Hypotheses and measures

Hypotheses

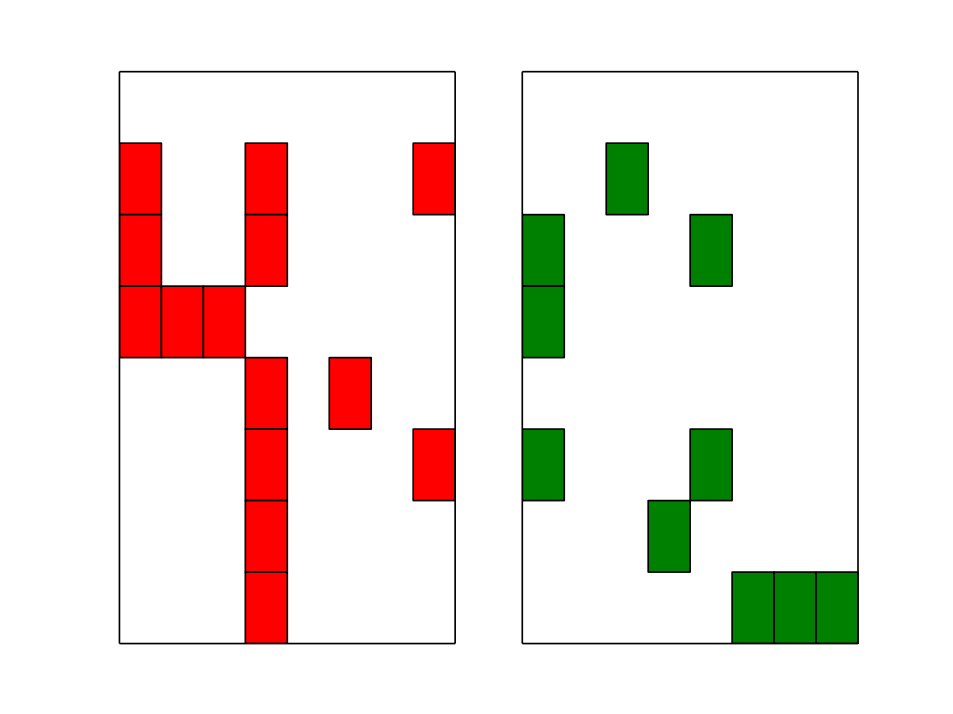
1. Most ($>$60%) dyads will successfully divide the grid.
2. Behavioral data will be explained by a simple heuristics.
3. Social background (e.g., sex, age, geographical location, political party, etc.) is NOT correlated with successful division of labor.

Measures

We will measure the division of labor using the following measures:

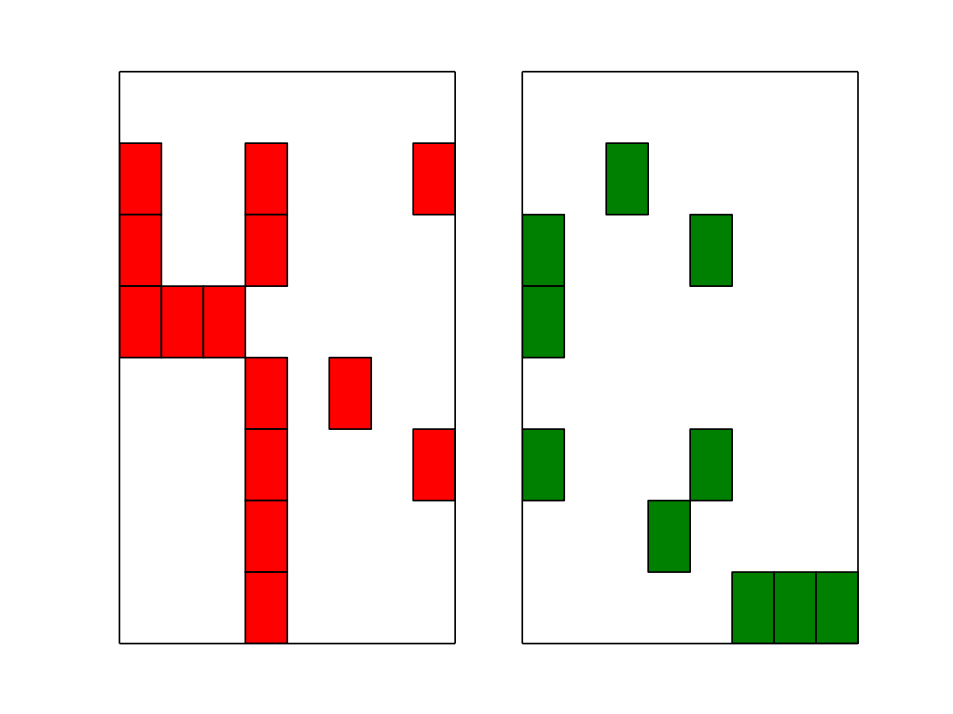
1. Distance between paths
2. Complementary distance
3. Normalized score
4. Fairness

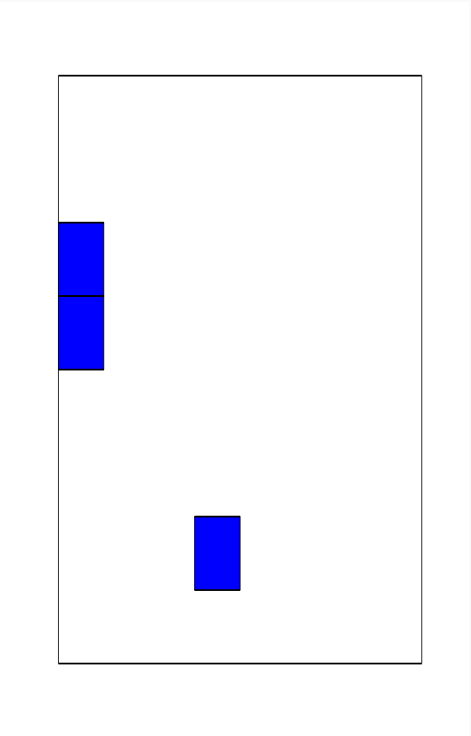
Measures — Distance between paths



Size Path Player 1 (Red) = 14 Size Path Player 2 (Green) = 10

Measures — Distance between paths

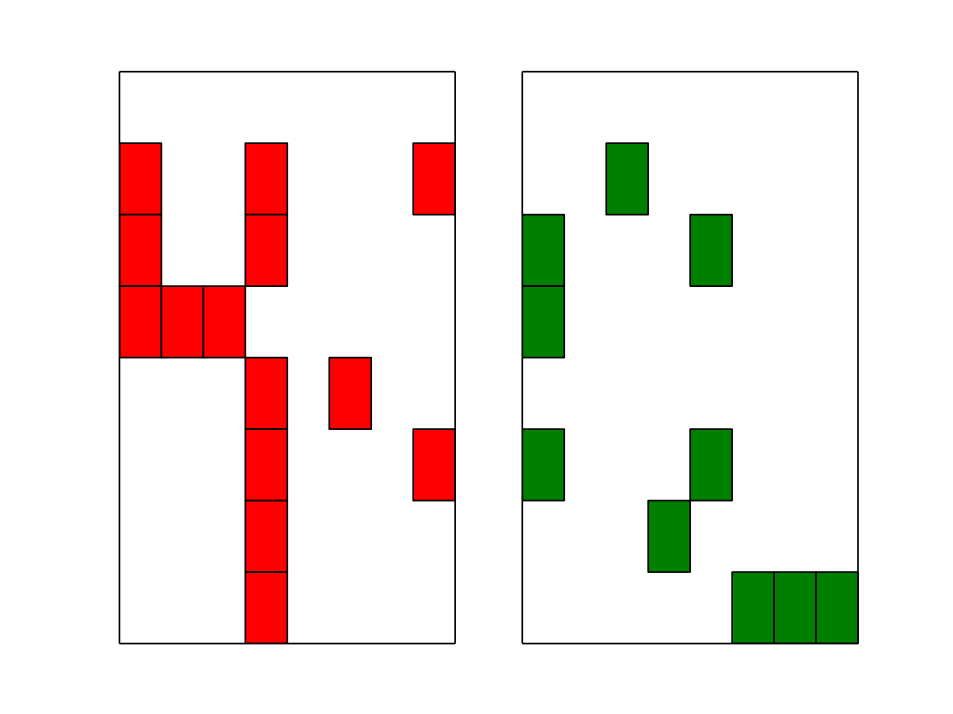


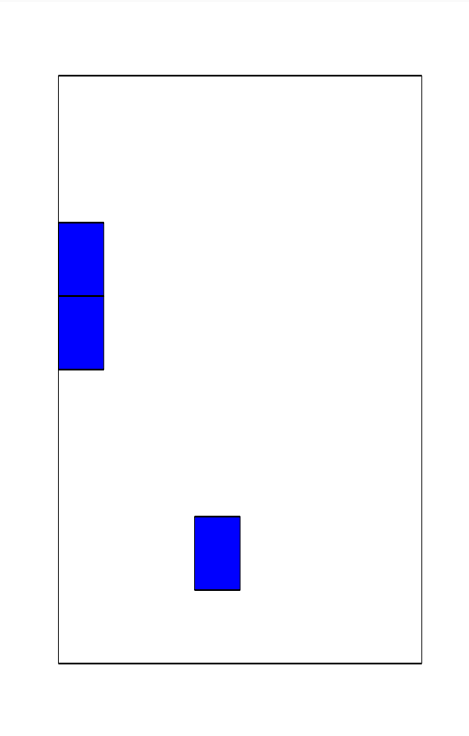


Size union = 21

Size intersection (Blue) = 3

Measures — Distance between paths

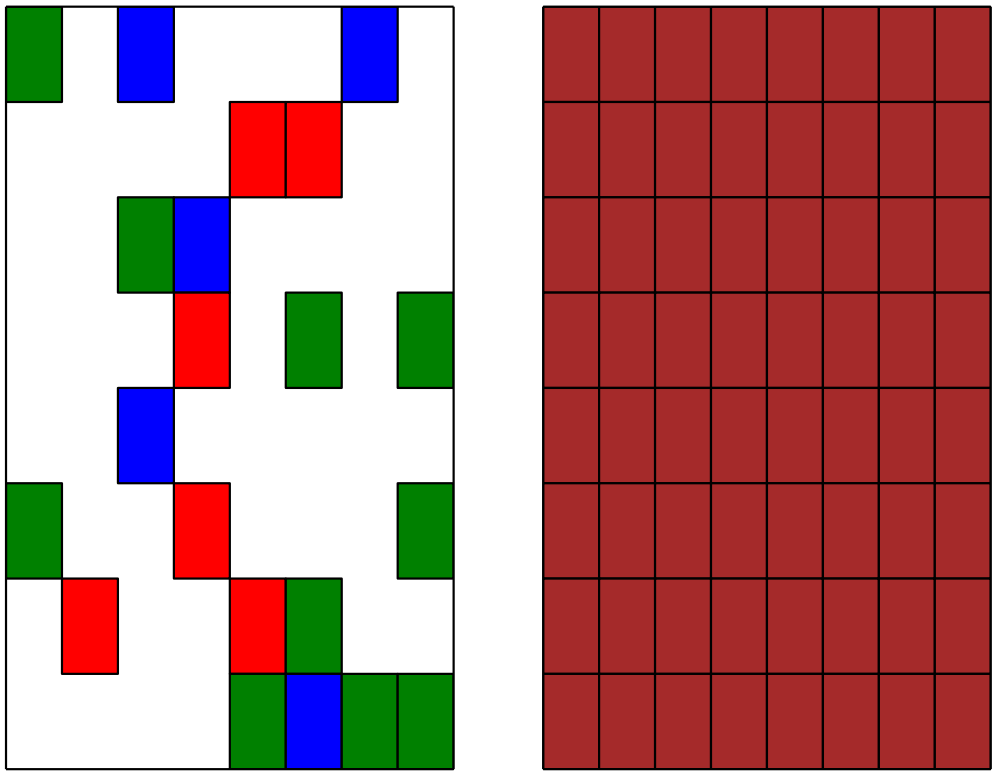




$$\text{Distance between paths} = 1 - \frac{\text{Size intersection}}{\text{size union}} = 1 - \frac{3}{21} = 0.86$$

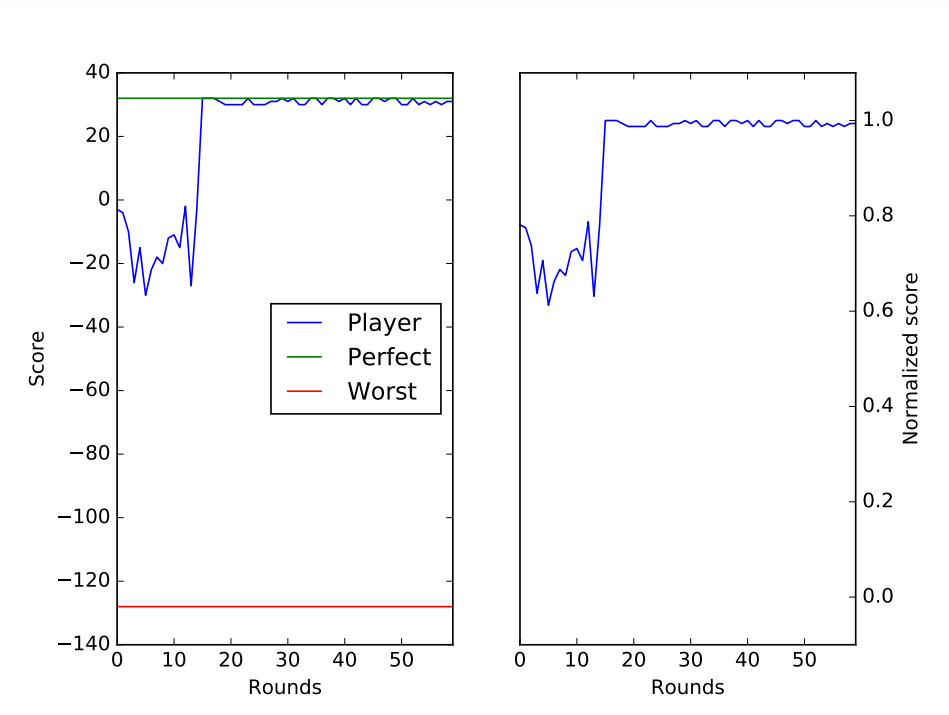
Measures — Complementary distance

Complementary distance is defined as 1 minus the distance between the union of both palyers' paths and the entire grid.



Measures — Normalized Score

We measure how close the accumulated score of a player is to the perfect score.



$$\textsc{Norm\_Score} = \frac{(\textsc{Score} - \textsc{Min\_Score})}{(\textsc{Max\_Score} - \textsc{Min\_Score})}$$

Measures — Fairness

We measure how even is the division of tiles among players.

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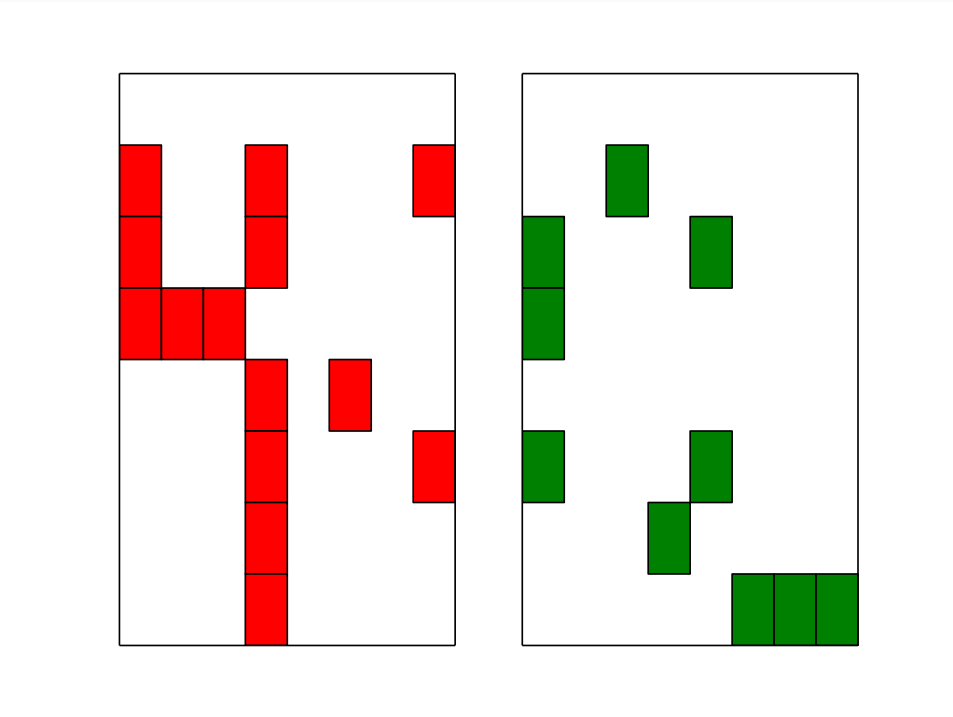

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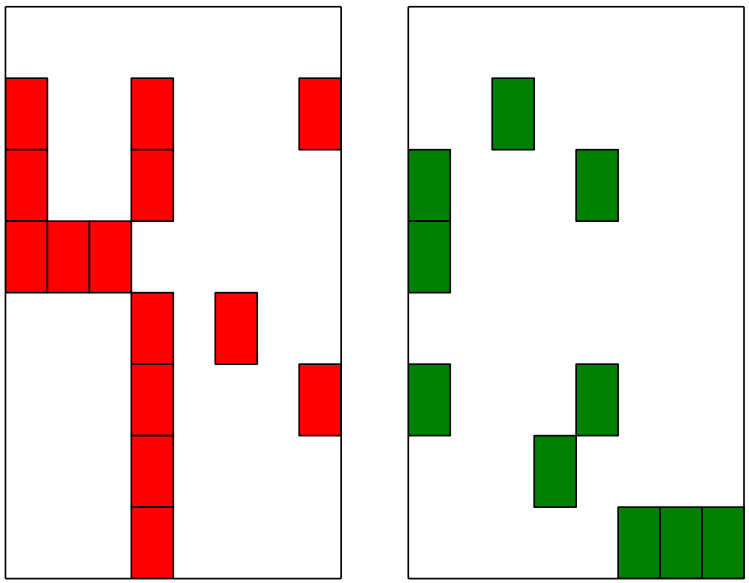

Size Path Player 1 (Red) = 14 Size Path Player 2 (Green) = 10

Measures — Fairness

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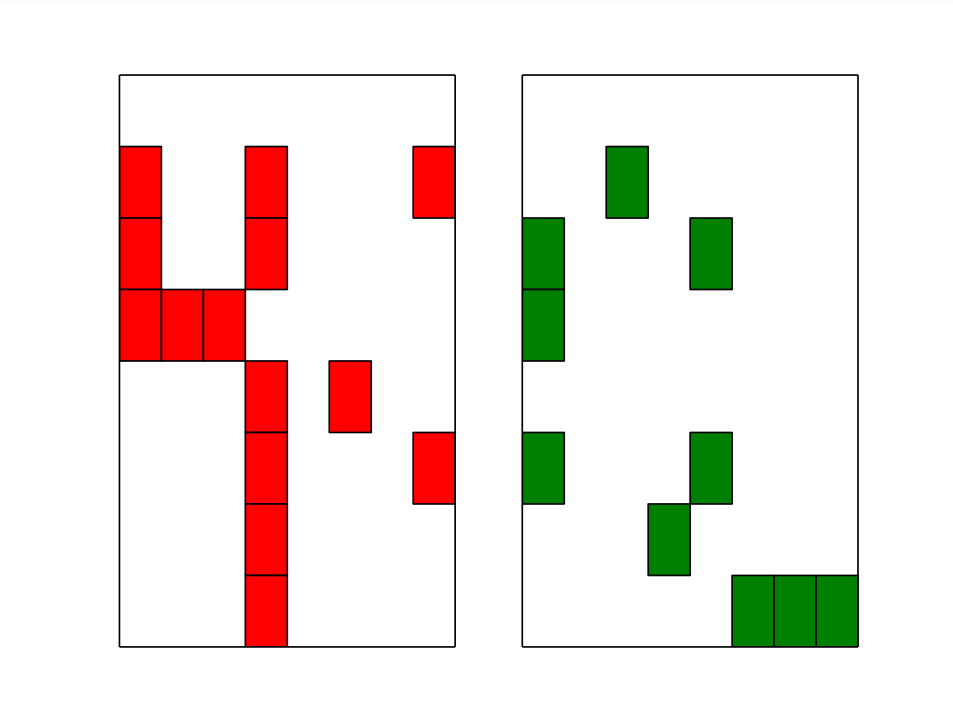
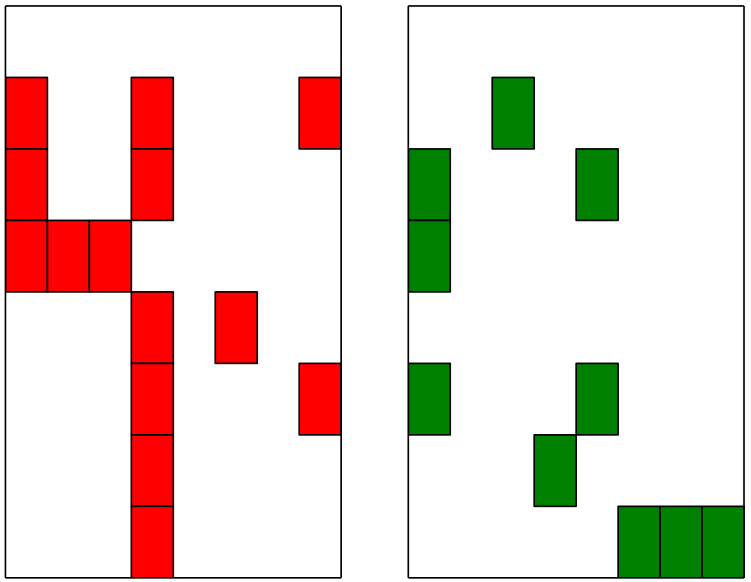


Size Path Player 1 (Red) = 14 Size Path Player 2 (Green) = 10

Difference in number of tiles between paths = 4

Measures — Fairness

We measure how even is the division of tiles among players.



$$\textsc{Fairness} = 1 - \frac{4}{64}$$

Measures — Fairness

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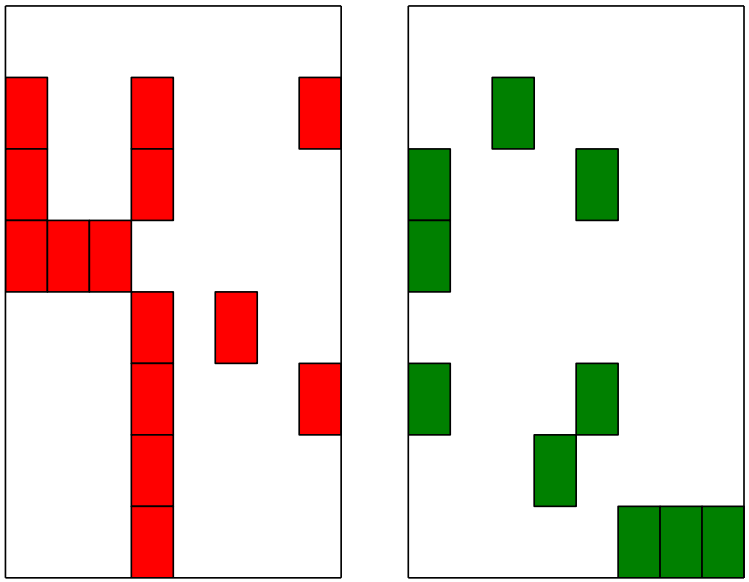

$$\textsc{Fairness} = 1 - \frac{\text{Difference in number of tiles between paths}}{\textsc{Num\_Tiles}}$$

DLIndex and DLIndex1

- $\overrightarrow{x_1}$: Distances between paths.
- $\overrightarrow{x_2}$: Complementary distance.
- $\overrightarrow{x_3}$: Normalized score.

$$DLIndex = mean(x_1, x_2, x_3)$$

$$DLIndex1 = x_1 - x_2$$