



# Coherent Book Builder

Every market on the board from one distribution, so no two prices can contradict each other.

Match odds, totals, Asian handicaps, both teams to score, correct score and clean sheets, each a sum over the same scoreline grid, with a margin applied at the end rather than market by market.

SPORT

**Football**

FAMILY

**Match pricing**

LICENCE

**£249**

one-off, perpetual

## RUNNING IN THE PLATFORM

<https://edgewortharena.com/arena/api/match?home=arsenal&away=chelsea&comp=E0>

## Inputs

| NAME              | TYPE        | UNITS                    | WHERE IT COMES FROM                                            |
|-------------------|-------------|--------------------------|----------------------------------------------------------------|
| score_matrix      | n x n array | probability              | the Match Price Engine, or any scoreline model you already own |
| margin (optional) | float       | fraction                 | your book's overround target                                   |
| lines (optional)  | list        | goals or goal difference | the handicap and total lines you quote                         |

## Outputs

| NAME          | TYPE                                         | UNITS                     | NOTES                                                                       |
|---------------|----------------------------------------------|---------------------------|-----------------------------------------------------------------------------|
| markets       | dict of market -> probability and fair price | probability, decimal odds |                                                                             |
| quoted        | dict of market -> price with the margin on   | decimal odds              |                                                                             |
| skellam_check | float                                        | probability               | the largest disagreement between the grid and the exact goal-difference law |

## Method

- 1 Sum the cells that satisfy each market's condition:  $x > y$  for the home win,  $x + y \geq 3$  for over 2.5,  $x - y > 1$  for a one-goal handicap, and so on.

### THIS IS THE SAMPLE

The method runs to 4 steps; one is shown. The assumptions, the limits, the module layout and the reference implementation come with the licence. Everything on the page below this -- what the model was measured at -- is the same in both versions, because that is the part you should not have to take on trust.



## What it was measured at

Computed now, from the same grid the Arena prices with.

| MEASURE                            | RESULT   | READING                                                           |
|------------------------------------|----------|-------------------------------------------------------------------|
| Markets from one grid              | 11       | match odds, totals, handicaps, both teams to score, correct score |
| Grid against the exact Skellam law | 1.2e-02  | largest disagreement over the goal difference                     |
| Sum of the whole grid              | 1.000000 | after truncation at ten goals a side                              |
| Over 2.5 at these rates            | 50.6%    | one sum among many                                                |

## Assumptions

What has to be true for the numbers to mean what they say.

- The scoreline grid is the whole truth about the match: everything quoted is a function of it.

## Limits

Where it is known to be wrong. Published because a model without stated limits is one nobody has pushed on.

- Markets that are not functions of the final score, such as cards or corners, are outside it.

### LICENCE

Issued to Evaluation copy. One perpetual licence to use and modify this model inside your own organisation. Redistribution of the specification or the reference implementation is not included. No warranty is given: the validation above is the whole of the claim being made.