0.0555	51.89%	Jayce
Aurora	Akali	+0.0550	51.87%	Jayce
Gragas	Anivia	+0.0550	51.87%	Jayce
Kled	Smolder	+0.0536	51.84%	Jayce
Aurora	Smolder	+0.0517	51.79%	Jayce
Camille	Anivia	+0.0503	51.76%	Jayce
Gragas	Zoe	+0.0493	51.73%	Jayce
Gragas	Annie	+0.0481	51.70%	Jayce
Jax	Aurora	+0.0479	51.70%	Jayce
Jax	Annie	+0.0465	51.66%	Jayce
Gragas	Ahri	+0.0463	51.66%	Jayce
Jax	Anivia	+0.0462	51.65%	Jayce
Camille	Aurora	+0.0449	51.62%	Jayce
Jax	Ahri	+0.0447	51.62%	Jayce
Camille	Zoe	+0.0446	51.62%	Jayce
Gragas	LeBlanc	+0.0442	51.60%	Jayce
Camille	Annie	+0.0434	51.58%	Jayce
Jax	LeBlanc	+0.0426	51.56%	Jayce
Jax	Akali	+0.0420	51.55%	Jayce
Camille	Ahri	+0.0417	51.54%	Jayce
Jax	Zoe	+0.0405	51.51%	Jayce
Camille	LeBlanc	+0.0395	51.49%	Jayce
Camille	Smolder	+0.0357	51.39%	Jayce
Jax	Smolder	+0.0316	51.29%	Jayce
Gragas	Akali	+0.0311	51.28%	Jayce
Camille	Akali	+0.0264	51.16%	Jayce

==========

STEP 1 RESULT: SPNE

==========

SPNE (tests ALL 89 combinations):

Optimal Blue picks: TOP=Jayce, MID=Smolder, Payoff=+0.1345 [SPNE]

Red's best TOP response: Gwen

T1 Win Rate: 53.85%

==========

T1 (Blue/T1) - Optimal Picks (from Minimax):

TOP : Jayce [OPTIMAL]

JUNGLE : Nocturne

MID : Smolder [OPTIMAL]

BOT : Kalista

SUPPORT : Renata

KT Rolster (Red/KT) - Optimal Response (from Minimax):

TOP : Gwen [OPTIMAL]

JUNGLE : Trundle

MID : Cassiopeia

BOT : Caitlyn

SUPPORT : TahmKench

==========

SUMMARY - TOP 10 BEST COMBINATIONS FOR BLUE:

==========

1. TOP=Jayce MID=Smolder Payoff= +0.1345 (Blue advantage), T1 Win=53.85%, Red TOP=Gwen [SPNE]

2. TOP=Jayce MID=Aurora Payoff= +0.1310 (Blue advantage), T1 Win=53.77%, Red TOP=Gwen

3. TOP=Jayce MID=LeBlanc Payoff= +0.1221 (Blue advantage), T1 Win=53.55%, Red TOP=Gwen

4. TOP=Jayce MID=Zoe Payoff= +0.1199 (Blue advantage), T1 Win=53.49%, Red TOP=Gwen

5. TOP=Gwen MID=Swain Payoff= +0.1152 (Blue advantage), T1 Win=53.37%, Red TOP=Jayce

6. TOP=Jayce MID=Swain Payoff= +0.1117 (Blue advantage), T1 Win=53.29%, Red TOP=Gwen

7. TOP=Gwen MID=Aurora Payoff= +0.1111 (Blue advantage), T1 Win=53.27%, Red TOP=Jayce

8. TOP=Gwen MID=Annie Payoff= +0.1096 (Blue advantage), T1 Win=53.24%, Red TOP=Jayce

9. TOP=Gwen MID=Anivia Payoff= +0.1093 (Blue advantage), T1 Win=53.23%, Red TOP=Jayce

10. TOP=Gwen MID=Ahri Payoff= +0.1079 (Blue advantage), T1 Win=53.19%, Red TOP=Jayce

==========

BLUE'S BEST COMBINATION (SPNE): TOP=Jayce, MID=Smolder

Red's optimal TOP response: Gwen

Payoff: +0.1345

T1 Win Rate: 53.85%

==========

Total calculations for Blue combinations: 792

Formula: 10 TOP ├ù 9 MID ├ù 10 TOP = 900 total

==========

STEP 2: BLUE'S ACTUAL PICKS

==========

Loaded 86 champion names from lolchampiontags.db

T1 (Blue/T1) - Actual Picks:

TOP: Gragas

MID: Anivia

==========

SCENARIO COMPARISONS

==========

Scenario	Payoff	T1 Win%	KT Win%
Optimal (Jayce, Smolder) vs Optimal (Gwen)	+0.1345	53.9%	46.1%
Actual (Gragas, Anivia) vs Actual (Mordekaiser)	+0.1072	53.2%	46.8%
Optimal (Jayce, Smolder) vs Actual (Mordekaiser)	+0.1695	54.7%	45.3%
Actual (Gragas, Anivia) vs Optimal (Gwen)	+0.0663	52.2%	47.8%

==========

DETAILED COMPARISON

==========

T1 (Blue/T1) Last Picks:

TOP: Actual=Gragas, Optimal=Jayce, Match=False

MID: Actual=Anivia, Optimal=Smolder, Match=False

KT Rolster (Red/KT) Last Pick:

TOP: Actual=Mordekaiser, Optimal=Gwen, Match=False

==========

ANALYSIS

==========

1. Optimal (Jayce, Smolder) vs Optimal (Gwen) (SPNE):

Payoff: +0.1345, T1: 53.9%, KT: 46.1%

2. Actual (Gragas, Anivia) vs Actual (Mordekaiser) (What happened):

Payoff: +0.1072, T1: 53.2%, KT: 46.8%

-> Optimal would be +0.0273 better for T1 than actual

3. Optimal (Jayce, Smolder) vs Actual (Mordekaiser) (If Blue optimal, Red actual):

Payoff: +0.1695, T1: 54.7%, KT: 45.3%

-> Shows value of Blue's optimal picks when Red doesn't respond optimally

4. Actual (Gragas, Anivia) vs Optimal (Gwen) (If Blue actual, Red optimal response):

Payoff: +0.0663, T1: 52.2%, KT: 47.8%

-> Shows how Red's optimal response performs against Blue's actual picks

==========

STEP 3: RED'S BEST RESPONSE TO BLUE'S OPTIMAL PICKS

==========

Cache status: 792 entries (will reuse to avoid duplicate API calls)

==========

ALL CALCULATIONS:

==========

Champion	Payoff	KT Win%	Status
Aatrox	+0.1528	45.69%	
Aurora	+0.1553	45.63%	
Camille	+0.1695	45.28%	
Gnar	+0.1681	45.31%	
Gragas	+0.1738	45.17%	
Gwen	+0.1345	46.15%	[SPNE]
Jax	+0.1880	44.82%	
Kled	+0.1678	45.32%	
Mordekaiser	+0.1695	45.28%	

==========

RED'S BEST RESPONSE: Gwen

Payoff: +0.1345 (Blue advantage)

KT Win Rate: 46.15%

==========

Total calculations performed: 792

==========

STEP 4: RED'S BEST RESPONSE TO BLUE'S ACTUAL PICKS

==========

Cache status: 792 entries (will reuse to avoid duplicate API calls)

Top 5 responses:

1. Jayce: Payoff=+0.0550, KT Win=48.1% [BEST]
2. Gwen: Payoff=+0.0663, KT Win=47.8%
3. Aatrox: Payoff=+0.0897, KT Win=47.3%
4. Aurora: Payoff=+0.0965, KT Win=47.1%
5. Kled: Payoff=+0.1043, KT Win=46.9%

Calculations performed: 792

==========

STEP 5: COMPARISON OF ALL SCENARIOS

==========

Cache status: 792 entries (will reuse to avoid duplicate API calls)

Scenario	Payoff	T1 Win%	KT Win%
Optimal Blue (Jayce, Smolder) vs SPNE Red (Gwen)	+0.1345	53.9%	46.1%
Optimal Blue (Jayce, Smolder) vs Best Response (Gwen)	+0.1345	53.9%	46.1%
Actual Blue (Gragas, Anivia) vs Best Response (Jayce)	+0.0550	51.9%	48.1%
Actual Blue (Gragas, Anivia) vs Actual Red (Mordekaiser)	+0.1072	53.2%	46.8%

Total calculations for scenarios: 792

==========

KEY FINDINGS

==========

1. Blue's Optimal Picks (Jayce, Smolder): TOP=Jayce, MID=Smolder

  Red's SPNE response (Gwen): Gwen

    -> Payoff: +0.1345 (T1 win: 53.9%, KT win: 46.1%)

  Red's best response (Gwen): Gwen

    -> Payoff: +0.1345 (T1 win: 53.9%, KT win: 46.1%)

  [OK] SPNE pick (Gwen) matches best response (Gwen)!

2. Blue's Actual Picks (Gragas, Anivia): TOP=Gragas, MID=Anivia

  Red's best response (Jayce): Jayce

    -> Payoff: +0.0550 (T1 win: 51.9%, KT win: 48.1%)

  Red's actual pick (Mordekaiser): Mordekaiser

    -> Payoff: +0.1072 (T1 win: 53.2%, KT win: 46.8%)

  [INFO] Red's actual pick differs from best response

  Actual pick has payoff +0.0522 MORE POSITIVE (worse for Red)

  Win rate difference: -1.3%

==========

SPNE VERIFICATION

==========

SPNE Definition:

In a Subgame Perfect Nash Equilibrium, each player's strategy must be

a best response to the other player's strategy at EVERY subgame.

If Blue picks optimally (Jayce, Smolder), then

Red's SPNE pick (Gwen) MUST be the best response (minimum payoff).

[OK] SPNE VERIFIED: The SPNE pick (Gwen) IS the best response (Gwen)!

Payoff: +0.1345 (minimum = best for Red)

===== GAME 5 =====

==========

GAME 5 NASH EQUILIBRIUM ANALYSIS

==========

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

Loaded 86 champion names from lolchampiontags.db

==========

CURRENT DRAFT STATE

==========

Bans (50): Rumble, Ambessa, Wukong, XinZhao, Ryze, Taliyah, Varus, Poppy, Ashe, Braum, Sion, RekSai, Vi, JarvanIV, Mel, Sylas, Ezreal, Sivir, Neeko, Lulu, Ksante, Renekton, DrMundo, Viego, Viktor, Syndra, Yunara, Corki, Alistar, Rakan, Mordekaiser, Gragas, Anivia, Cassiopeia, Nocturne, Kalista, Renata, TahmKench, Caitlyn, Trundle, Yone, Azir, Orianna, Hwei, Ziggs, Galio, Ornn, Pantheon, Bard, Yorick

KT Rolster (Blue/KT) - Locked Picks:

TOP : Camille

JUNGLE : Pantheon

MID : Galio

BOT : MissFortune

SUPPORT : [OPEN]

T1 (Red/T1) - Locked Picks:

TOP : Camille

JUNGLE : Pantheon

MID : Galio

BOT : MissFortune

SUPPORT : [OPEN]

Available Champions: 33

Aatrox, Jax, Kled, Jayce, Gwen, Aurora, Gnar, Qiyana, Naafiri, Sejuani, Skarner, Maokai, Nidalee, Aurora, Akali, Annie, LeBlanc, Smolder, Ahri, Swain...

==========

INITIALIZING WITH API CALLS ENABLED

==========

Note: Memoization is ENABLED to cache API calls and prevent duplicates

This will speed up calculations significantly after the first run

WARNING: API calls to u.gg can be slow (10s timeout per matchup)

Each team matchup requires ~10 API calls (5 lanes ├ù 2 directions)

First run will take time, but results are cached for future runs

If it hangs, press Ctrl+C and set skip_api_calls=True for faster testing

==========

Loading player comfort data from database...

Loaded comfort data for 10 players

Player comfort data loaded - will use database instead of OP.GG scraping

==========

RUNNING NASH EQUILIBRIUM ANALYSIS

==========

Finding optimal picks using backward induction...

(This may take a few minutes)

Starting fresh SPNE calculation...

Beam width: 1000 (set high to prevent pruning - we only have ~48 Blue JUNGLE+MID combinations)

Fast heuristic: False

Memoization: True

Available champions: 33

Max depth: 3 (Blue picks 2, Red picks 1)

Available JUNGLE champions for KT (Blue): 6

Available MID champions for KT (Blue): 8

Available SUPPORT champions for T1 (Red): 4

Total combinations Blue can pick: 48

Expected calculations: ~192 (all combinations)

NOTE: With beam_width=1000, all 48 Blue JUNGLE+MID combinations should be explored

==========

STEP 1: BLUE'S OPTIMAL PICKS (USING MINIMAX)

==========

Optimal picks will be determined in STEP 1.5 using minimax calculation...

==========

STEP 1.5: VERIFYING BLUE'S OPTIMAL PICKS

==========

Testing ALL Blue combinations (JUNGLE + MID) to verify optimal picks...

Found 6 valid JUNGLE champions (scenario pool)

Found 8 valid MID champions (scenario pool)

Total combinations to test: 48

Cache status: 0 entries (will reuse to avoid duplicate API calls)

Pre-calculating locked role matchups...

Clearing matchup cache to force fresh API calls...

Cache size before clearing: 0

Cleared entire matchup cache (now: 0)

Pre-calculating top: Yorick vs Camille... 49.07%

Pre-calculating adc: Ziggs vs MissFortune... 51.66%

Pre-calculated 2 locked role matchups

Matchup cache now has 2 entries

Pre-calculating all KT JUNGLE champions vs Pantheon...

This will make 6 API calls for JUNGLE vs Pantheon

Pre-calculated 6/6 JUNGLE vs Pantheon matchups (cache now has 8 entries)

Pre-calculating all KT MID champions vs Galio...

This will make 8 API calls for MID vs Galio

Pre-calculated 8/8 MID vs Galio matchups (cache now has 16 entries)

Found 4 valid SUPPORT champions for Red (scenario pool)

Verifying cache integration...

Γ£ô Aurora vs Galio (MID): CACHE HIT

Γ£ô All pre-calculated matchups are properly cached and will be reused!

Total calculations needed: 192

(6 JUNGLE ├ù 8 MID ├ù 4 SUPPORT)

Expected cache hits: All locked roles (TOP, BOT), all JUNGLE vs Pantheon, all MID vs Galio

Expected new API calls: SUPPORT vs Nautilus matchups across all combinations

==========

ALL BLUE COMBINATIONS (JUNGLE + MID):

==========

Calculating 48 Blue JUNGLE+MID choices ├ù 4 Red SUPPORT picks...

Total calculations: 192

Cache will prevent duplicate API calls for same team matchups

JUNGLE	MID	Payoff	KT Win%	Red Best SUP	Status
Skarner	LeBlanc	-0.0061	50.35%	Rell	[SPNE]
Nidalee	Aurora	-0.0108	50.23%	Rell	
Maokai	LeBlanc	-0.0151	50.12%	Rell	
Sejuani	LeBlanc	-0.0194	50.02%	Rell	
Skarner	Aurora	-0.0251	49.87%	Rell	
Skarner	Akali	-0.0295	49.76%	Rell	
Sejuani	Aurora	-0.0366	49.59%	Rell	
Skarner	Zoe	-0.0392	49.52%	Rell	
Nidalee	Smolder	-0.0401	49.50%	Rell	
Skarner	Ahri	-0.0414	49.47%	Rell	
Sejuani	Akali	-0.0428	49.43%	Rell	
Nidalee	LeBlanc	-0.0458	49.35%	Rell	
Skarner	Smolder	-0.0472	49.32%	Rell	
Skarner	Annie	-0.0474	49.31%	Rell	
Maokai	Zoe	-0.0482	49.30%	Rell	
Nidalee	Akali	-0.0494	49.26%	Rell	
Maokai	Ahri	-0.0503	49.24%	Rell	
Nidalee	Swain	-0.0514	49.22%	Rell	
Sejuani	Zoe	-0.0525	49.19%	Rell	
Skarner	Swain	-0.0531	49.17%	Rell	
Sejuani	Ahri	-0.0547	49.13%	Rell	

Maokai	Smolder	-0.0561	49.10% Rell
Maokai	Annie	-0.0564	49.09% Rell
Maokai	Aurora	-0.0574	49.06% Rell
Sejuani	Annie	-0.0589	49.03% Rell
Nidalee	Zoe	-0.0591	49.02% Rell
Sejuani	Smolder	-0.0604	48.99% Rell
Nidalee	Ahri	-0.0613	48.97% Rell
Maokai	Akali	-0.0618	48.95% Rell
Sejuani	Swain	-0.0645	48.89% Rell
Nidalee	Annie	-0.0655	48.86% Rell
Qiyana	LeBlanc	-0.0801	48.50% Rell
Naafiri	LeBlanc	-0.0819	48.45% Rell
Qiyana	Aurora	-0.0901	48.25% Rell
Qiyana	Zoe	-0.0934	48.17% Rell
Naafiri	Aurora	-0.0936	48.16% Rell
Qiyana	Smolder	-0.0977	48.06% Rell
Maokai	Swain	-0.0998	48.01% Rell
Qiyana	Akali	-0.1017	47.96% Rell
Naafiri	Akali	-0.1034	47.92% Rell
Naafiri	Zoe	-0.1042	47.90% Rell
Qiyana	Swain	-0.1072	47.82% Rell
Naafiri	Smolder	-0.1085	47.79% Rell
Qiyana	Ahri	-0.1154	47.62% Rell
Naafiri	Swain	-0.1162	47.60% Rell
Naafiri	Ahri	-0.1171	47.57% Rell
Naafiri	Annie	-0.1214	47.47% Rell

Qiyana Annie -0.1214 47.47% Rell

==========

STEP 1 RESULT: SPNE

==========

SPNE (tests ALL 48 combinations):

Optimal Blue picks: JUNGLE=Skarner, MID=LeBlanc, Payoff=-0.0061 [SPNE]

Red's best SUPPORT response: Rell

KT Win Rate: 50.35%

==========

KT Rolster (Blue/KT) - Optimal Picks (from Minimax):

TOP : Yorick [OPTIMAL]

JUNGLE : Skarner [OPTIMAL]

MID : LeBlanc [OPTIMAL]

BOT : Ziggs [OPTIMAL]

SUPPORT : Nautilus [OPTIMAL]

T1 (Red/T1) - Optimal Response (from Minimax):

TOP : Camille [OPTIMAL]

JUNGLE : Pantheon [OPTIMAL]

MID : Galio [OPTIMAL]

BOT : MissFortune [OPTIMAL]

SUPPORT : Rell [OPTIMAL]

==========

SUMMARY - TOP 10 BEST COMBINATIONS FOR BLUE:

==========

1. JUNGLE=Skarner MID=LeBlanc Payoff= -0.0061 (Red advantage), KT Win=50.35%, Red SUP=Rell [SPNE]

2. JUNGLE=Nidalee MID=Aurora Payoff= -0.0108 (Red advantage), KT Win=50.23%, Red SUP=Rell

3. JUNGLE=Maokai MID=LeBlanc Payoff= -0.0151 (Red advantage), KT Win=50.12%, Red SUP=Rell

4. JUNGLE=Sejuani MID=LeBlanc Payoff= -0.0194 (Red advantage), KT Win=50.02%, Red SUP=Rell

5. JUNGLE=Skarner MID=Aurora Payoff= -0.0251 (Red advantage), KT Win=49.87%, Red SUP=Rell

6. JUNGLE=Skarner MID=Akali Payoff= -0.0295 (Red advantage), KT Win=49.76%, Red SUP=Rell

7. JUNGLE=Sejuani MID=Aurora Payoff= -0.0366 (Red advantage), KT Win=49.59%, Red SUP=Rell

8. JUNGLE=Skarner MID=Zoe Payoff= -0.0392 (Red advantage), KT Win=49.52%, Red SUP=Rell

9. JUNGLE=Nidalee MID=Smolder Payoff= -0.0401 (Red advantage), KT Win=49.50%, Red SUP=Rell

10. JUNGLE=Skarner MID=Ahri Payoff= -0.0414 (Red advantage), KT Win=49.47%, Red SUP=Rell

==========

BLUE'S BEST COMBINATION (SPNE): JUNGLE=Skarner, MID=LeBlanc

Red's optimal SUPPORT response: Rell

Payoff: -0.0061

KT Win Rate: 50.35%

==========

Total calculations for Blue combinations: 192

Formula: 6 JUNGLE ├ù 8 MID ├ù 4 SUPPORT = 192 total

==========

STEP 2: BLUE'S ACTUAL PICKS

==========

Loaded 86 champion names from lolchampiontags.db

KT Rolster (Blue/KT) - Actual Picks:

JUNGLE: Sejuani

MID: Smolder

==========

SCENARIO COMPARISONS

==========

Scenario	Payoff	KT Win%	T1 Win%
Optimal (Skarner, LeBlanc) vs Optimal (Rell)	-0.0061	50.3%	49.7%
Actual (Sejuani, Smolder) vs Actual (Leona)	-0.0152	50.1%	49.9%
Optimal (Skarner, LeBlanc) vs Actual (Leona)	+0.0390	51.5%	48.5%
Actual (Sejuani, Smolder) vs Optimal (Rell)	-0.0604	49.0%	51.0%

==========

DETAILED COMPARISON

==========

KT Rolster (Blue/KT) Last Picks:

JUNGLE: Actual=Sejuani, Optimal=Skarner, Match=False

MID: Actual=Smolder, Optimal=LeBlanc, Match=False

T1 (Red/T1) Last Pick:

SUPPORT: Actual=Leona, Optimal=Rell, Match=False

==========

ANALYSIS

==========

1. Optimal (Skarner, LeBlanc) vs Optimal (Rell) (SPNE):

Payoff: -0.0061, KT: 50.3%, T1: 49.7%

2. Actual (Sejuani, Smolder) vs Actual (Leona) (What happened):

Payoff: -0.0152, KT: 50.1%, T1: 49.9%

-> Actual outcome matches optimal outcome!

3. Optimal (Skarner, LeBlanc) vs Actual (Leona) (If Blue optimal, Red actual):

Payoff: +0.0390, KT: 51.5%, T1: 48.5%

-> Shows value of Blue's optimal picks when Red doesn't respond optimally

4. Actual (Sejuani, Smolder) vs Optimal (Rell) (If Blue actual, Red optimal response):

Payoff: -0.0604, KT: 49.0%, T1: 51.0%

-> Shows how Red's optimal response performs against Blue's actual picks

==========

STEP 3: RED'S BEST RESPONSE TO BLUE'S OPTIMAL PICKS

==========

Cache status: 192 entries (will reuse to avoid duplicate API calls)

==========

ALL CALCULATIONS:

==========

Champion	Payoff	T1 Win%	Status
Karma	+0.0418	48.46%	
Leona	+0.0390	48.52%	
Nami	+0.0406	48.49%	
Rell	-0.0061	49.65%	[SPNE]

==========

RED'S BEST RESPONSE: Rell

Payoff: -0.0061 (T1 advantage)

T1 Win Rate: 49.65%

==========

Total calculations performed: 192

==========

STEP 4: RED'S BEST RESPONSE TO BLUE'S ACTUAL PICKS

==========

Cache status: 192 entries (will reuse to avoid duplicate API calls)

Top 5 responses:

1. Rell: Payoff=-0.0604, T1 Win=51.0% [BEST]
2. Nami: Payoff=-0.0137, T1 Win=49.8%
3. Karma: Payoff=-0.0125, T1 Win=49.8%
4. Nautilus: Payoff=-0.0123, T1 Win=49.8%

Calculations performed: 193

==========

STEP 5: COMPARISON OF ALL SCENARIOS

==========

Cache status: 193 entries (will reuse to avoid duplicate API calls)

Scenario	Payoff	KT Win%	T1 Win%
Optimal Blue (Skarner, LeBlanc) vs SPNE Red (Rell)	-0.0061	50.3%	49.7%
Optimal Blue (Skarner, LeBlanc) vs Best Response (Rell)	-0.0061	50.3%	49.7%
Actual Blue (Sejuani, Smolder) vs Best Response (Rell)	-0.0604	49.0%	51.0%
Actual Blue (Sejuani, Smolder) vs Actual Red (Leona)	-0.0152	50.1%	49.9%

Total calculations for scenarios: 193

==========

KEY FINDINGS

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1. Blue's Optimal Picks (Skarner, LeBlanc): JUNGLE=Skarner, MID=LeBlanc

  Red's SPNE response (Rell): Rell

    -> Payoff: -0.0061 (KT win: 50.3%, T1 win: 49.7%)

  Red's best response (Rell): Rell

    -> Payoff: -0.0061 (KT win: 50.3%, T1 win: 49.7%)

  [OK] SPNE pick (Rell) matches best response (Rell)!

2. Blue's Actual Picks (Sejuani, Smolder): JUNGLE=Sejuani, MID=Smolder

  Red's best response (Rell): Rell

    -> Payoff: -0.0604 (KT win: 49.0%, T1 win: 51.0%)

  Red's actual pick (Leona): Leona

    -> Payoff: -0.0152 (KT win: 50.1%, T1 win: 49.9%)

  [INFO] Red's actual pick differs from best response

  Actual pick has payoff +0.0452 MORE POSITIVE (worse for Red)

  Win rate difference: -1.1%

==========

SPNE VERIFICATION

==========

SPNE Definition:

  In a Subgame Perfect Nash Equilibrium, each player's strategy must be

  a best response to the other player's strategy at EVERY subgame.

  If Blue picks optimally (Skarner, LeBlanc), then

Red's SPNE pick (Rell) MUST be the best response (minimum payoff).

[OK] SPNE VERIFIED: The SPNE pick (Rell) IS the best response (Rell)!

Payoff: -0.0061 (minimum = best for Red)