Jade's Shining Live Advanced Scoring Guide

a.k.a. scoring for number nerds

Before we begin, if you have not yet read the very excellent Keri's Score Guide, **go read that first!!** It gives all the basics that you need to know without going excessively into the math.

This guide is largely written for anyone who's curious about how the Event Team Builder works, but is otherwise *way* too detailed for regular gameplay.

Contents:

Many thanks to everyone on the Discord for answering / confirming the mechanics of the scoring!

In-Game Color Bar Explained
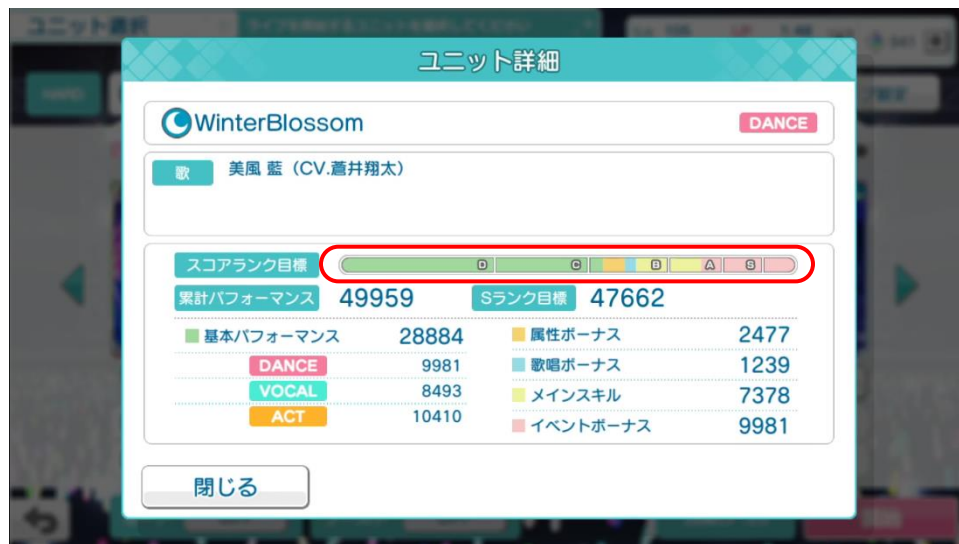
1. **Base team stats** (green section of color bar)
   Each card has its Dance, Vocal and Act stats. Note that the numbers in **BLUE** are the total stat. The numbers in **PINK** are the component that comes from the memorial board, and are ***not in addition*** to the total stat.

   Your team base stat is merely an addition of each individual cards' stats.

2. **Color bonus** (orange section of color bar)

Cards that match the song color (Dream/Shine/Star) are given a **30% boost** on their **base stat**.
The boost is only given to individual cards on your team that match color, and does not give 30% to the whole team. Note that the various bonuses **do not compound**. Bonuses are only applied on cards' base stats.

Example team, on Winter Blossom (Dream song):

Shining Live Ai (Dream) -	Base: 4128, Color boost: 4128 * 0.3 = 1238.4 (then rounded up)
Luna Tokiya (Dream) -	Base: 4125, Color boost: 4125 * 0.3 = 1237.5 (then rounded up)
Shining Live Cecil (Star) -	Base: 4128, Color boost: 0
Sweets Ai #1 (Star) -	Base: 4125, Color boost: 0
Soliel Otoya (Shine) -	Base: 4125, Color boost: 0
Toyland Natsuki (Star) -	Base: 4128, Color boost: 0
Sweets Ai #2 (Star) -	Base: 4125, Color boost: 0

Total Color Boost = 1239 + 1238 = **2477**

3. **Character bonus** (blue section of color bar)

Cards that match the singer(s) of the song get a **10% boost** on their **base stat**.
The boost is given to individual cards, and if you have multiple of the same card, each card gets a 10% boost.
In the example above, character boosts go to:

Shining Live Ai -	Base: 4128, Character boost: 4128 * 0.1 = 412.8 (rounded up)
Sweets Ai #1 -	Base: 4125, Character boost: 4125 * 0.1 = 412.5 (rounded up)
Sweets Ai #2 -	Base: 4125, Character boost: 4125 * 0.1 = 412.5 (rounded up)

Total character boost = 413 + 413 + 413 = **1239**

4. **Event attribute bonus** (pink section of color bar)

Events (as we know them so far, Dec 2017) **double a particular stat** of your team. The latest method of boosting **only boosts the base stat** of the cards and does not compound.
For the Lavender Crystal event, the event attribute is Dance. Hence we get:

Shining Live Ai (Dream) -	Dance: 1436	Vocal: 1436	Act: 1256	Event boost: 1436
Luna Tokiya (Dream) -	Dance: 939	Vocal: 1458	Act: 1728	Event boost: 939
Shining Live Cecil (Star) -	Dance: 1346	Vocal: 1436	Act: 1346	Event boost: 1346
Sweets Ai #1 (Star) -	Dance: 1728	Vocal: 939	Act: 1458	Event boost: 1728
Soliel Otoya (Shine) -	Dance: 1458	Vocal: 939	Act: 1728	Event boost: 1458
Toyland Natsuki (Star) -	Dance: 1346	Vocal: 1346	Act: 1436	Event boost: 1346
Sweets Ai #2 (Star) -	Dance: 1728	Vocal: 939	Act: 1458	Event boost: 1728

Total event attribute boost = 1436 + 939 + 1346 + 1728 + 1458 + 1346 + 1728 = **9981**

5. Main + Supporter skill bonus (yellow section of color bar)

All main skills we know of so far (for URs) are **60% [Color] [Attribute] up**. As usual, these **only boosts the base stat** of the cards and **do not compound**. (i.e. you get 0.6+0.6 = 1.2 boost, rather than [1.6*1.6] - 1 = 1.56 boost)

Suppose my main is a 60% Yellow Dance Up and I choose another 60% Yellow Dance Up as a supporter, we get:

Shining Live Ai (Dream) -	Dance: 1436	Vocal: 1436	Act: 1256	Skill boost: 0
Luna Tokiya (Dream) -	Dance: 939	Vocal: 1458	Act: 1728	Skill boost: 0
Shining Live Cecil (Star) -	Dance: 1346	Vocal: 1436	Act: 1346	Skill boost: 1615.2
Sweets Ai #1 (Star) -	Dance: 1728	Vocal: 939	Act: 1458	Skill boost: 2073.6
Soliel Otoya (Shine) -	Dance: 1458	Vocal: 939	Act: 1728	Skill boost: 0
Toyland Natsuki (Star) -	Dance: 1346	Vocal: 1346	Act: 1436	Skill boost: 1615.2
Sweets Ai #2 (Star) -	Dance: 1728	Vocal: 939	Act: 1458	Skill boost: 2073.6

Total event boost = 1615.2 + 2073.6 + 1615.2 + 2073.6 = **7378**

→ Number is **7378** because all Yellow Dance stats are added first, then multiplied by 1.2, then rounded up. This is unlike previous boosts which are rounded up individually first then added.

Notice that if I had chosen a full team of Yellows, my skill bonus would have exceeded my event bonus. This is critical when deciding how to choose your teams. Don't worry too much about event attribute.

We now have all the bonuses that appear in the in-game colored stats bar, and this is what the in-game Omakase team builder tries to maximize.

Notice also that all boosts apply to cards underlined individually, never to the full team, so it is trivial to calculate each card's 'boosted stat' individually and pick and highest ones. This is likely what the Omakase does.

If we add up all the boosts, the team stat for Winter Blossom on a Dance attribute event, with 60% Yellow Dance UP main and 60% Yellow Dance UP supporter is:

	SL Ai	Luna Toki	SL Cecil	Sweets Ai	Sun Otoya	Toy Natsuki	Sweets Ai	TOTAL
Base stat	4128	4125	4128	4125	4125	4128	4125	28884
Color boost	1239	1238	0	0	0	0	0	2477
Character boost	413	0	0	413	0	0	413	1239
Event Boost	1436	939	1346	1728	1458	1346	1728	9981
Main + Support Boost	0	0	1615.2	2073.6	0	1615.2	2073.6	7378
							Grand Total:	**49959**

(Compare back with first screenshot on Page 2)

# Relation Between Card Stats and Song Score

6. Stats to Score

Every card has a unique skill, such as Cut-in Bonus UP, or Add Score Notes, or Bad / Great to Perfect etc. Let us first talk about scoring as if these unique skills don't exist.

Here we have a team of yellow UR cards whose unique skills do not affect most regular notes, in order to demonstrate the math. Scoring in SL is very simple:

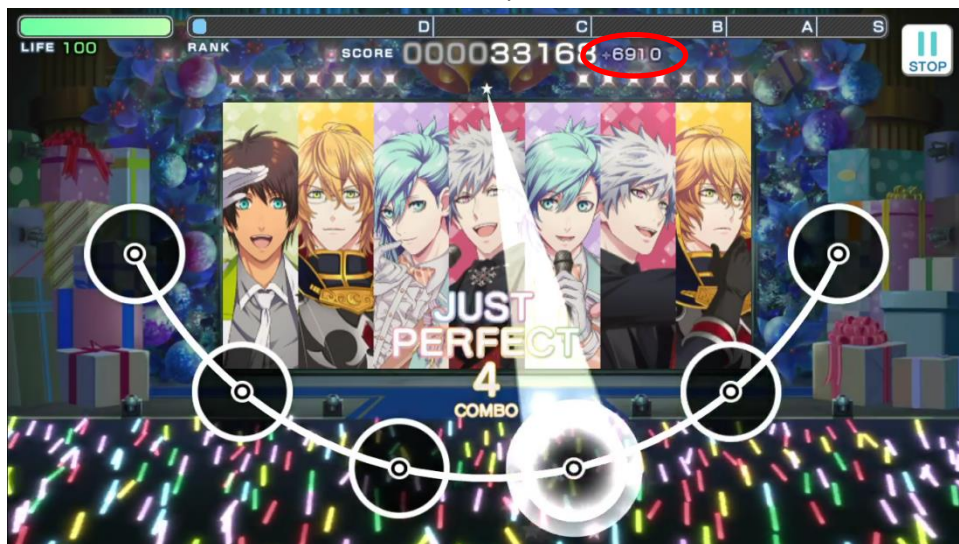|	
1 Perfect note	= (Team stat / 10), rounded up to the nearest 10
1 Just Perfect note	= 1.1 * (Team stat / 10), rounded to the nearest 10
1 Great note	= 0.9 * (Team stat / 10), rounded to the nearest 10
1 Bad note	= 0.5 * (Team stat / 10), rounded to the nearest 10
1 Miss note	= 0

Team base stats:
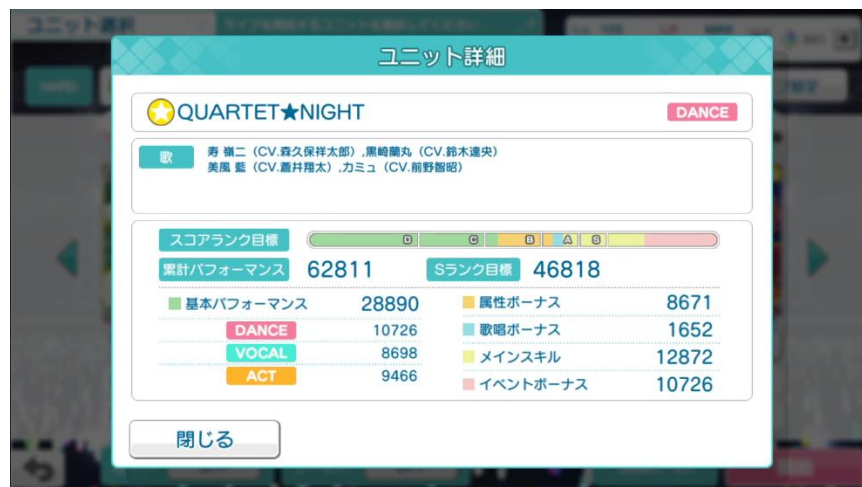
Perfect Note: 62811 / 10 = 6281.1 → rounded up = **6290**

Just Perfect Note: 6281.1 * 1.1 = 6909.21 → rounded up = **6910**

(Sorry no screenshots of Great/Bad/Miss notes)

7. Cut-in bonus

Cut-in bonus exists in all songs, regardless of the skills of your team. Depending on the difficulty level, every X^{th} note in a combo has an extra 2x Perfect note's worth of score. If you break combo e.g. on the 18th note, the count resets and you won't get a bonus till you hit the following round numbers on the combo.

Easy: every 20th note
Normal: every 30th note
Hard: every 40th note
Pro: every 50th note

8. **Full Combo bonus**

If you Full Combo / Perfect Combo / Ultimate Combo a song, you will get 4 x Perfect [JP] / 4 x Great [EN] worth of extra score, regardless of difficulty level. There is also no difference between a Full Combo and a Perfect Combo / Ultimate Combo.

Understanding Unique Skills

(For a list of which cards have which skills, refer to KasumiTorisei's database.)

9. **Cut-in bonus UP skill**

   Shining Live URs, Listen to Music SRs and Autumn Basic Style Rs have the Cut-in bonus UP skill. This merely applies a multiplier to the standard cut-in bonus, meaning it has zero relation to your player ability.

   Stacking
   If you have multiple cards with the Cut-in bonus UP skill, they will stack linearly.

 | | |
   |---|---|
   | Regular Cut-in bonus | = 2x Perfect notes |
   | With 1 card at 90% Cut-in bonus UP | = 2x Perfect notes * 1.9 |
   | With 1 card at 90% and 1 card at 120% Cut-in bonus UP | = 2x Perfect notes * 3.1 |

   Boost estimation
   Suppose you are playing Force Live on Hard (400 notes total) and have the 2 Cut-in bonus UP cards as described above. You will be getting (400/40) * 2 * Perfect note score * 3.1 extra score above the score you would get with only your team stat.

   Most team stats are around 50,000 give or take. This means that regular cut-in bonus will give 5,000 * 2 * (400/40) = 100,000 extra score. Each cut-in bonus card at 100% Cut-in bonus UP will give another 100,000 in extra score.

   To put this in perspective, assuming all your notes are Just Perfect, ignoring hold notes, your approximate base score is 400 * 5000 * 1.1 = 2,200,000. An extra 100,000 is a good **4.5% boost** to your base score that **does not reflect in the in-game color bar stats**.

10. **Add score notes skill**

    Shining Super Star URs, a couple of event URs and SRs, and Lesson Style Rs have the Add Score Notes skill.
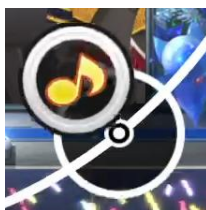
    A score note **multiplies the worth of that note by 3**. If you hit a Just Perfect on a score note, you get 3.3 times a Perfect score instead of 1.1 times. If you hit a Perfect, you get 3 times a Perfect score instead of 1 etc.

    Stacking
    Add Score Notes stacks straightforwardly – the more such cards you have, the more score notes you get.

Boost estimation

Using our estimation in section 8 of a team stat of 50,000, suppose you have a card that adds 10 score notes. Suppose you hit Just Perfect on all of them, giving you 2.2 * 10 * 5000 = 110,000 extra score in total. This is similarly a **whopping 5% in addition** to your base score of 2,200,000.

However unlike the Cut-in bonus UP skill, how much the Add Score Notes skill is <u>worth depends on your ability</u> (can you hit Just Perfects on the score notes?) *and* the <u>length of the song</u>. 10 score notes in a 700-note song is worth proportionally less than 10 notes in a 250-note song.

11. Just Perfect UP skill

Shining Kingdom and Odorokiman URs and SRs have the Just Perfect UP skill.
This skill is sufficiently straightforward as to not need much explanation. A Just Perfect UP skill of 4.6% means your note is worth Perfect * 1.1 * 1.046.

Stacking

If you have multiple Just Perfect UP skill cards, like everything else in this game, they stack linearly rather than exponentially. In the above case you would get Perfect * 1.1 * (1+0.046+0.046) rather than Perfect * 1.1 * 1.046 * 1.046.

Boost estimation

Assuming a Perfect is worth 5,000, that's an additional 253 score per note for each Just Perfect UP skill card. For 400 notes, that's a total extra 101,200, which is again on the order of a **4.5-5% boost**.
This skill is obviously dependent on player ability, but scales with length of song, so is worth roughly the same amount for a 700-note song as a 250-note song.

12. Bad-to-Great & Bad/Great-to-Perfect skill

Also known as glockers and plockers, we've now entered the realm of minimal-to-no benefit in score boosting. Beach Summer Live URs and SRs, a couple of event URs and SRs, and Shining TV Style Rs have this skill.

For up to ~12-13 notes on a fully-skilled card, it will either turn a Bad to a Great (0.4 * Perfect score improvement), or turn a Bad to a Perfect (0.5 * Perfect score improvement), or turn a Great to a Perfect (0.1 * Perfect score improvement).

Stacking

Similarly to Add Score Notes, the more of these cards you have the more you'll get away with bad timing. If you have some Bad/Great-to-Perfect cards and some Bad-to-Great cards in your party, the former get used up first.

Boost estimation

The maximum possible boost you could get out of a plocker is 13 notes of Bad to Perfect, i.e. 13 * 0.5 * Perfect score. Assuming Perfect is 5,000, that's an improvement of 32,500. If you are struggling to hit all the notes to begin with, this is more saving your score than boosting it.

There is a sweet spot of # of Bads for which a plocker is better than a scoring card, but it's a very narrow range. A glocker is probably better because it gives a 0.4 * Perfect improvement for all 12 Bad notes, whereas a plocker often catches Greats, making the improvement marginal.

13. Add life notes skill

Since this is a scoring guide and life notes do not add score, we'll only touch on this briefly.
Sweet Café URs and SRs, Dancing with Stars SRs and Cooking Style Rs have this skill.

Each Bad loses you 2 health, each Miss loses you 5 health, and each Miss on a slide note loses you 1 health. Each Life Note regains you 5 health.

The only way this is relevant to scoring is the Event Mission where you have to clear 4 songs with >=90% health remaining, which nets you 350 event points on Hard and 450 event points on Pro.

14. Stacking of multiple skills

Case 1: Just Perfect UP card + Add Score Notes card

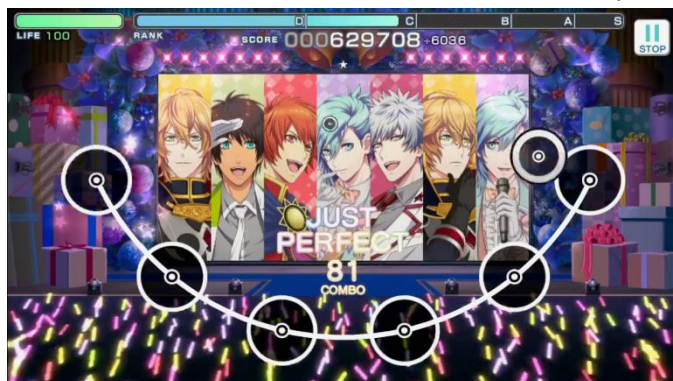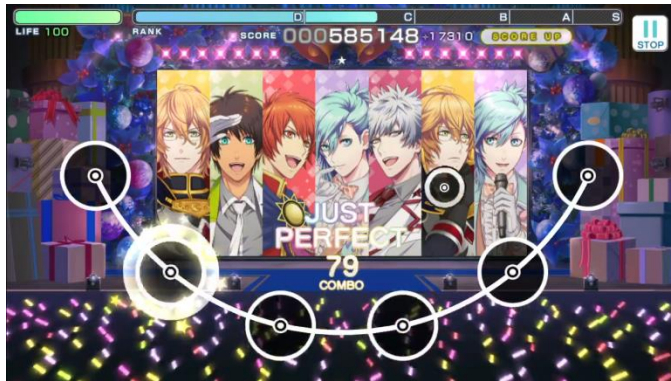Question: Does a Just Perfect on a Score Note multiply?
Answer: **No.**

Proof:
Team base stat for this team: 52398; Just Perfect UP skill: 4.6%
Base Just Perfect score = 5239.8 * 1.1 (rounded up to 10) = 5770
Skilled Just Perfect score = 5770 * 1.046 (rounded up to integer) = 6036 (see screenshot)

Score of score note = 17310 (see screenshot) = 5770 * 3 → does NOT have Just Perfect UP bonus

Case 2: Cut-in Bonus UP card + Add Score Notes card

Question: Does a Score Note on a Cut-in multiply?
Answer: **No.**

You will simply have Just Perfect * 3 for the score component, and the regular Cut-in bonus * skill up for the Cut-in component applied separately and added to give you a super high score for that note.

TL;DR + General Suggestions

If you didn't quite make it through the 10-page wall of text, here are the key points you want to keep in mind if you formulate your team manually:

Stats-wise:
1) A single copy UR of any color is almost always superior to an SR *except* a matching color maxed SR.
2) If you have 4 or more of the correct color UR/maxed SR, it is better to match color of the song.
3) If you do not, you are better-off with 5 or more of any one color and choosing the same color for Main + Supporter skill
4) Character bonuses are only 10%, they are close to useless *unless* you have more than a full team of correct-colored URs, in which case a matching boy will give the highest score.
5) Once you have full UR teams of each color, your score will plateau unless you obtain multiple copies of URs and up their rank. The easiest way to do this is to rank 10% and above in events.

Unique skill-wise:
6) ***Always*** choose a scorer over a healer/locker if you have that choice. (Also prioritize skilling scorers, since skill bubbles are limited)
7) It is better to hit a few 'Bad' notes than to use a locker since there is no combo penalty.
8) If you have trouble surviving on pro and need more than 1-2 lockers/healers, it is *much* more efficient to play on hard.

Spring Update 2018: Subskills & Crowns

Subskills have been added to latest versions of the [Teambuilder](#) developed by CrucixX.
Crowns merely increase stats so are handled as per normal.

15. Subskills

In general, the type of subskill unlockable on a card is determined by the type of unique skill it has. Below is a table of which subskills correspond to which unique skills:

Unique Skill	Subskill (Event UR Lvl 1, +2000/lvl)	Subskill (Gacha UR Lvl 1, +3000/lvl)
Cut-in bonus UP	+27000 on Full Combo	+28000 on Full Combo
Add score notes	+12000 for life >60%	+13000 for life >60%
Just Perfect UP	+12000 for life >60%	+13000 for life >60%
Bad-to-Great	[No such event cards]	+28000 on Full Combo
Bad/Great-to-Perfect	+27000 on Full Combo	+28000 on Full Combo
Add life notes	+17000 for life >80%	+18000 for life >80%

Note that Full Combo subskill scores are added immediately as you finish the live, together with the regular FC bonus. Life subskills are added on the score page afterwards.

16. Crowns

Crowning a max ranked card gives +150 or +200 of one stat (Dance, Vocal, Act/Charm) per crown, with up to 3 crowns per card. Note that once a crown is set, it cannot be individually rerolled. Any reroll will reset ALL crowns beginning from silver.

Since crowning only adds to stats and does not give additional skills, the increase in stats is handled as per normal by existing team builders and no further action is necessary.

No analysis has yet been done on the best crowning method, but a general guideline would be to reroll the two cheaper crowns (silver & gold) to get +200 on the card's highest stat, and to only reroll the rainbow crown to get +200 on any stat, since the cost is high.

Optimizing Team Score Calculations

This section is only relevant to the minutiae of the Event Team Builder. TL;DR can skip.

All previous sections have contained exact math, i.e. given a particular team, what score do we expect? No approximations were made.

However a team-builder works from the opposite direction – for the best score, what team do I use? Ideally this requires a brute force search through all possible teams, supporter choices and main choices. If you have 50+ cards, that's a search space of (50 choose 7) * 7 * 7= 50!/(7!*43!) = 4,894,335,600 per song. Clearly this is impractical in Excel and will require a standalone program.

Hence this team-builder uses a number of simplifying assumptions and approximations, which will be stated in the following sections.

17. Calculating a total team score

Base Team Score

Before we can estimate a score for any given song, we need to first know the player's ability level – how many Just Perfects / Perfects / Greats / Bads / Misses do they tend hit for that song? This determines which unique skill boost would be most beneficial for them. Someone who mostly hits Just Perfects would benefit most from Just Perfect UP cards, while someone with a lot of Bads will be saved by Bad-to-Great cards.

We'll call this variable the "Player Profile" where:

$$PlayerProfile = 1.1 * \#JP + \#P + 0.9 * \#G + 0.5 * \#B$$

Now we use this to estimate a base score using only team stats and no unique skill boosts:

$$BaseScore = \frac{TeamStat}{10} * PlayerProfile$$

Note that we do not bother rounding to 10 because the actual variance in player profile likely exceeds the rounding amount.

In addition to the base score, there is also the base cut-in bonus (CIB) that is given regardless of player ability, but depends on the length of the song.

$$BaseCIB = \frac{TeamStat}{10} * 2 * \frac{\#Notes}{Freq}$$

where $Freq$ = 20 (easy); 30 (normal); 40 (hard); 50 (pro)

Unique Skill Scoring

We have explained how unique skills add to score in earlier sections, so we will not repeat that and merely put it into math. Each of these is the *additional* score you get for each card with a unique boost. If you recall, stacking does not compound, it only adds linearly, so each card can be considered independently.

We ignore all rounding effects as their effect is minimal and will be blurred by actual player ability variation:

Cut-in Bonus UP skill:

$$CIBup = \frac{TeamStat}{10} * 2 * \frac{\#Notes}{Freq} * CIBskill$$

where $CIBskill$ is the skill level which your card is raised to (e.g. Cut-in bonus UP by 90%).

Add Score Notes:

$$SN = \frac{TeamStat}{10} * \frac{PlayerProfile}{\#Notes} * 2 * SNskill$$

where $SNskill$ is the skill level which your card is raised to (e.g. Add 7 score notes). We normalize the Player Profile by number of notes assuming that your Score Note hit rate is proportional to your overall hit rate.

Just Perfect UP:

$$JPup = \frac{TeamStat}{10} * \#JP * 1.1 * JPskill$$

where $JPskill$ is the skill level which your card is raised to (e.g. Just Perfect UP by 4.6%).

Bad, Great to Perfect:

$$BGtP = \frac{TeamStat}{10} * \left(0.1 * \frac{\#G}{\#B + \#G} + 0.5 * \frac{\#B}{\#B + \#G}\right) * SkillRate$$

$$if\ BGtPskill > \#G + \#B,$$
$$then\ SkillRate = \#G + \#B$$
$$else\ SkillRate = BGtPskill$$

where $BGtPskill$ is the skill level which your card is raised to (e.g. Turn 7 notes from Bad/Great to Perfect). Again we normalize by total number of Bad and Great notes, so that it can easily scale with changing BGtPskill.

Bad to Great:

$$BtG = \frac{TeamStat}{10} * 0.5 * \#B * SkillRate$$

$$if\ BtGskill > \#B,$$
$$then\ SkillRate = \#B$$
$$else\ SkillRate = BtGskill$$

where $BtGskill$ is the skill level which your card is raised to (e.g. Turn 9 notes from Bad to Great).

(Add Life Notes has no score effect and is not considered here.)

18. Converting score boosts back into stats

Since we wish to compare and choose teams of cards based on their stats instead of their score, we now need to back convert each unique skill additional score into an 'effective stat'. i.e. since the base score is written as

$$BaseScore = \frac{TeamStat}{10} * PlayerProfile$$

we want to be able to similarly express all additional scores as

$$UniqueSkillScore = \frac{UniqueSkillStat}{10} * PlayerProfile$$

rearranging all equations in section 14, we arrive at:

$$BaseCIBstat = CardStat * \frac{2 * \frac{\#Notes}{Freq}}{PlayerProfile}$$

Note that we express the BaseCIBstat a little differently than the other unique skill stats because each card's contribution to the Cut-in bonus is only its own stat. Whereas for unique skills, the multiplier applies to the existing base score, which is a whole-team stat.

$$CIBupstat = CardStat * \frac{2 * \frac{\#Notes}{Freq}}{PlayerProfile} * CIBskill * TeamStat$$

$$SNstat = \frac{2 * SNskill}{\#Notes} * TeamStat$$

$$JPup = \frac{\#JP * 1.1 * JPskill}{PlayerProfile} * TeamStat$$

$$BGtP = \frac{\left(0.1 * \frac{\#G}{\#B + \#G} + 0.5 * \frac{\#B}{\#B + \#G}\right) * SkillRate}{PlayerProfile} * TeamStat$$

$$if\ BGtPskill > \#G + \#B,$$
$$then\ SkillRate = \#G + \#B$$
$$else\ SkillRate = BGtPskill$$

$$BtG = \frac{0.5 * \#B * SkillRate}{PlayerProfile} * TeamStat$$

$$if\ BtGskill > \#B,$$
$$then\ SkillRate = \#B$$
$$else\ SkillRate = BtGskill$$

Estimation Notes!

- Here we note that for any given card, we don't actually know the TeamStat, because we have not yet formed the team! We thus use the estimation that the TeamStat is the sum of the card's own base stat and the 6 other highest base stats among all your cards.
- We also multiply things based on # of notes and player profile. However you will have noticed that hold notes in the song are worth more than regular notes. This is not taken into account as the number and length of hold notes is different for each song and the effort needed to catalog this is unnecessary when comparing teams for the same song.

19. Choosing the best Main and Supporter

The Main and Supporter skills only work for a specific stat for specific colors. It can be trivially proven that one should always use the same Main and Supporter skills, but we also know that supporters of a specific type tend to run out while grinding. As such, the calculator sweeps through all (3 colors x 3 stats) x (3 colors x 3 stats) to determine all possible boosts. The results are not displayed on the 'Results' page, but if the user so wishes, they can unhide individual song calculation sheets to find the 10 best Main/Supporter combinations for their teams, ranked in descending order.

And that concludes everything about scoring in UtaPri Shining Live, as well as how the automatic team builder works! Thank you to all on the Discord server for providing invaluable data and answering many silly questions!
~Jade