

Scoring 5 Star Relics from Honkai: Star Rail with Combinatorics

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Abstract—Honkai: Star Rail is a free-to-play turn-based space fantasy RPG (Role-Playing Game) developed and published by HoYoverse on April 26, 2023. It's combat system encourages players to build characters and make them stronger. One such way of making a character stronger is through the relic system, where a character can equip relics and upgrade them for a boost in stats. This will improve their performance in combat, helping players progress and clear harder content. This paper aims to create a simple 5 star relic scorer using combinatorics to help judge if a relic is a perfect fit for a character. The relic scorer is made in C language and works as intended. Despite the many weaknesses to this algorithm, one such weakness being it only considers one relic when a character can hold up to 6 different types of relics and is most likely going to receive external buffs, the relic scorer still is able to score a 5 star relic properly as long as it's a valid relic piece.

Keywords—Honkai: Star Rail, Relics, Combinatorics, Scoring 5 Star Relics

I. INTRODUCTION

Honkai: Star Rail is a free-to-play turn-based space fantasy RPG (Role-Playing Game) developed and published by HoYoverse for PC, and iOS/Android platforms [1], which officially released on April 26, 2023 and released for PS5 on October 11, 2023. The story of Honkai: Star Rail follows the Trailblazer, the main character and the person you play as, with a group of people called the Nameless who boards a train called the Astral Express and travel to many different types of planets resolving crisis along the way.



Fig. 1. Honkai: Star Rail first anniversary art. Source: <https://www.hoyolab.com/article/27690358>

The combat system in Honkai: Star Rail needs us to assemble a team of 1 to 4 different characters, where each character has

their own kits and playstyle. To triumph over a battle, players must construct a team that coordinate and support each other well. Players can also make their characters stronger through many ways, one such way is equipping and upgrading relics to gain more stat boost. The relic system enables players to build their characters, enhancing their performance in combat, whether that be more damage or more supportive capabilities. This is crucial to players so they could progress in the main game and continue to the end game, where the enemies get tougher to beat.

This paper aims to create a simple 5 star relic scorer using combinatorics, since the relic system involves a lot of RNG and luck, to help players easily judge if a relic is a perfect fit for a certain character.

II. THEORETICAL FRAMEWORK

A. Combinatorics

Combinatorics is a branch in mathematics where people can count the amount of arrangement of objects without enumerating all possible arrangements [1]. There are two ways to find all those arrangements, permutation is used if the order of items is important and combination is used if the order does not matter. For this paper, we will be focusing and using combinations. The formula used for combinations is shown with the notation $C(n, r)$, where

$$C(n, r) = \frac{n!}{(n-r)! r!} \quad (1)$$

with n representing total objects and r representing the number of objects to choose.

B. Repeating Combination

Repeating Combination is a modification towards the normal combination. The original combination is used to solve how many ways items can be arranged with each slot only can be filled with one item maximum. While repeating combination can be used to solve how many ways items can be arranged and each slot can be filled with more than one item. This changes the formula to

$$C(n+r-1, r) = \frac{(n+r-1)!}{((n+r-1)-r)! r!} \quad (2)$$

with n representing how many slots are available and r representing the total number of items.

C. Probability

Probability is the branch of mathematics where we can determine how likely an event is to occur [5]. The value of probability will be in the range of 0 to 1. The formula for probability is

$$\text{Probability} = \frac{\text{the outcome we want}}{\text{total possible outcomes}} \quad (3)$$

D. Stats



Stats Details	
Base Stats	
HP	1922 +1113
ATK	1338 +1815
DEF	1087 +52
SPD	97 +39
Advanced Stats	
CRIT Rate	77.3%
CRIT DMG	210.7%
Break Effect	0.0%
Outgoing Healing Boost	0.0%

Fig. 2. Character Stat Details Screen 1. Source: in-game screenshot by author.



Stats Details	
Outgoing Healing Boost	0.0%
Max Energy	140
Energy Regeneration Rate	100.0%
Effect Hit Rate	3.8%
Effect RES	0.0%
Elation	0.0%
DMG Type	
Physical DMG Boost	0.0%
Fire DMG Boost	0.0%
Ice DMG Boost	0.0%

Fig. 3. Character Stat Details Screen 2. Source: in-game screenshot by author.

Each character in Honkai: Star Rail has many different stats that will determine their performance in battles. These stats can be raised by leveling up the character, equipping light cones, upgrading the characters traces, and equipping relics. There are 21 different stat that can be obtained through relics to increase the original characters attributes, such as

1. **HP%**
HP% or Health Point Percent increases the HP stat of a character by a certain percentage.
2. **HP**
HP or Health Point increases the HP stat of a character by a fixed number.
3. **ATK%**
ATK% or Attack Percent increases the ATK stat of a character by a certain percentage.
4. **ATK**
ATK or Attack increases the ATK stat of a character by a fixed number.
5. **DEF%**
DEF% or Defense Percent increases the DEF stat of a character by a certain percentage.
6. **DEF**
DEF or Defense increases the DEF stat of a character by a fixed number.
7. **SPD**
SPD or Speed increases the SPD stat of a character by a fixed number which helps them move faster on the action bar.
8. **CRIT Rate**
CRIT Rate or Critical Rate increases the CRIT Rate stat of a character which increases the chance for a critical hit. If the CRIT Rate is 100%, it means the character will always do a critical hit when damaging an enemy.
9. **CRIT DMG**
CRIT DMG or Critical Damage increases the CRIT DMG stat of a character which increases the damage done by a critical hit.
10. **Effect Hit Rate**
Effect Hit Rate increases the Effect Hit Rate stat of a character which increases the chance for inflicting an enemy with a certain status or debuff.
11. **Break Effect**
Break Effect increases the Break Effect stat of a character which increases the break damage of a character.
12. **Effect Resistance**
Effect Resistance increases the Effect Resistance stat of a character which increases the chance for resisting a status or debuff that's inflicted by an enemy.
13. **Energy Regeneration Rate**
Energy Regeneration Rate increases the Energy Regeneration Rate stat of a character which increases the energy produced from attacks or gained by external sources.
14. **Outgoing Healing Boost**
Outgoing Healing Boost increases the Outgoing Healing Boost stat of a character which increases the amount of healing that character can do by a certain percentage.
15. **Elemental DMG Bonus**
Elemental DMG Bonus or Elemental Damage Bonus has 7 different types, which are Physical DMG, Fire DMG, Ice DMG, Lightning DMG, Wind DMG, Quantum DMG, and Imaginary DMG. Elemental DMG Bonus will increase the damage of a character's attack depending on the element.

E. Relics



Fig. 4. Character Relic Screen. Source: in-game screenshot by author.

Relics are in-game items that can be equipped onto characters to provide them with additional stats [3]. All relics have their own sets where they give an additional upgrade when equipped together. These relics can come in different rarity, ranging from 1 star to 5 star, where a 5-star relic is the rarest and highest tier. Each relic has one main stat and a maximum of four sub stats. A main stat and sub stats are randomized in every relic and are determined by the relic type. For 5-star relics, there is a chance of getting three sub stats or four sub stats when obtaining one, these relics are often referred to a three liner and four liner respectively. All relics can be upgraded to a certain level depending on their rarity, for 5-star relics, they can be upgraded to level 20. Every interval of 3 levels, there are two different ways a relic can upgrade, one, if the relic hasn't reached the maximum sub stat it can hold, a random sub stat will be added and two, if the relic has four sub stats, one random existing sub stat will be raised by a random amount. The probability of each main stat and sub stat appearing, which sub stat is picked to be upgraded and the value it is increased by is all different. A rule all relic follow is if a stat is already a main stat, that stat could never be a sub stat.

In Honkai: Star Rail, there are two types of relics, which are Cavern Relics and Planar Ornaments. There are four different types of Cavern Relics, which are

1. Head
This relic has a fixed main stat, which is Flat HP.
2. Hands
This relic also has a fixed main stat, being Flat ATK.
3. Body
This relic can have 7 different types of main stat, which are HP%, ATK%, DEF%, Effect Hit Rate, Outgoing Healing Boost, CRIT Rate, and CRIT DMG.
4. Feet
This relic can have 4 different types of main stat, which are HP%, ATK%, DEF%, and SPD.

There are two different types of Planar Ornaments, which are

1. Planar Sphere
This relic can have 10 different types of main stat, which are HP%, ATK%, DEF%, Physical DMG, Fire DMG, Ice DMG, Lightning DMG, Wind DMG, Quantum DMG, and Imaginary DMG.
2. Link Rope
This Relic can have 5 different types of main stat, which

are HP%, ATK%, DEF%, Break Effect, and Energy Regeneration Rate.

There are 12 different types of sub stats a relic can have, which are HP%, Flat HP, ATK%, Flat ATK, DEF%, Flat DEF, CRIT Rate, CRIT DMG, SPD, Effect Hit Rate, Break Effect, Effect RES.

III. STAT TERMINOLOGIES

This section will provide some terminologies that will be commonly used in this paper with their meaning. All of these terminologies are not used in the official Honkai: Star Rail game, but some are used in the community for ease of reference and some are personally made by myself to shorten names. All terminologies used are

1. HP, ATK, DEF
Originally just HP, ATK, or DEF, but to differentiate between the percentage counterpart, we will be calling them Flat HP, Flat ATK, and Flat DEF.
2. EHR
EHR will be referring to Effect Hit Rate.
3. BrkEff
BrkEff will be referring to Break Effect.
4. EffRes
EffRes will be referring to Effect Resistance.
5. ERR
ERR will be referring to Energy Regeneration Rate.
6. Heal
Heal will be referring to Outgoing Healing Boost.
7. Orb
Orb will be referring to Planar Sphere, one of the types of Planar Ornaments.
8. Rope
Rope will be referring to Link Rope, one of the types of Planar Ornaments.
9. CRIT
CRIT will be referring to both CRIT Rate and CRIT DMG at the same time.
10. DMG
DMG when seen in the Orb relic type, it will correspond to Element DMG Bonus where the element will depend on which character is being referred to.
11. High Roll, Low Roll, Average Roll
These terminologies will refer to the quality of how much a sub stat is increased by after an upgrade. A High Roll means that the sub stat is increased by the highest value possible at x1.0 a certain value. A Low Roll means that the sub stat is increased by the lowest value possible at x0.8 a certain value. An Average Roll means that the sub stat is increased by x0.9 of a certain value.

IV. SCOPE OF ANALYSIS

This paper will only focus on a fully leveled 5-star relic. The relic scorer algorithm will only look at one relic without considering other relics the character has and will ignore set bonuses and external sources of stats. This relic scorer will also ignore low rolls and high rolls, which is how big a sub stat can roll. So, this algorithm will score a relic based on the possibilities of that certain relic piece rolling worse or equal to its current state.

V. RELIC SCORER

A. Relic Stat Scoring

The relic scorer will rely on data and a point system about each characters recommended build, that includes which main stat is recommended in every relic type with the recommended sub stats. The point system is as follows

1. Main Stat Point System
All possible main stat for the Body, Feet, Orb, and Rope relic type will be scored based on the character, with a 1.0 point meaning it is recommended or good for the character and 0.0 point meaning it does not help the character. While the main stat for Head and Hands will automatically be 1.0 point because it is fixed.
2. Sub Stat Point System
All sub stats that can appear in the relics will also be scored based on the character, with 1.0 point meaning it is the best stat for that character, 0.5 point meaning it still contributes to helping that character but it's not the most important stat to focus on, 0.25 point meaning it is a good bonus to have but having too much will not help in the long run, and 0.0 point meaning it does not help the character.

The data will be compiled based on source [4] and is compiled when Honkai: Star Rail has a total of 87 characters as of version 4.3 The Lethe Below the Living. We will be using a sample data going onwards in this paper, but the full data table can be accessed through this link: <https://drive.google.com/file/d/1ha1dGgq25-ZWm6DtEsUN2t1cF5LMT0f/view?usp=sharing>.

Below is the sample recommended build for the character Anaxa.

TABLE I. ANAXA BUILD RECOMMENDATION

Element	Name	Main Stat				Sub Stats
		Body	Feet	Orb	Rope	
Wind	Anaxa	CRIT	SPD / ATK%	ATK% / DMG	ATK% / ERR	CRIT (1) SPD (0.5) ATK%(0.5) ATK (0.25)

After compiling each characters recommended build, this data needs to be put into the relic scorer program. In this paper, we will be using C language to build this program. The full code can be accessed through this link: <https://github.com/Bimbini/5-Star-Relic-Scorer.git>

Below is the code snippet for the array list structure.

```
#define MAINSTATS_BODY 7
#define MAINSTATS_FEET 4
#define MAINSTATS_ORB 10
#define MAINSTATS_ROPE 5
#define SUBSTATS 12

typedef struct
{
    float point_body[MAINSTATS_BODY];
    float point_feet[MAINSTATS_FEET];
    float point_orb[MAINSTATS_ORB];
    float point_rope[MAINSTATS_ROPE];
    float point_substats[SUBSTATS];
} RelicData;

typedef struct
{
    char name[30];
    const RelicData *data;
} Character;
```

Fig. 5. Array list structure for chracter build recommendation data. Source: relic_data.h by author

Each character will have their own RelicData, where it will track each recommended main stat and sub stats with how much points each stat is worth for that character. Below is the structure or indexing of each array in the list.

```
// MAIN STAT BODY ORDER
/*
[0] HP% / HP Percent
[1] ATK% / Attack Percent
[2] DEF% / Defense Percent
[3] Effect Hit Rate / EHR
[4] Outgoing Healing Boost / Heal
[5] CRIT Rate / Critical Rate
[6] CRIT DMG / Critical Damage
*/
```

Fig. 6. Array indexing for point_body[MAINSTATS_BODY]. Source: relic_data.h by author

```
// MAIN STAT FEET ORDER
/*
[0] HP% / HP Percent
[1] ATK% / Attack Percent
[2] DEF% / Defense Percent
[3] SPD / Speed
*/
```

Fig. 7. Array indexing for point_feet[MAINSTATS_FEET]. Source: relic_data.h by author

```
// MAIN STAT ORB ORDER
/*
[0] HP% / HP Percent
[1] ATK% / Attack Percent
[2] DEF% / Defense Percent
[3] Physical DMG
[4] Fire DMG
[5] Ice DMG
[6] Lightning DMG
[7] Wind DMG
[8] Quantum DMG
[9] Imaginary DMG
*/
```


Fig. 8. Array indexing for point_orb[MAINSTATS_ORB]. Source: relic_data.h by author

```
// MAIN STAT ROPE ORDER
/*
[0] HP% / HP Percent
[1] ATK% / Attack Percent
[2] DEF% / Defense Percent
[3] BrkEff / Break Effect
[4] ERR / Energy Regeneration Rate
*/
```

Fig. 9. Array indexing for point_rope[MAINSTATS_ROPE]. Source: relic_data.h by author

```
// SUBSTATS ORDER
/*
[0] HP% / HP Percent
[1] HP / Flat HP
[2] ATK% / Attack Percent
[3] ATK / Flat Attack
[4] DEF% / Defense Percent
[5] DEF / Flat Defense
[6] CRIT Rate / Critical Rate
[7] CRIT DMG / Critical Damage
[8] SPD / Speed
[9] EHR / Effect Hit Rate
[10] BrkEff / Break Effect
[11] EffRes / Effect Resistance
*/
```

Fig. 10. Array indexing for point_substats[SUBSTATS]. Source: relic_data.h by author

Below is the translated version of the data from the table to the array in C.

```
const RelicData anaxa =
{
    {0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 1.0},
    {0.0, 1.0, 0.0, 1.0},
    {0.0, 1.0, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0, 0.0},
    {0.0, 1.0, 0.0, 0.0, 1.0},
    {0.0, 0.0, 0.5, 0.25, 0.0, 0.0, 1.0, 1.0, 0.5, 0.0, 0.0, 0.0}
};
```

Fig. 11. Anaxa RelicData. Source: relic_data.h by author

B. Possibilities of Relic Rolls

Next is to analyze two possibilities of how a relic rolls or how many times a relic upgrades its sub stats. This mainly depends on how much sub stats a relic has when its level 0.

- Relic is a four liner

If the relic is a four liner or starts with four sub stats, then this relic can upgrade its sub stats 5 times. This also means a four liner relic can wield the max score if all 5 upgrades go towards the best sub stats that are worth 1.0 point. Using repeating combinations, we can count the total amount of possibilities a four liner relic can roll. Let $r = 5$ for how many times the relic can upgrade and $n = 4$ for how many sub stats are available, which results in

$$x_1 + x_2 + x_3 + x_4 = 5$$

where

$$x_1 > 0, x_2 > 0, x_3 > 0, x_4 > 0$$

$$C(4+5-1, 5) = C(8, 5) = \frac{8!}{(8-5)! 5!} = 56 \text{ ways} \quad (4)$$

- Relic is a three liner

If the relic is a three liner or starts with three sub stats, that means the first upgrade at level 3 will add a sub stat onto the relic first, then subsequent upgrades will start to upgrade the relics sub stat. This means a three liner relic will sometimes be worse than a 4 liner, even if all 4 of its upgrades goes to the sub stats that is worth 1.0 point. Using repeating combinations, we can count the total amount of possibilities for a three liner relic can roll. Since one upgrade is used for adding a sub stat, that means $r = 4$ for how many times left the relic can upgrade itself and $n = 4$ stays because it needs to have 4 sub stats to start upgrading, which results in

$$x_1 + x_2 + x_3 + x_4 = 4$$

where

$$x_1 > 1, x_2 > 0, x_3 > 0, x_4 > 0$$

$$C(4+4-1, 4) = C(7, 4) = \frac{7!}{(7-4)! 4!} = 35 \text{ ways} \quad (5)$$

This means that the program needs to know if the relic is a four liner or a three liner to differentiate them. One way to do this is by dividing the value of the sub stat with the average value a stat can upgrade then round it normally and minus 1 to ignore the starting value of the sub stat. Then the total times the relic upgrades should either equate to 5 or 4 times. The data on the average value each stat can increase by will be taken from source [6], which is data that was gathered by the Chinese player base, so these values might not be accurate. Below is a translated version of one of the tables focusing on a 5 star relic roll value.

TABLE II. 5 STAR RELIC ROLL VALUES

Sub Stats	Low Roll	Average Roll	High Roll
HP%	3.456%	3.888%	4.320%
HP	33.870	38.104	42.338
ATK%	3.456%	3.888%	4.320%
ATK	16.935	19.052	21.169
DEF%	4.320%	4.860%	5.400%
DEF	16.935	19.052	21.169
CRIT Rate	2.592%	2.916%	3.240%
CRIT DMG	5.184%	5.832%	6.480%
SPD	2.000	2.300	2.600
EHR	3.456%	3.888%	4.320%
BrkEff	5.184%	5.832%	6.480%
EffRes	3.456%	3.888%	4.320%

Below is a piece of the code that will determine how many times a certain relic is upgraded.

```
// Count how many upgrades are happening on the stat
timesupgrade = round(substatvalue / averagesubstats[subindex]) - 1;
if (timesupgrade < 0)
{
    timesupgrade = 0;
}

upgradesubstats[i] = timesupgrade;
totalrolls = totalrolls + timesupgrade;
```

Fig. 12. Code to differentiate a four liner and a three liner relic. Source: relic_scorer.c by author

C. Calculating the Final Score

To calculate the final score, the program needs to simulate through all possibilities a certain piece of relic can roll to count how many of these possibilities are worse or equal than the current score. The program will use nested loops to simulate repeating combinations so it can count the scores of each event and compare it to the current state of the relic. Below is a piece of the code that will simulate this.

```
for(x1 = 0 ; x1 <= totalrolls ; x1++)
{
    for(x2 = 0 ; x2 <= totalrolls-x1 ; x2++)
    {
        for(x3 = 0 ; x3 <= totalrolls-x2-x1 ; x3++)
        {
            x4 = totalrolls - x3 - x2 - x1;

            otherscore = (sub1 * (x1 + 1)) + (sub2 * (x2 + 1)) + (sub3 * (x3 + 1)) + (sub4 * (x4 + 1));

            if (currentscore >= otherscore)
            {
                worseequalpossibilities = worseequalpossibilities + 1.0;
            }
            totalpossibilities = totalpossibilities + 1.0;
        }
    }
}
```

Fig. 13. Code to simulate different possibilities a relic can roll and compare all the scores. Source: relic_scorer.c by author

The nested for loops will go through all possible iterations of upgrades in the relic, then the most inner loop will compare the current score with other possibilities scores and keep count of the total possibilities. If the relic is a four liner, total possibilities will be 56, but if it's a three liner it will be 35.

If the main stat is recommended for the character, the final score will be using the probability formula with multiplying the result with 100 to get a score that's out of 100. The code is shown below.

```
// Final
finalscore = (worseequalpossibilities / totalpossibilities) * 100.0;
```

Fig. 14. Final Score Code. Source: relic_scorer.c by author

Otherwise, the final score will be 0.00 because the main stat doesn't contribute to the character's kit.

VI. SIMULATION

This section will now show a few examples of the program scoring some relics.

- "Perfect" 4 liner relic

```
Character Name: ANAXA
What piece is it? (Head/Hands/Body/Feet/Orb/Rope)
Relic Piece: orb

How to input main stats? [Stat Name] Ex. CRIT DMG
Main Stat: atk%

How to input sub stats? [Stat Name] [Value] Ex. ATK%, 7.3
Sub Stat 1: atk, 19
Sub Stat 2: spd, 2
Sub Stat 3: crit rate, 8.4
Sub Stat 4: crit dmg, 22.6

Total possibilities: 56.000000
Relic is a Four Liner.

Your Relic Score: 100.00/100.00
```

Fig. 15. Output if relic is a "perfect" 4 liner. Source: output screenshot of code by author

- "Perfect" 3 liner relic

```
Character Name: anaxa
What piece is it? (Head/Hands/Body/Feet/Orb/Rope)
Relic Piece: head
Main Stat [fixed]: HP

How to input sub stats? [Stat Name] [Value] Ex. ATK%, 7.3
Sub Stat 1: def%, 4.8
Sub Stat 2: crit rate, 11.6
Sub Stat 3: crit dmg, 12.3
Sub Stat 4: effres, 3.8

Total possibilities: 35.000000
Relic is a Three Liner.

Your Relic Score: 100.00/100.00
```

Fig. 16. Output if the relic is a "perfect" 3 liner. Source: output screenshot of code by author

- Average random relic

```
Character Name: anaxa
What piece is it? (Head/Hands/Body/Feet/Orb/Rope)
Relic Piece: head
Main Stat [fixed]: HP

How to input sub stats? [Stat Name] [Value] Ex. ATK%, 7.3
Sub Stat 1: atk, 40
Sub Stat 2: atk%, 7.3
Sub Stat 3: crit rate, 3.2
Sub Stat 4: crit dmg, 24.6

Total possibilities: 56.000000
Relic is a Four Liner.

Your Relic Score: 64.29/100.00
```

Fig. 17. Output score of a random relic. Source: output screenshot of code by author

VII. CONCLUSION

In this paper, we explored the connection between combinatorics and its application in scoring a 5 star relic from the game Honkai: Star Rail. Using repeating combinations, we can determine how well a relic rolled by simulating all possible iterations and counting the amount of worse or equal score compared with the current relic score.

This scoring system has its weakness, where it only focuses on scoring a single relic and it does not consider external bonuses. Having too much of a single stat will dilute the effect the higher the value it is compared to having a mix of different stats that contributes to the characters kit. But overall, the

program successfully detects if a relic is a four liner or a three liner and can give a score based on how well it has rolled.

Further research on this topic can lead to more advanced combinatorics to determine a better scoring system where it will consider potential external stats from other teammates, light cones, eidolons, or maybe an optimization system for relic rolling.

APPENDIX

The full source code of the 5 star relic scorer can be found in this GitHub repository:

<https://github.com/Bimbini/5-Star-Relic-Scorer.git>

The table data of each characters recommended builds at is used in this paper can be accessed through this drive link:

<https://drive.google.com/file/d/1ha1dGgq25-ZWm6DtEsUN2t1cF5LMT0f-/view?usp=sharing>

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REFERENCES

- [1] Rinaldi Munir, "Kombinatorika (Bagian 1)," IF1221 Matematika Diskrit – Semester II Tahun 2025/2026, 2026. [Online]. Available: <https://informatika.stei.itb.ac.id/~rinaldi.munir/Matdis/2025-2026/18-Kombinatorika-Bagian1-2026.pdf> [Accessed: 18 June, 2026]

- [2] Rinaldi Munir, "Kombinatorika (Bagian 2)," IF1221 Matematika Diskrit – Semester II Tahun 2025/2026, 2026. [Online]. Available: <https://informatika.stei.itb.ac.id/~rinaldi.munir/Matdis/2025-2026/19-Kombinatorika-Bagian2-2026.pdf> [Accessed: 18 June, 2026]
- [3] Community, "Relic," Honkai: Star Rail Wiki. [Online]. Available: <https://honkai-star-rail.fandom.com/wiki/Relic> [Accessed: 18 June, 2026]
- [4] Prydwen, "Honkai Star Rail Characters & Build Guides," <https://www.prydwen.gg/>. [Online]. Available: <https://www.prydwen.gg/star-rail/characters> [Accessed: 17 June, 2026]
- [5] GeeksforGeeks, "Probability in Maths," <https://www.geeksforgeeks.org/>. [Online]. Available: <https://www.geeksforgeeks.org/maths/probability-in-maths/> [Accessed: 19 June, 2026]
- [6] Chinese HSR Playerbase, "星穹铁道掉率统计," [Online]. Available: <https://docs.qq.com/sheet/DYkFxSVFNSGp5YIVv?tab=d9ju7v> [Accessed: 18 June, 2026]
- [7] Community, "Home," Honkai: Star Rail Wiki. [Online]. Available: https://honkai-star-rail.fandom.com/wiki/Honkai:Star_Rail_Wiki [Accessed: 19 June, 2026]

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I hereby declare that this paper I have written is my own original work, it is not an adaptation or translation of another person's work, nor is it plagiarized.

Bandung, 19 Juni 2026



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