

Calculation of Weighted Scores

1. Introduction

One important principle applies to all such calculations: -

The weightings are only applied to the final form of scoring for the board.

2. Aggregate Scoring

Simply apply the assigned weighting to each of the component scores

$$\begin{aligned}
 60\% \ 4\heartsuit= & \quad +420 & = 0.6 \times 420 & = 252 \\
 40\% \ 4\heartsuit-1 & \quad -50 & = 0.4 \times -50 & = \underline{-20} \\
 & & & 232 \text{ rounded to } \mathbf{230}
 \end{aligned}$$

3. Teams of Four – IMPs with each match scored in VPs

$$\begin{aligned}
 60\% \ 4\heartsuit= \text{ by N} & \quad +420 \\
 40\% \ 4\heartsuit-1 \text{ by N} & \quad -50
 \end{aligned}$$

The result at the other table was 3♥= by N 140.

It would be incorrect simply to calculate the weighted score as $(0.6 \times 420) + (0.4 \times -50)$ and use the result of this to calculate the IMP score for the board – the weightings are only applied to the final form of scoring for the board, ie IMPs.

Similarly it would be incorrect to apply the weighting to the VP score – the weighting only applies to a single board and not to the match as a whole.

The correct way is to calculate the IMP scores for each of the component weighted scores and then apply the weightings to these IMP scores.

$$\begin{aligned}
 420 - 140 & = +280 & = 7 \text{ IMPs} & \quad 7 \times 0.6 = 4.2 \\
 -50 - 140 & = -190 & = -5 \text{ IMPs} & \quad -5 \times 0.4 = \underline{-2} \\
 & & & 2.2 \text{ rounded to } \mathbf{2 \text{ IMPs}}
 \end{aligned}$$

4. Pairs – Matchpointed

4.1 The Correct Way

The following results are obtained on a board that is played 12 times:-

Score	Freq
+1430	2
+680	5
+650	2
-100	2
	11

The missing score is a weighted assigned score: -

+1430	30%
+680	40%
+650	20%
-100	10%

The frequencies are first adjusted to take account of the assigned weighting so that the

Score	Freq	Adj. Freq	NS MP
+1430	2	2.3	20.7
+680	5	5.4	13.0
+650	2	2.2	5.4
-100	2	2.1	1.1
	11	12	

adjusted frequency for +1430, for example, becomes 2.3 and the MPs for each score then calculated.

The MP for the weighted assigned score is then calculated by applying the assigned weighting to the MP allocation for each of the component scores: -

$$(0.3 \times 20.7) + (0.4 \times 13.0) + (0.2 \times 5.4) + (0.1 \times 1.1) = \mathbf{12.6}$$

4.2 Alternative calculation method when software does not support weighted scores

Clearly to make one of these weighted adjustments for matchpoint scoring without the aid of computer software would be tedious, if not impossible, particularly in large fields. At the moment only Magic Contest and PairsScorer (Jeff Smith) have the facility to cope with weighted scores and both would give the result obtained in 4.1

If using any other scoring program, (as long as it supports Neuberg) the best that can be done is to enter the scores as normal, substituting A= to both pairs to which the weighted ruling applies. This would give the result shown below.

Score	NS MPs
+1430	20.8
+680	13.2
+650	5.5
-100	1.2

The weighted score is now calculated using these matchpoints allocations -:

$$(0.3 \times 20.8) + (0.4 \times 13.2) + (0.2 \times 5.5) + (0.1 \times 1.2) = \mathbf{12.7}$$

Finally correct the matchpoints for these pairs using the adjustments/awards/fines routine.

Since average for the board is 11 and has already been assigned, the scorer will add 1.7 matchpoints to NS and deduct 1.7 from EW.

5. Pairs – Butler Scoring (IMPs)

5.1 The Correct Way

The principle illustrated in the matchpoints example is applied here – factor the frequencies then score as you would normally using the factored frequencies.

Using the example from Section 4 again

Score	Freq	Adj. Freq
+1430	2	2.3
+680	5	5.4
+650	2	2.2
-100	2	2.1
	11	12

Datum Calculation (no scores removed)

$$\begin{aligned} +1430 \times 2.3 &= 3289 \\ +680 \times 5.4 &= 3672 \\ +650 \times 2.2 &= 1430 \\ -100 \times 2.1 &= \underline{-210} \\ \text{Total} &= 8181 \end{aligned}$$

Divide by total Adj Freq (12) = 681.75, rounded to 680.

IMP Calculation

IMP Calculation	IMPS
+1430 – 680 = +750	= +13
+680 – 680 = 0	= 0
+650 – 680 = -30	= -1
-100 – 680 = -780	= -13

Weighted score

$$(0.3 \times 13) + (0.4 \times 0) + (0.2 \times -1) + (0.1 \times -13)$$

$$3.9 + 0 - 0.2 - 1.3 = 2.4 \text{ rounded to } \mathbf{2}.$$

Note: If 1 score from either end is to be removed in calculating the datum, then the datum calculation becomes: -

$$(+1430 \times 1.3) + (+680 \times 5.4) + (+650 \times 2.2) + (-100 \times 1.1) \text{ with the total divided by } 10.$$

5.2 Alternative calculation method when software does not support weighted scores

Only Magic Contest and PairsScorer (Jeff Smith) have the facility to cope with weighted scores and both would give the result obtained above

If using any other scoring program, enter the scores as normal, substituting A= (0 IMPs) to both pairs to which the weighted ruling applies. This would give the result: -

Score	IMPs
+1430	13
+680	0
+650	-1
-100	-13

The weighted score is now calculated using these IMP scores and the assigned weightings -: $(0.3 \times 13) + (0.4 \times 0) + (0.2 \times -1) + (0.1 \times -13) = 2.4$ rounded to **2**.

Finally correct the IMPs for these pairs using the adjustments/awards/fines routine. Since average for the board is 0 and has already been assigned, the scorer will add 2 IMPs to NS and deduct 2 from EW.

6. Pairs – Cross-IMPs

6.1 The Correct Way

The principle illustrated in the matchpoints example is applied here – factor the frequencies then score as you would normally, using these factored frequencies. Using the same example as sections 4 & 5: -

	Adj. Freq
+1430	2.3
+680	5.4
+650	2.2
-100	2.1

Cross-IMPs Calculation

+1430

$$(5.4 \times 13) + (2.2 \times 13) + (2.1 \times 17) = 70.2 + 28.6 + 35.7 = +134.5$$

+680

$$(2.3 \times -13) + (2.2 \times 1) + (2.1 \times 13) = -29.9 + 2.2 + 27.3 = -0.4$$

+650

$$(2.3 \times -13) + (5.4 \times -1) + (2.1 \times 13) = -29.9 - 5.4 + 27.3 = -8.0$$

-100

$$(2.3 \times -17) + (5.4 \times -13) + (2.2 \times -13) = -39.1 - 70.2 - 28.6 = -137.9$$

Weighted score

$$(0.3 \times 134.5) + (0.4 \times -0.4) + (0.2 \times -8) + (0.1 \times -137.9) = 40.35 - 0.16 - 1.6 - 13.79 = \mathbf{24.8}$$

6.2 Alternative calculation method when software does not support weighted scores

Only Magic Contest and PairsScorer (Jeff Smith) have the facility to cope with weighted scores and both would give the result obtained above.

If using any other scoring program, enter the scores as normal, substituting A= (0 Cross-IMPs) to both pairs to which the weighted ruling applies. This would give the result shown below.

Score	Cross-IMPs
+1430	+136.25
+680	+ 2.18
+650	- 5.45
-100	-136.25

The weighted score is now calculated using these allocations and the assigned weightings-:

$$(0.3 \times 136.25) + (0.4 \times 2.18) + (0.2 \times -5.45) + (0.1 \times -136.25) \\ = 40.88 + 0.87 - 1.09 - 13.63 = \mathbf{27.0}$$

Finally correct the scores for these pairs using the adjustments/awards/fines routine. Since average (0) and has already been assigned, add 27 to NS and deduct 27 from EW.

Note:

ScoreBridge reports in cross-imps divided by comparisons per board

Tony Haworth's Scorer reports in total cross-imps

Jeff Smith's PairsScorer reports in cross-imps divided by scores per board or total cross-imps

Magic Contest offers the choice of total cross-imps, cross-imps divided by comparisons per board or cross-imps divided by scores per board.

Component of the weighted score does not occur on the board

Pairs – Matchpointed

The Correct Way

The following results are obtained on a board that is played 12 times:-

Score	Freq	
+1430	2	The missing score is a weighted assigned score: -
+680	5	+1430 30%
+650	2	+680 40%
-100	2	+620 20% (this score does not actually occur on the board)
	2	-100 10%
	11	

The frequencies are first adjusted to take account of the assigned weighting so that the

Score	Freq	Adj. Freq	NS MP
+1430	2	2.3	20.7
+680	5	5.4	13.0
+650	2	2.0	5.6
+620	0	0.2	3.4
-100	2	2.1	1.1
	11	12	

adjusted frequency for +1430, for example, becomes 2.3 and the MPs for each score then calculated.

The MP for the weighted assigned score is then calculated by applying the assigned weighting to the MP allocation for each of the component scores: -

$$(0.3 \times 20.7) + (0.4 \times 13.0) + (0.2 \times 3.4) + (0.1 \times 1.1) \\ = 6.21 + 5.2 + 0.68 + 0.11 = \mathbf{12.2}$$

Alternative calculation method when software does not support weighted scores

Only Magic Contest and PairsScorer (Jeff Smith) have the facility to cope with weighted scores and both would give the result obtained above.

If using any other scoring program, enter the scores as normal, substituting A= to both pairs to which the weighted ruling applies. This would give the result: -

Score	NS MPs
+1430	20.8
+680	13.2
+650	5.5
-100	1.2

Replace the A= award with the score included in the weighting that does not actually occur on the board (ie +620) and note the MP allocation to this score (NS = 4 MPs).

Now, re-instate the A= award and calculate the MP award for the weighted score: -

$$(0.3 \times 20.8) + (0.4 \times 13.2) + (0.2 \times 4) + (0.1 \times 1.2) \\ = 6.24 + 5.28 + 0.8 + 0.12 = \mathbf{12.4}$$

Finally correct the matchpoints for these pairs using the adjustments/awards/fines routine.

Since average for the board is 11 and has already been assigned, the scorer will add 1.4 matchpoints to NS and deduct 1.4 from EW.

If using BSP, such adjustments are expressed as (integer) percentages of a top, rather than in absolute matchpoints. Therefore, in this case, the adjustments should be $(1.4/22) \times 100 = +6$ for NS and -6 for EW.

Component of the weighted score does not occur on the board

Pairs – Butler Scoring (IMPs)

The Correct Way

The principle illustrated in the matchpoints example is applied here – factor the frequencies then score as you would normally using the factored frequencies.

Using the same example: -

The following results are obtained on a board that is played 12 times:-

Score	Freq
+1430	2
+680	5
+650	2
-100	2
	11

The missing score is a weighted assigned score: -

+1430 30%

+680 40%

+620 20% (this score does not actually occur on the board)

-100 10%

The frequencies are first adjusted to take account of the assigned weighting so that the adjusted frequency for +1430, for example, becomes 2.3.

Score	Freq	Adj. Freq
+1430	2	2.3
+680	5	5.4
+650	2	2.0
+620	0	0.2
-100	2	2.1
	11	12

Datum Calculation (no scores removed)

+1430 x 2.3 = 3289

+680 x 5.4 = 3672

+650 x 2.0 = 1300

+620 x 0.2 = 124

-100 x 2.1 = -210

Total = 8175

Divide by total Adj Freq (12) = 681.25, rounded to 680.

IMP Calculation

+1430 – 680 = +750

+680 – 680 = 0

+650 – 680 = -30

+620 – 680 = -60

-100 – 680 = -780

IMPS

= +13

= 0

= -1

= -2

= -13

Weighted score

$(0.3 \times 13) + (0.4 \times 0) + (0.2 \times -2) + (0.1 \times -13)$

$3.9 + 0 - 0.4 - 1.3 = 2.2$ rounded to **2**.

Alternative calculation method when software does not support weighted scores

Only Magic Contest and PairsScorer (Jeff Smith) have the facility to cope with weighted scores and both would give the result obtained above.

If using any other scoring program, enter the scores as normal, substituting A= to both pairs to which the weighted ruling applies. This would give the result: -

Score	NS IMPs
+1430	+13
+680	0
+650	-1
-100	-13

Replace the A= award with the score included in the weighting that does not actually occur on the board (ie +620) and note the IMP allocation to this score (NS = 2 IMPs).

Now, re-instate the A= award and calculate the IMP award for the weighted score: -

Component of the weighted score does not occur on the board

The weighted score is now calculated using these IMP allocations -:

$$(0.3 \times 13) + (0.4 \times 0) + (0.2 \times -2) + (0.1 \times -13) \\ = 3.9 + 0 - 0.4 - 1.3 = 2.2 \text{ rounded to } 2.$$

Finally correct the IMPs for these pairs using the adjustments/awards/fines routine. Since average for the board is 0 and has already been assigned, the scorer will add 2 IMPs to NS and deduct 2 from EW.

Pairs – Cross-IMPs**The Correct Way**

The principle illustrated in the matchpoints example is applied here – factor the frequencies then score as you would normally, using these factored frequencies.

Using the same example again: -

The following results are obtained on a board that is played 12 times:-

Score	Freq
+1430	2
+680	5
+650	2
-100	2
	11

The missing score is a weighted assigned score: -

+1430 30%

+680 40%

+620 20% (this score does not actually occur on the board)

-100 10%

The frequencies are first adjusted to take account of the assigned weighting so that the adjusted frequency for +1430, for example, becomes 2.3 and the Cross-IMPs for each score then calculated.

	Adj. Freq
+1430	2.3
+680	5.4
+650	2.0
+620	0.2
-100	2.1

Cross-IMPs Calculation**+1430**

$$(5.4 \times 13) + (2.0 \times 13) + (0.2 \times 13) + (2.1 \times 17) \\ = 70.2 + 26 + 2.6 + 35.7 = +134.5$$

+680

$$(2.3 \times -13) + (2 \times 1) + (0.2 \times 2) + (2.1 \times 13) \\ = -29.9 + 2 + 0.4 + 27.3 = -0.2$$

+650

$$(2.3 \times -13) + (5.4 \times -1) + (0.2 \times 1) + (2.1 \times 13) \\ = -29.9 - 5.4 + 0.2 + 27.3 = -7.8$$

+620

$$(2.3 \times -13) + (5.4 \times -2) + (2 \times -1) + (2.1 \times 12) \\ = -29.9 - 10.8 - 2 + 25.2 = -17.5$$

-100

$$(2.3 \times -17) + (5.4 \times -13) + (2 \times -13) + (0.2 \times -12) \\ = -39.1 - 70.2 - 26 - 2.4 = -137.7$$

Weighted score

$$(0.3 \times 134.5) + (0.4 \times -0.2) + (0.2 \times -17.5) + (0.1 \times -137.7) \\ = 40.35 - 0.08 - 3.5 - 13.77 = 23$$

*Component of the weighted score does not occur on the board***Alternative calculation method when software does not support weighted scores**

Only Magic Contest and PairsScorer (Jeff Smith) have the facility to cope with weighted scores and both would give the result obtained above.

If using any other scoring program, enter the scores as normal, substituting A= (0 Cross-IMPs) to both pairs to which the weighted ruling applies. This would give the result shown below.

Score	Cross-IMPs
+1430	+136.25
+680	+2.18
+650	-5.45
-100	-136.25

Replace the A= award with the score included in the weighting that does not actually occur on the board (ie +620) and note the Crosss-IMP allocation to this score (NS = -14).

Now, re-instate the A= award and calculate the Cross-IMP award for the weighted score: -

The weighted score is now calculated using these allocations and the assigned weightings:-

$$(0.3 \times 136.25) + (0.4 \times 2.18) + (0.2 \times -14) + (0.1 \times -136.25)$$

$$= 40.88 + 0.87 - 2.8 - 13.63 = \mathbf{25.3}$$

Finally correct the scores for these pairs using the adjustments/awards/fines routine. Since average (0) and has already been assigned, add 25.3 to NS and deduct 25.3 from EW.

Frequency Tables

Frequency table: normal traveller

Although frequency tables are not normally used to score events, an understanding of them is needed in order to calculate weighted scores by the correct method

Score	Freq	NS MP	EW MP
+600	1	10	0
+150	1	8	2
-100	2 (e)	5 (f)	5
-200	1 (c)	2 (d)	8
-300	1 (a)	0 (b)	10
	6		

Record the NS scores sorted in descending order along with their frequency.

The total of the frequencies should equal the number of scores on that board.

Like a traveller, the NS awards are calculated first.

Start with the lowest score.

To calculate its MPs, subtract 1 from its frequency, $(a)-1 = (b)$; $1-1 = 0$.

The MPs for the next lower score are then calculated by adding the MPs for the score below it (b) to its frequency (a) and then adding the frequency of the next lower score;

ie $(b) + (a) + (c) = (d)$; $0 + 1 + 1 = 2$. Then, $(d) + (c) + (e) = (f)$ and so on.

EW MPs are obtained by subtracting the NS MPs from TOB.

Frequency table: traveller with an artificial adjusted score

In this example, the score of +150 in the previous example has been replaced with A= / A=.

Score	Freq	Adj. Freq	NS MP	EW MP
AVE	1		5	5
+600	1	1.2	9.8	0.2
-100	2	2.4	6.2	3.8
-200	1	1.2	2.6	7.4
-300	1	1.2	0.2	9.8
	6	6		

Same layout as above except there is an extra column (Adjusted Frequency). Average is calculated as if there were the expected number of scores.

The Adjusted Frequency is the original frequency x expected scores/actual scores ($6/5 = 1.2$). Note that once we put in the adjusted frequencies we take out the frequency for the AVE so that the total frequencies remain at 6. Calculate as normal using

the adjusted frequencies; then the EW awards are obtained by subtracting the NS award from the expected TOB of 10.

Same result is obtained by using the original frequencies to calculate the match points and

then applying the **Neuberg Formula: $MP = [N/n \times (mp+1)] - 1$**

MP = final MP award

N = number of expected scores

n = number of actual scores

mp = initial matchpoint award

For example, for the score of +600, the initial mp award would be 8.

Using Neuberg: $MP = [6/5 \times (8+1)] - 1 = 9.8$.

The commonly used scoring programs, BSP (Andrew Barnes), Magic Contest (Tomas Brenning), Pairs Scorer (Howarth), PairsScorer (Jeff Smith) all employ Neuberg by default whenever there are less than the expected number of scores on a board. In ScoreBridge (Stephen Bligh) it is an option which can (should!) be selected via Club > Preferences > Scoring Preferences.