

Definitions – per CH-01.

Overview – This specification describes a method by which outlying elo may be corrected in an Age of Empires II: Definitive Edition through use of handicap. This will allow competitions to include all persons who adhere to their rules, regardless of skill, while ensuring worthy match-ups with unpredictable results.

Handicap Summary – Handicap may be assigned in the game lobby in increments of 5%, starting at 100% and going up to 200%. Different handicaps may be assigned to different players as desired, with their respective values multiplied by the following properties:

- Starting Resources
- Villager Collection Rates (Relic and Trade Income Unaffected)
- Building Rate
- Building Hit-points
- Unit Hit-points
- Military Building Work Rate
- Counter Unit Bonus Damage

Given the large number of affected properties, handicap is understood to be a very powerful parameter.

Boosting Only – Handicap may only be used to boost the above listed properties. There is no way to diminish them. In the case of extreme low skill, only the outlying player needs handicap to be on par with the rest of the division. In the case of extreme high skill, all players in the division require handicap *except* the outlier. In games not involving the high-skilled outlier, the handicap received by both players is subtracted by the minimum handicap between both, such that only one player receives handicap. For example, if a highly skilled player were to be included in a division that caused its three other players to receive handicaps of 5%, 10%, and 20%, respectively, then a match between the two least skilled players in the division would involve the least skilled player receiving 0% handicap and the more skilled player receiving 5%, instead of 10% and 5%, respectively.

Competition Testing – The MikeJet22 Community’s “Kraken Slayer Tournament” used handicap to correct for elo differences among participants. Details can be found through the following link: https://liquipedia.net/ageofempires/Kraken_Slayer

| Bill of Materials: | | Alchemy AOE | SPC-3 | Revision | |
|--------------------|-------------|--------------------------------|------------------|--------------------------|--|
| CH-01 | Definitions | | | - | |
| | | | | Elo Correction, Handicap | |
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| | | ----- Document Approvals ----- | | Date: | |
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Table 1 was used to determine handicap depending on elo:

| Handicap | | Their Elo | | | | | | | | | | | | | | | | | | | | Key | | | |
|-----------|-----------|-----------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|-------------|----------------|----------------|
| | | 300-400 | 400-500 | 500-600 | 600-700 | 700-800 | 800-900 | 900-1000 | 1000-1100 | 1100-1200 | 1200-1300 | 1300-1400 | 1400-1500 | 1500-1600 | 1600-1700 | 1700-1800 | 1800-1900 | 1900-2000 | 2000-2100 | 2100-2200 | 2200-2300 | | | 2300-2400 | 2400 ++ |
| Your Elo | 300-400 | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | 100% | 100% | 300 - 600 | 5% per 100 elo |
| | 400-500 | 0% | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | 100% | | |
| | 500-600 | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | | |
| | 600-700 | 0% | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 20% | 25% | 30% | 35% | 40% | 40% | 45% | 50% | 55% | 60% | 60% | 65% | 70% | 75% | 600 - 900 | 5% per 125 elo |
| | 700-800 | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 20% | 25% | 30% | 35% | 40% | 40% | 45% | 50% | 55% | 60% | 60% | 65% | 70% | | |
| | 800-900 | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 20% | 25% | 30% | 35% | 40% | 40% | 45% | 50% | 55% | 60% | 60% | 65% | | |
| | 900-1000 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 20% | 20% | 25% | 30% | 30% | 35% | 40% | 40% | 45% | 50% | 900 - 1200 | 5% per 150 elo |
| | 1000-1100 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 20% | 20% | 25% | 30% | 30% | 35% | 40% | 40% | 45% | | |
| | 1100-1200 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 20% | 20% | 25% | 30% | 30% | 35% | 40% | 40% | | |
| | 1200-1300 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 15% | 20% | 25% | 25% | 30% | 35% | 35% | 1200 - 1500 | 5% per 175 elo |
| | 1300-1400 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 15% | 20% | 25% | 25% | 30% | 35% | | |
| | 1400-1500 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 15% | 20% | 25% | 25% | 30% | | |
| | 1500-1600 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 10% | 15% | 15% | 20% | 20% | 1500 - 1800 | 5% per 200 elo |
| | 1600-1700 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 10% | 15% | 15% | 20% | | |
| | 1700-1800 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 10% | 15% | 15% | | |
| | 1800-1900 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 10% | 1800 - 2100 | 5% per 225 elo |
| 1900-2000 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | | | |
| 2000-2100 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | | | |
| 2100-2200 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 2100 - 2400 | 5% per 250 elo | |
| 2200-2300 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | | | |
| 2300-2400 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | | | |
| 2400 ++ | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 2400 ++ | No Handicap | |

Table 1: Kraken_Slayer Tournament Handicap System

The Kraken Slayer tournament had no divisions, and was conducted at a time when the maximum elo on the AOE2:DE ranked ladder was approximately 2.6k.

Generalized Table – Although elo transfer is “zero-sum” –the amount gained by the winner of a match is equal to the amount lost by the loser– the amount of elo in the online ranked pool continues to grow as new players join, making highest-elo an ever-expanding number, as top players absorb a noticeable fraction of the “fresh meat”. This impacts the validity of absolute numbers, such as those found in Table 1. Thus, all elos from Table 1 were divided by 2600, the maximum elo at the time of their collection, to reflect a “percentage to maximum”, and make required handicap estimations more accurate. Table 2 shows the revised numbers.



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| Handicap | [Their Elo]/[Maximum Elo] | | | | | | | | | | | | | | | | | | | | | Key | | |
|--------------------------|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|----------------|-------------------------------------|
| | 11.5% to 15.4% | 15.4% to 19.2% | 19.2% to 23.1% | 23.1% to 26.9% | 26.9% to 30.7% | 30.7% to 34.6% | 34.6% to 38.5% | 38.5% to 42.3% | 42.3% to 46.2% | 46.2% to 50.0% | 50.0% to 53.9% | 53.9% to 57.7% | 57.7% to 61.5% | 61.5% to 65.4% | 65.4% to 69.2% | 69.2% to 73.1% | 73.1% to 76.9% | 76.9% to 80.8% | 80.8% to 84.6% | 84.6% to 88.5% | 88.5% to 92.3% | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| [Your Elo]/[Maximum Elo] | 11.5% to 15.4% | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | 100% | 11.5% to 23.1% | 5% Handicap per 3.8% of Maximum Elo |
| | 15.4% to 19.2% | 0% | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | | |
| | 19.2% to 23.1% | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | | |
| | 23.1% to 26.9% | 0% | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 20% | 25% | 30% | 35% | 40% | 40% | 45% | 50% | 55% | 60% | 60% | 65% | 70% | 23.1% to 34.6% | 5% Handicap per 4.8% of Maximum Elo |
| | 26.9% to 30.7% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 20% | 25% | 30% | 35% | 40% | 40% | 45% | 50% | 55% | 60% | 60% | 65% | | |
| | 30.7% to 34.6% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 40% | 45% | 50% | 55% | 60% | 60% | 60% | | |
| | 34.6% to 38.5% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 20% | 20% | 25% | 30% | 30% | 35% | 40% | 40% | 45% | 34.6% to 46.2% | 5% Handicap per 5.8% of Maximum Elo |
| | 38.5% to 42.3% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 20% | 20% | 25% | 30% | 30% | 35% | 40% | 40% | | |
| | 42.3% to 46.2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 20% | 20% | 25% | 30% | 30% | 35% | 40% | | |
| | 46.2% to 50.0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 15% | 20% | 25% | 25% | 30% | 35% | 46.2% to 57.7% | 5% Handicap per 6.7% of Maximum Elo |
| | 50.0% to 53.9% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 15% | 20% | 25% | 25% | 30% | | |
| | 53.9% to 57.7% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 10% | 10% | 15% | 15% | 20% | 25% | 25% | | |
| | 57.7% to 61.5% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 10% | 15% | 15% | 20% | 57.7% to 69.2% | 5% Handicap per 7.7% of Maximum Elo |
| | 61.5% to 65.4% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 10% | 15% | 15% | | |
| | 65.4% to 69.2% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 10% | 15% | | |
| | 69.2% to 73.1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | 10% | 69.2% to 80.8% | 5% Handicap per 8.7% of Maximum Elo |
| | 73.1% to 76.9% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 5% | | |
| | 76.9% to 80.8% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | | |
| | 80.8% to 84.6% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 5% | 80.8% to 92.3% | 5% Handicap per 9.6% of Maximum Elo |
| | 84.6% to 88.5% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | | |
| | 88.5% to 92.3% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | | |

Table 2: Normalized Elo Handicap Recommendations

Rounding – The maximum and minimum values in the axes of Table 2 are duplicated across rows. In the case of a value that is “right on the edge”, rounding in favor of a “lower elo gap” is recommended, even if it would assign slightly more handicap.



Example 1 – Handicap Determination: The top elo in the 1v1 ranked pool happens to be 2765 when a tournament is seeded. Determine the amount of handicap that must be assigned to include a 2231 player in a division whose minimum elo is 2543.

The value of 2231 is “your elo”, and 2543 is “their elo”. Dividing both of these elos by 2765 gives 80.7% for “your normalized elo” and 92.0% for “their normalized elo”. Following the first column down, we stop at the 4th row from the bottom – “76.9% to 80.8%”. From there we scroll to the right until reaching the end of the table – “88.5% to 92.3%”, and the handicap recommended by the Table is 5%.

Conclusion – This specification presents a Table constructed by another Age of Empires community for assigning handicap based on elo discrepancy, to account for skill differences. Although more advanced techniques may be applied (such as equation fitting), this table is simply normalized according to the maximum skill at the time, and made into a general reference, with limited use in forming divisions for an AOE2 competition.

| Revision | Description | Change Document | Date |
|----------------|-------------|-----------------|------------|
| Original Issue | ----- | N/A | 2023/10/26 |