

- Relational Transformation Formula for Formation Conversion

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This formula provides a rule-based approach to convert 11-a-side football formations to 7-a-side, prioritizing the preservation and adaptation of tactical roles and relationships.

1. Define 11-a-side Roles and Relationships (Input):

Represent your 11-a-side formation as a set of roles (R_{11}) and understand their key partnerships/units.

Example Roles (for a 4-4-2):

- $R_{11} = \{CD_R, CD_L, FB_R, FB_L, CM_C, CM_D, WM_R, WM_L, ST_F, ST_T\}$
 - CD_R : Right Center-Back
 - CD_L : Left Center-Back
 - FB_R : Right Full-Back
 - FB_L : Left Full-Back
 - CM_C : Central Midfielder (Creator/Box-to-box)
 - CM_D : Defensive Midfielder
 - WM_R : Right Wide Midfielder
 - WM_L : Left Wide Midfielder
 - ST_F : Forward Striker
 - ST_T : Target Striker

2. Prioritized Role Retention and Transformation Rules (Ordered Rules):

Apply these rules in order to derive the 7-a-side roles (R_7).

- Rule 1: Preserve Central Defensive Core:**

$R_{7_CD} = \text{SELECT}(2, \text{from } \{CD_R, CD_L, FB_R, FB_L\}, \text{prioritize CD roles})$

- **Explanation:** Select 2 central defenders for 7-a-side. Prioritize original Center-Back roles (CD_{R} , CD_{L}).

- **Rule 2: Maintain Central Midfield Control:**

$R_{7_CM} = \text{SELECT}(2, \text{from } \{CM_C, CM_D, WM_R, WM_L, \text{Remaining_FB/WB from Rule 1}\}, \text{prioritize CM roles})$

- **Explanation:** Select 2 central midfielders for 7-a-side. Prioritize original Central Midfielders (CM_C , CM_D). Then consider Wide Midfielders or remaining Full-backs adaptable to central midfield.

- **Rule 3: Create an Attacking Focus (Central or Dual):**

$R_{7_ST} = \text{SELECT}(1, \text{from } \{ST_F, ST_T, WM_R, WM_L, \text{Remaining_FB/WB/WM from Rules 1 \& 2}\}, \text{prioritize ST roles})$

- **Explanation:** Select 1 attacker. Prioritize original Striker roles (ST_F , ST_T). Then consider Wide Midfielders or remaining roles that can be attacking.

- **Rule 4: Adapt Remaining Roles for Width and Balance (Flexibility):**

$R_{7_Flex} = \text{SELECT}(\text{remaining roles from } R_{11} - (R_{7_CD} \cup R_{7_CM} \cup R_{7_ST}), \text{prioritize versatile roles for width/balance})$

- **Explanation:** Select remaining roles (if any) for flexibility. Prioritize roles that can provide width, support defense or attack, based on versatility.

3. Construct 7-a-side Formation (Output):

Based on the selected roles in R_{7_CD} , R_{7_CM} , R_{7_ST} , R_{7_Flex} , determine the 7-a-side formation count (e.g., 2 Defenders - 2 Midfielders - 1 Attacker + 1 Flexible = 2-3-1 or 2-2-2 depending on flexible role positioning).

Important Notes:

- The $\text{SELECT}(N, \text{from set, prioritize roles})$ function implies choosing N roles from the given set based on the prioritization criteria. In a program, this could be implemented with conditional logic and role type checking.

- This formula is a guideline. Tactical adjustments based on specific player attributes and game context are always necessary.