From 1 to *n*
Multiplayer Game Design

Raph Koster

Core concepts

Symmetry

How similar are the games played?

Teams

How many actors to a side?

Resource pools

How are in-game assets split?

Agency

How are verbs divided across actors?

Trust

What is the emotional intimacy between actors?

From 1…

What is a one player game?

Defining a “single player game”

A game that is not played

in opposition to

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Defining a “single player game”

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(In other words, hardly anything.)

Defining a “single player game”

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in opposition to,
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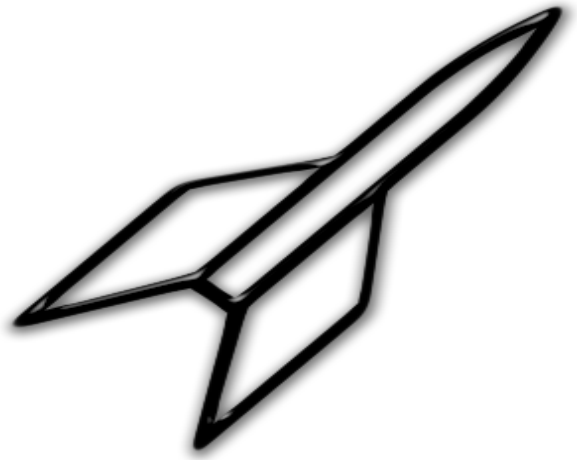
A hypothetical arcade game

- The player is playing *nested games* of…
  1. Steering the ship
  2. Hitting the asteroids with lasers
  3. Dodging asteroids and bullets and UFOs
  4. Getting advice from her friend over the shoulder
  5. Getting as high a score as she can
  6. To brag to her friend that she beat him
  7. And competing against everyone who has played this particular arcade machine
- This *nesting* quality will be important…



Symmetry in parallel

Leaderboards

#1		29846
#2		24334
#3		18624
#4		10935

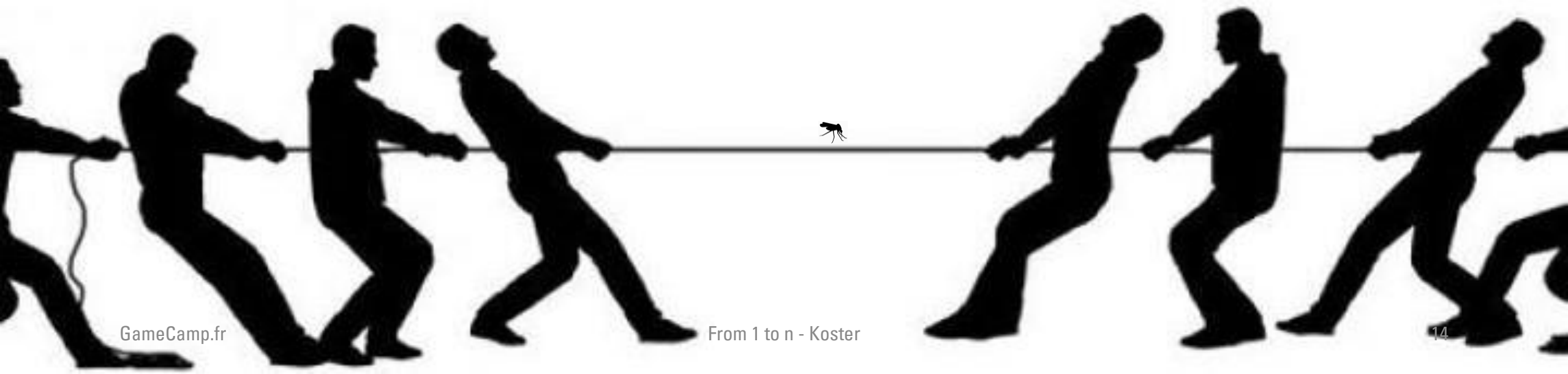
Symmetric opposition

- This adds the notion of a **victory point** of some sort; territory, whatever.
  - Victory points are a term from tabletop games.
  - They can be hard to see in videogames because we do not approach the design problem this way.
  - In *Super Mario*, level completion is a victory point.
  - In Othello/reversi, every square's color is a victory point.

- Different competitive structures can share or not share the victory point pool.

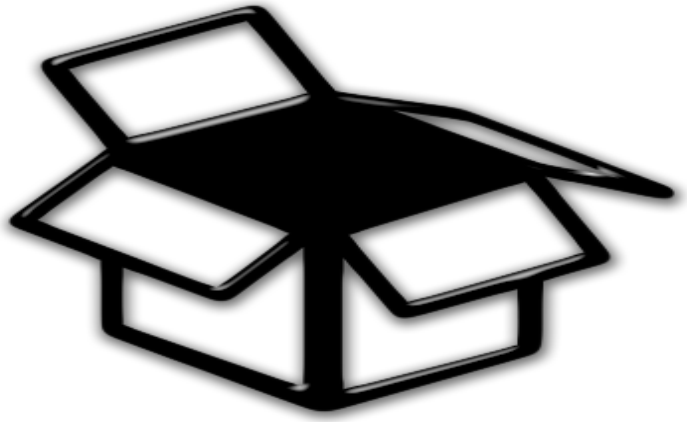
Tug of war

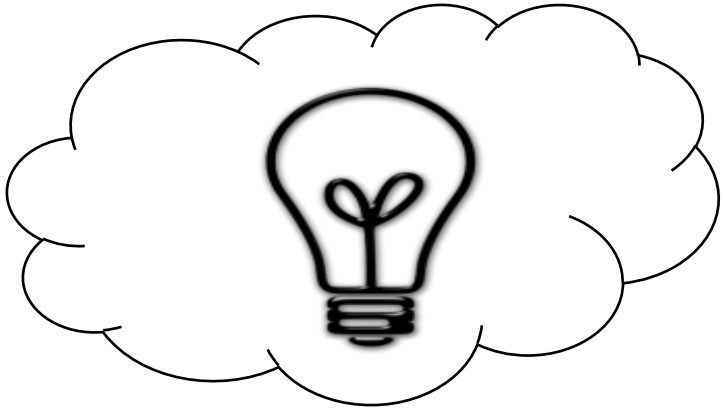
- A single resource value sits between two competitors.
- It is always split; when one gains, the other loses.



Rival and non-rival goods

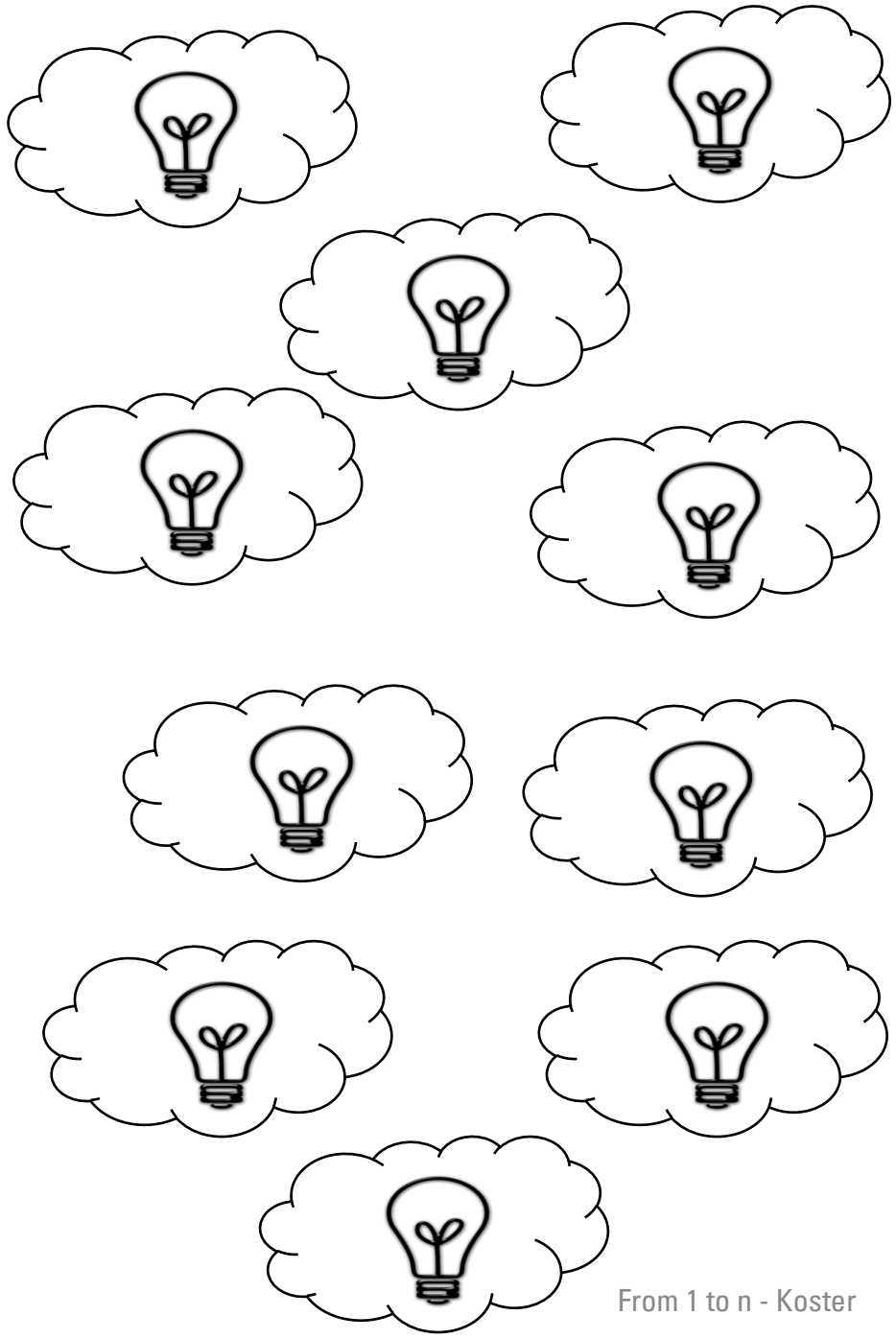
- A rival good is something that cannot be used by someone else at the same time.

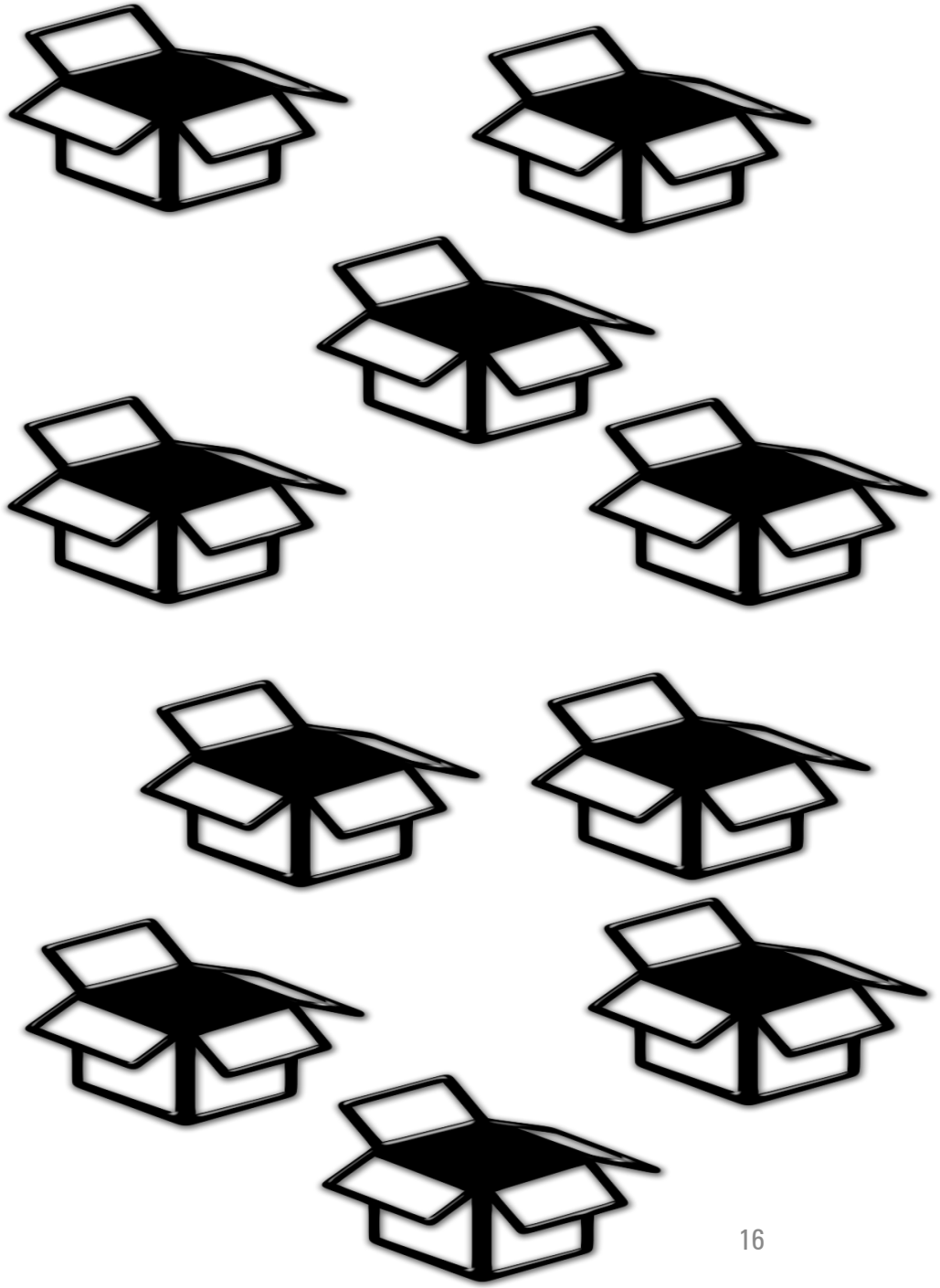




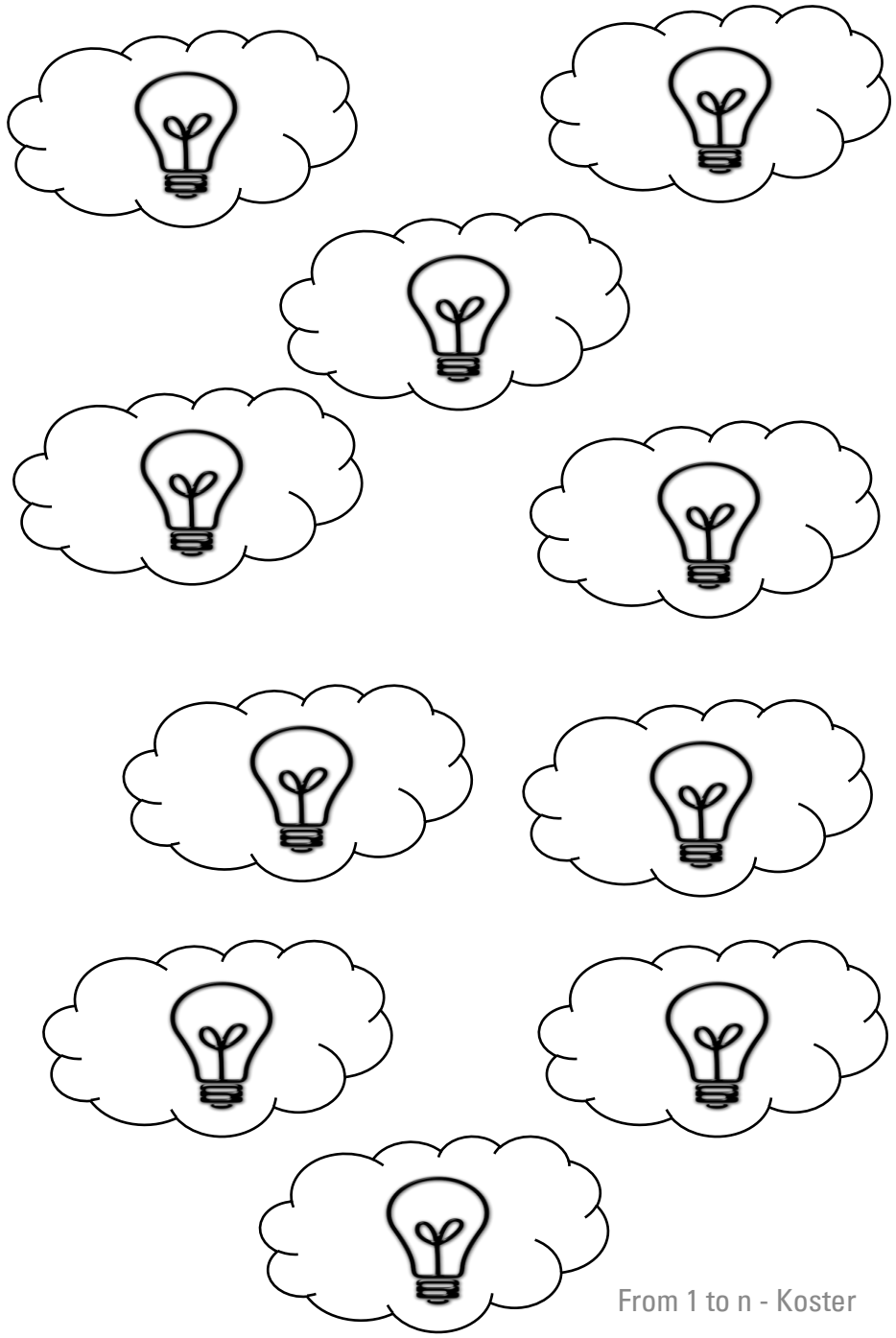
- A non-rival good is stuff like information, or the public park.

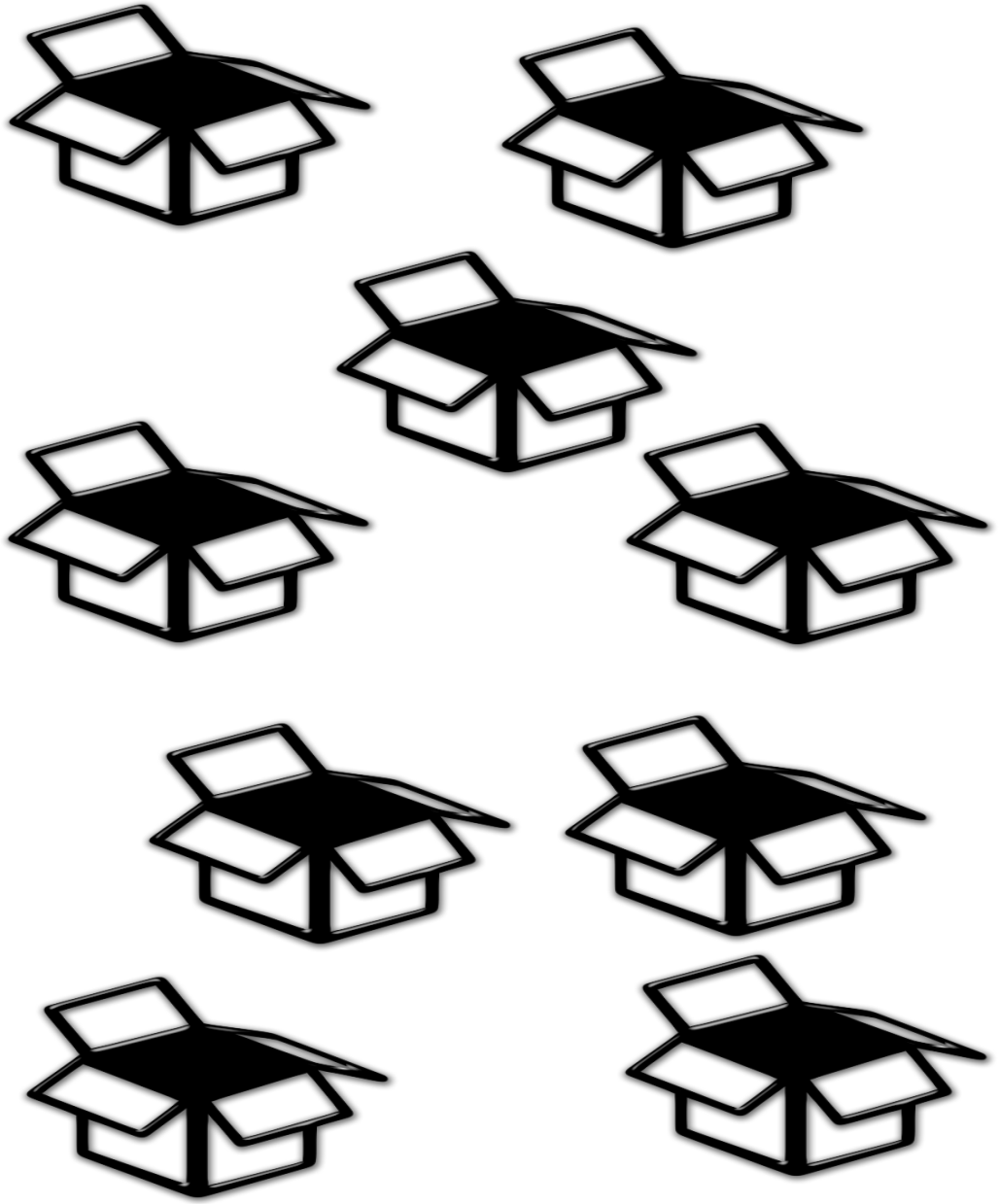
Non-zero sum and zero sum





Non-zero sum and zero sum





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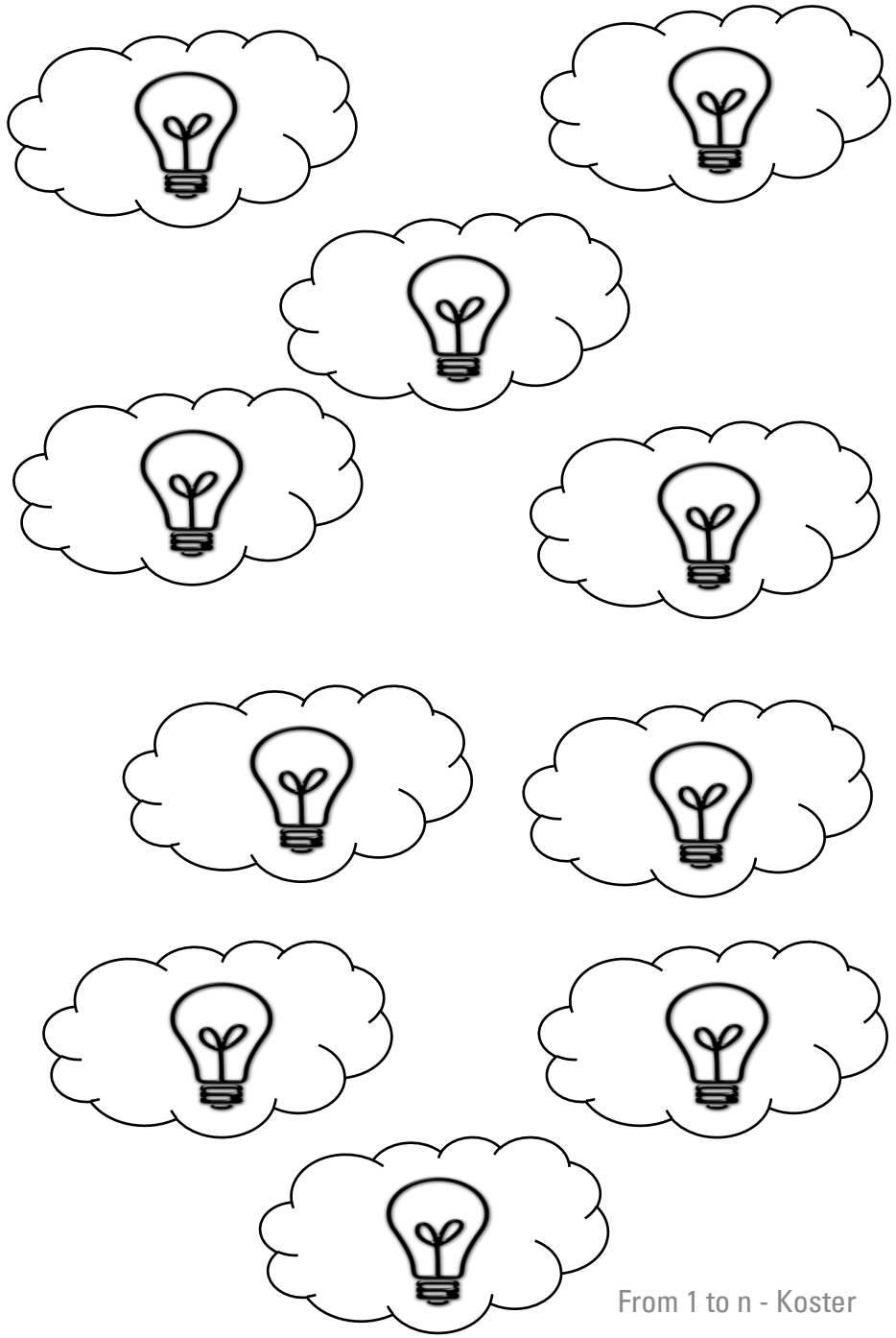

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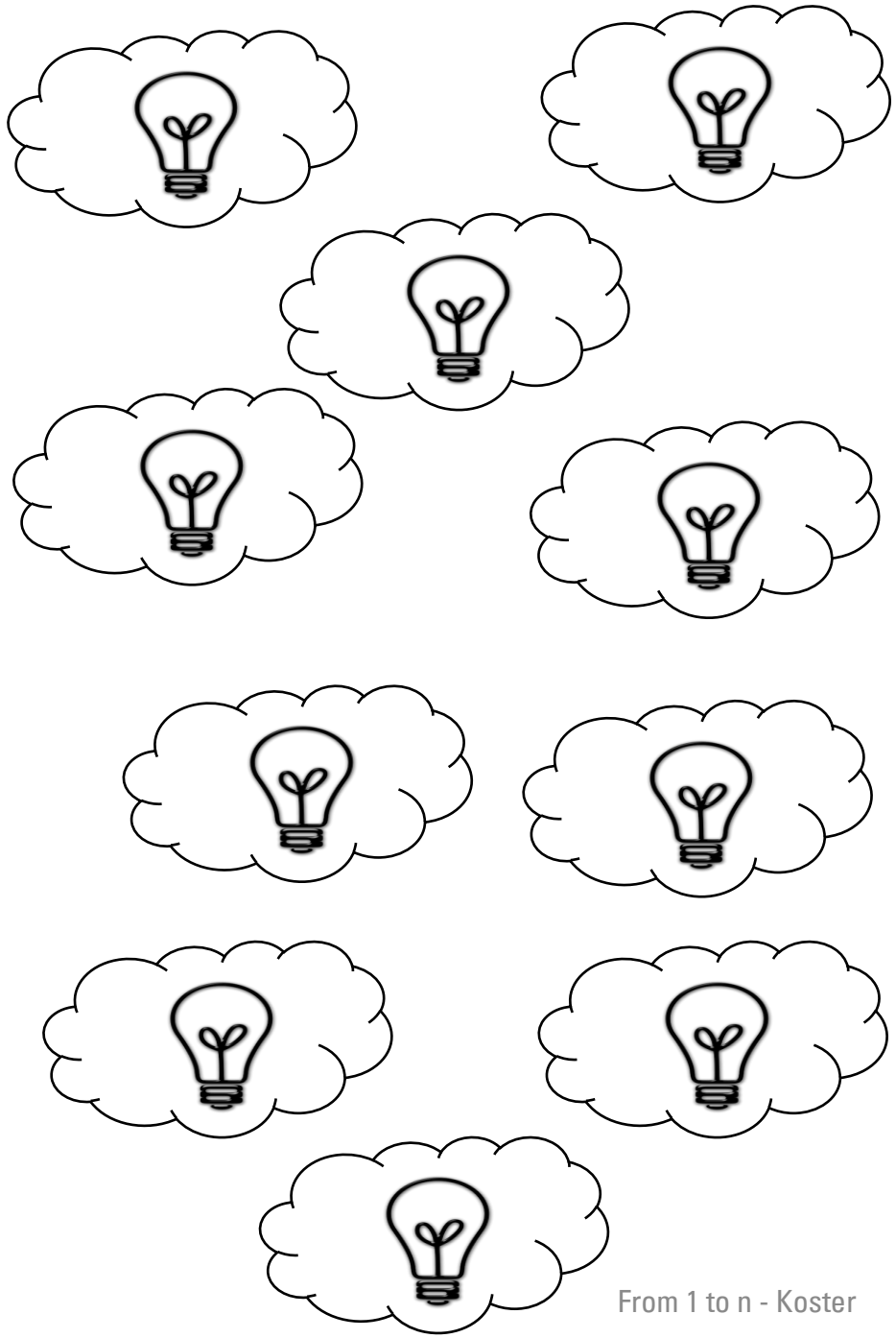

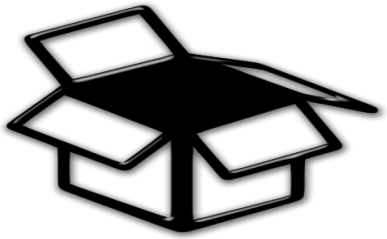

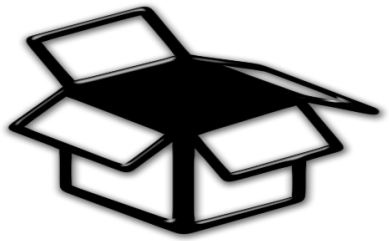

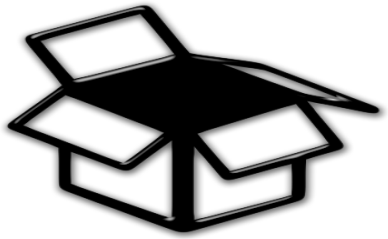

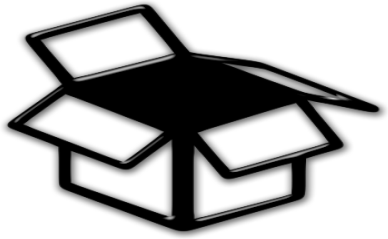

Possession
Goals
The match
Brackets
Tiebreakers

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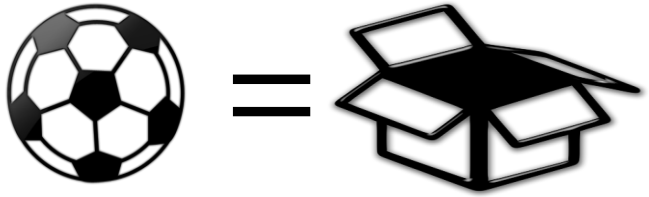

Football

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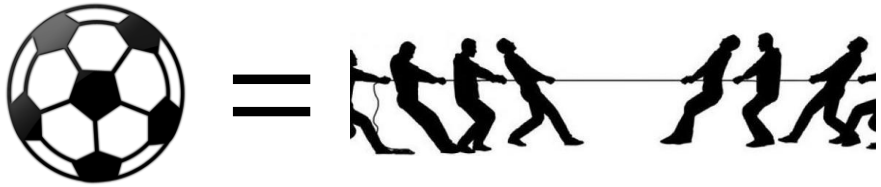

Football

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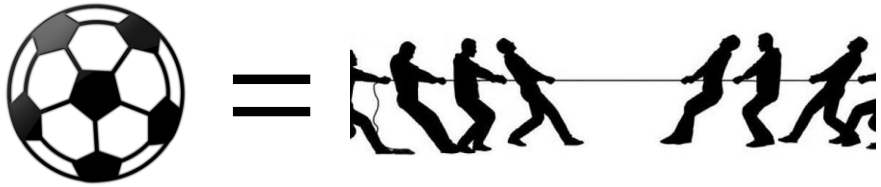

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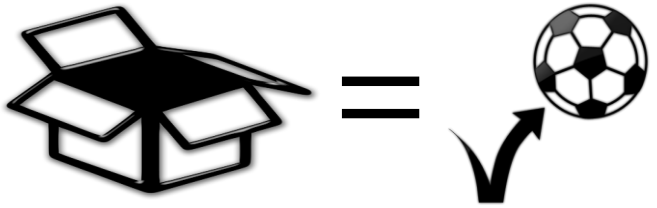

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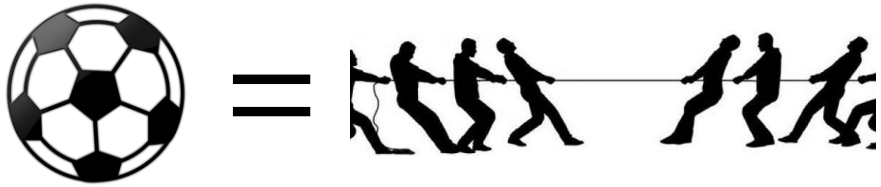

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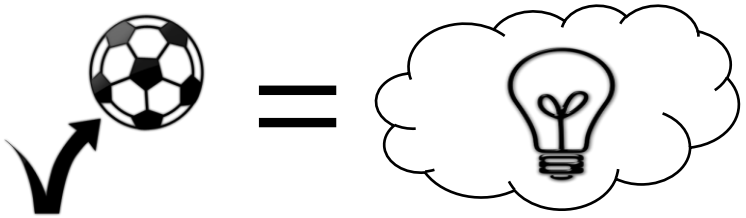

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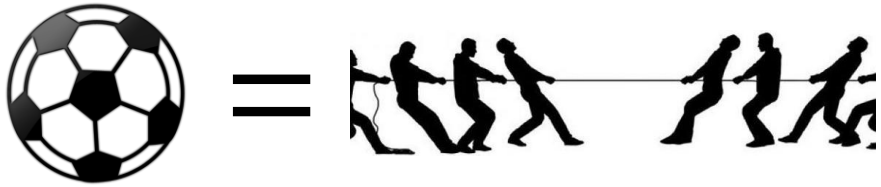
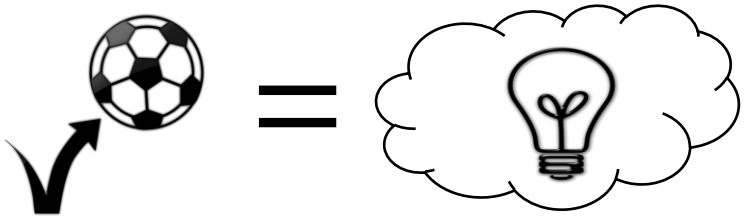
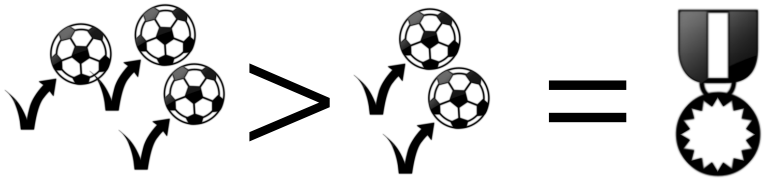
Football

Possession 

Goals 

The match 

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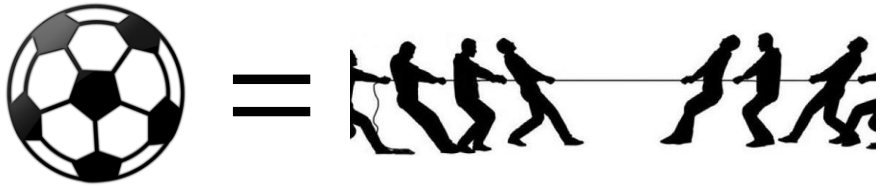

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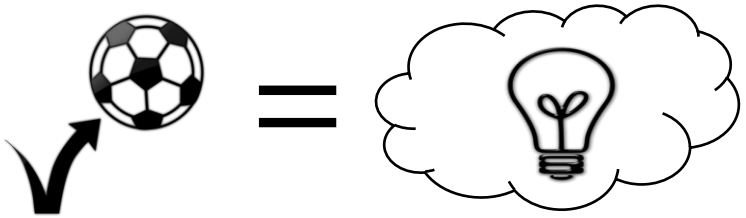

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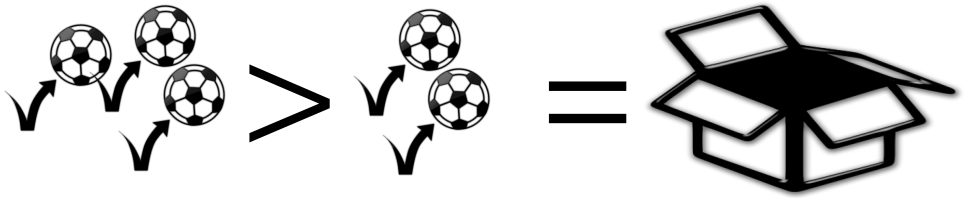

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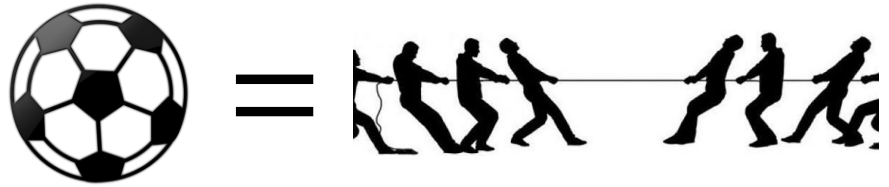

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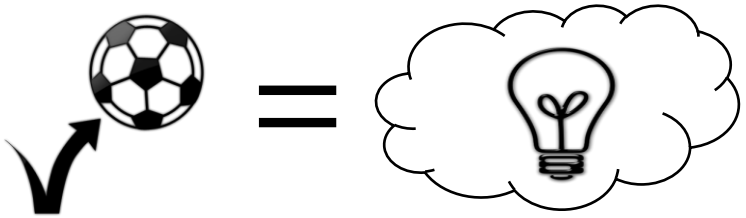

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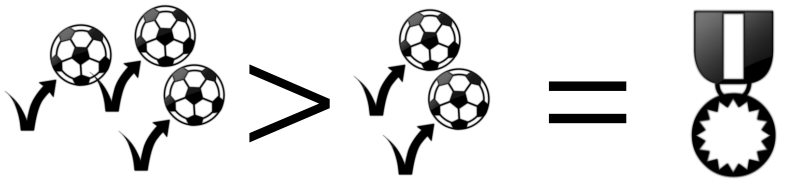

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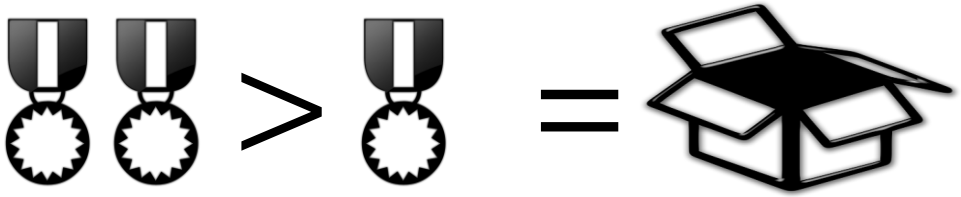

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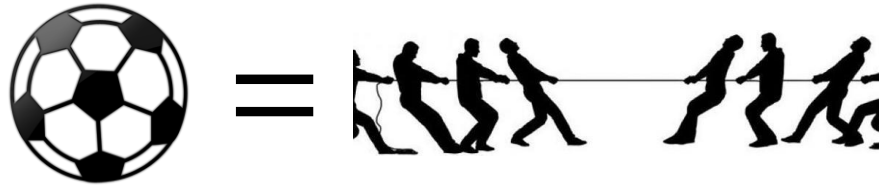
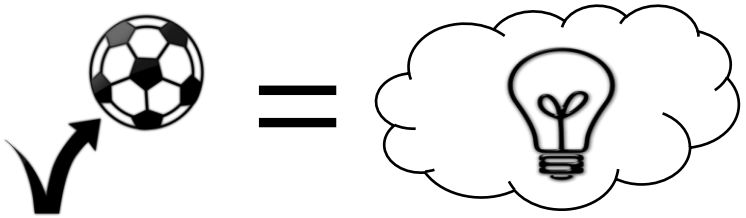
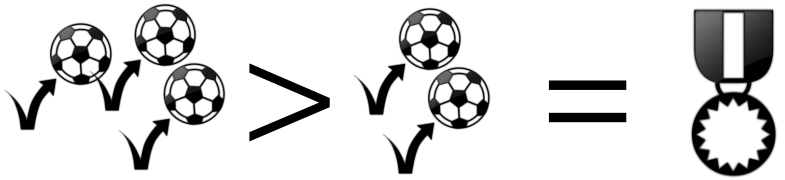
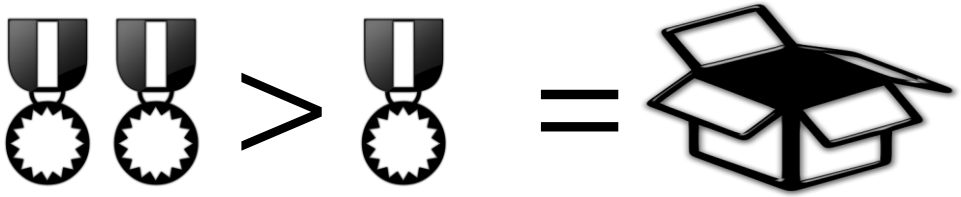
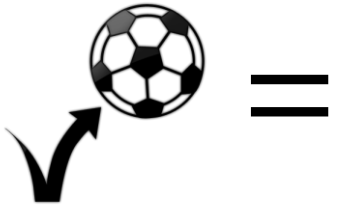
Football

Possession 

Goals 

The match 

Brackets 

Tiebreakers 

Football

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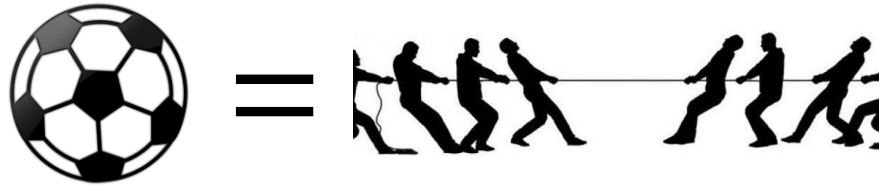

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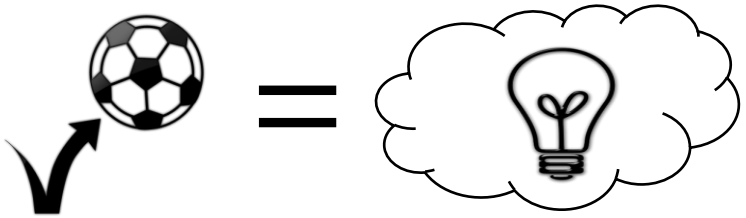

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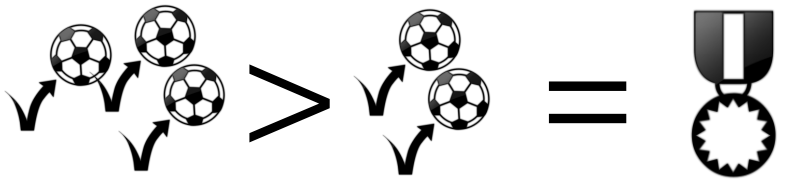

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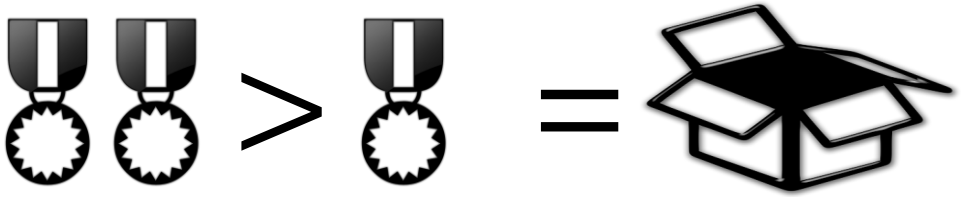

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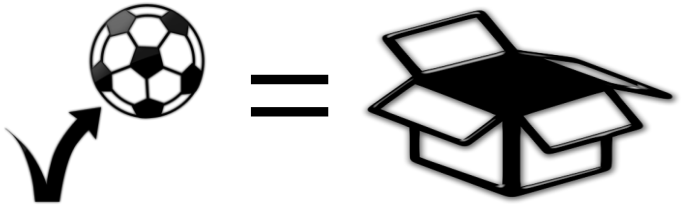
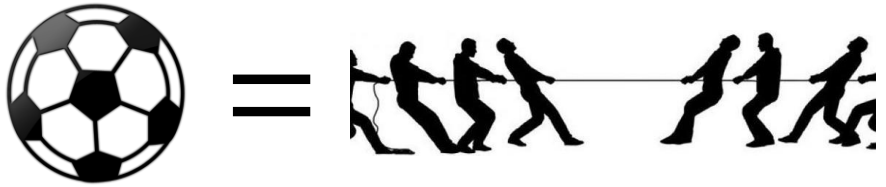


Football

Possession



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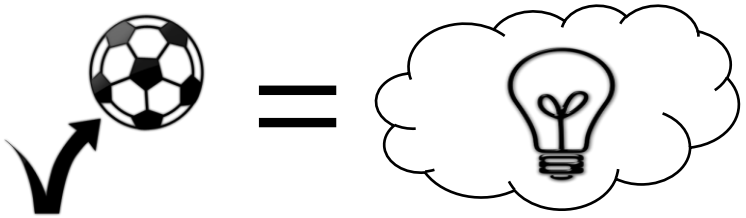

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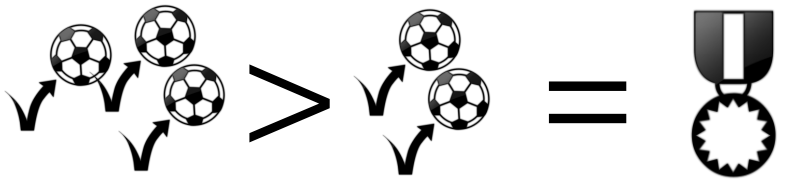

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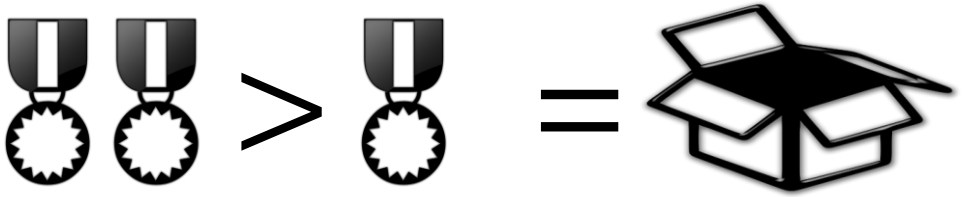
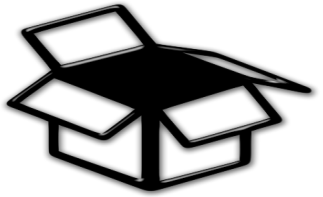
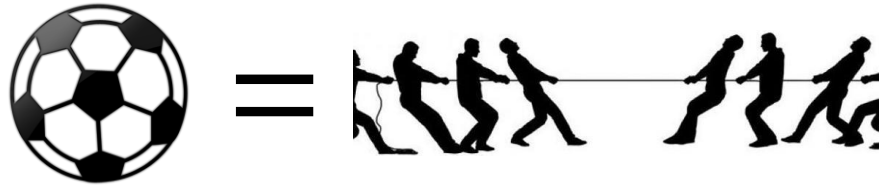


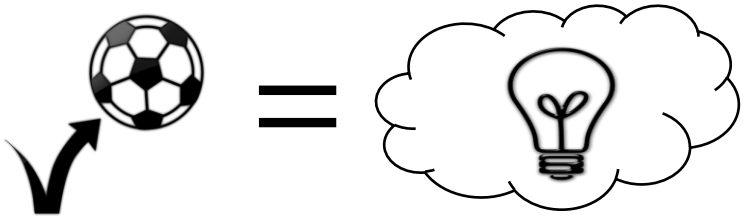
Tiebreakers

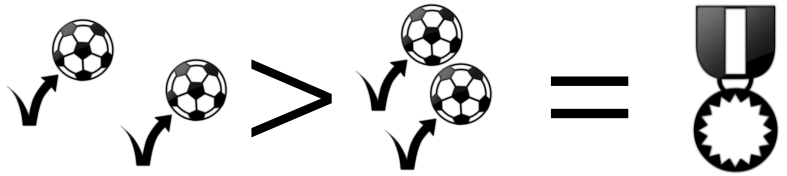
#1	12
#2	9
#3	8
#4	3

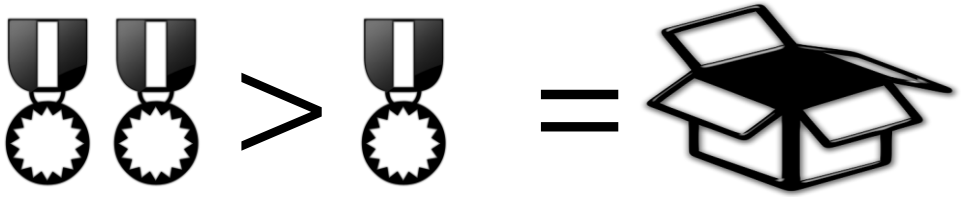


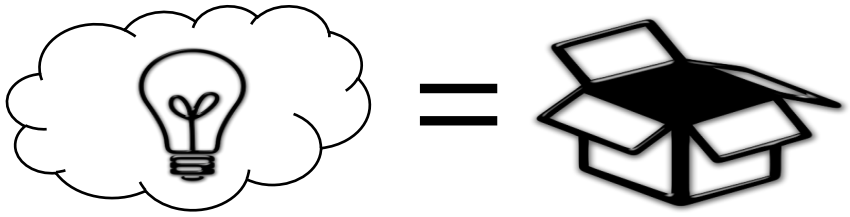
Football

Possession 

Goals 

The match 

Brackets 

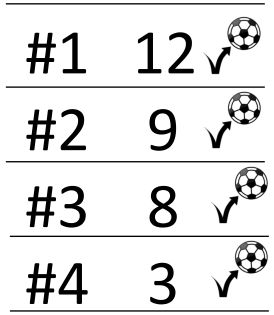
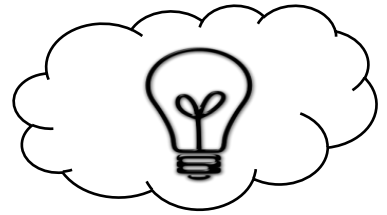
Tiebreakers 

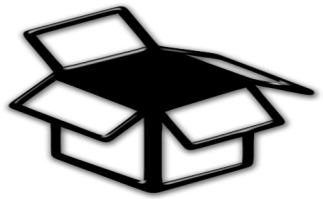
Tournaments

- Tournaments are an example of converting zero-sum and non-zero sum back and forth in order to make simple opposition scale.

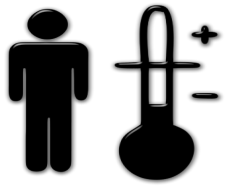
Auctions

Auctions are another way to do this.

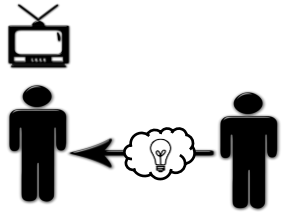
Bid =  = 

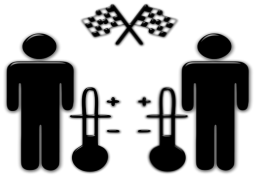
Victory = 

More 1-v-1 patterns

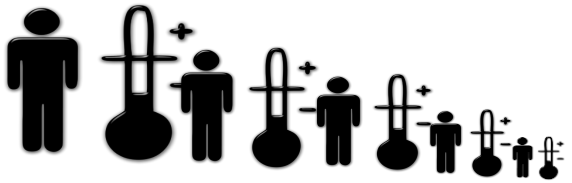


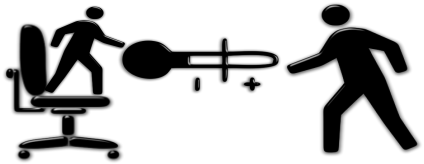
The true solitaire

Helping 



Races

Leaderboards 



Handicapping

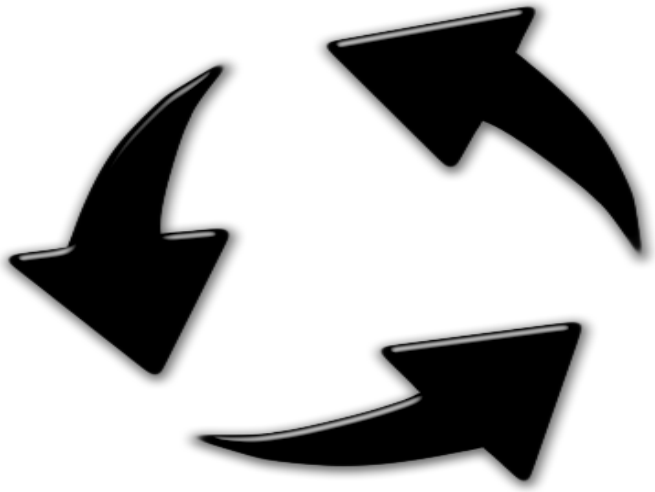
Imperfect information 

…to *n*

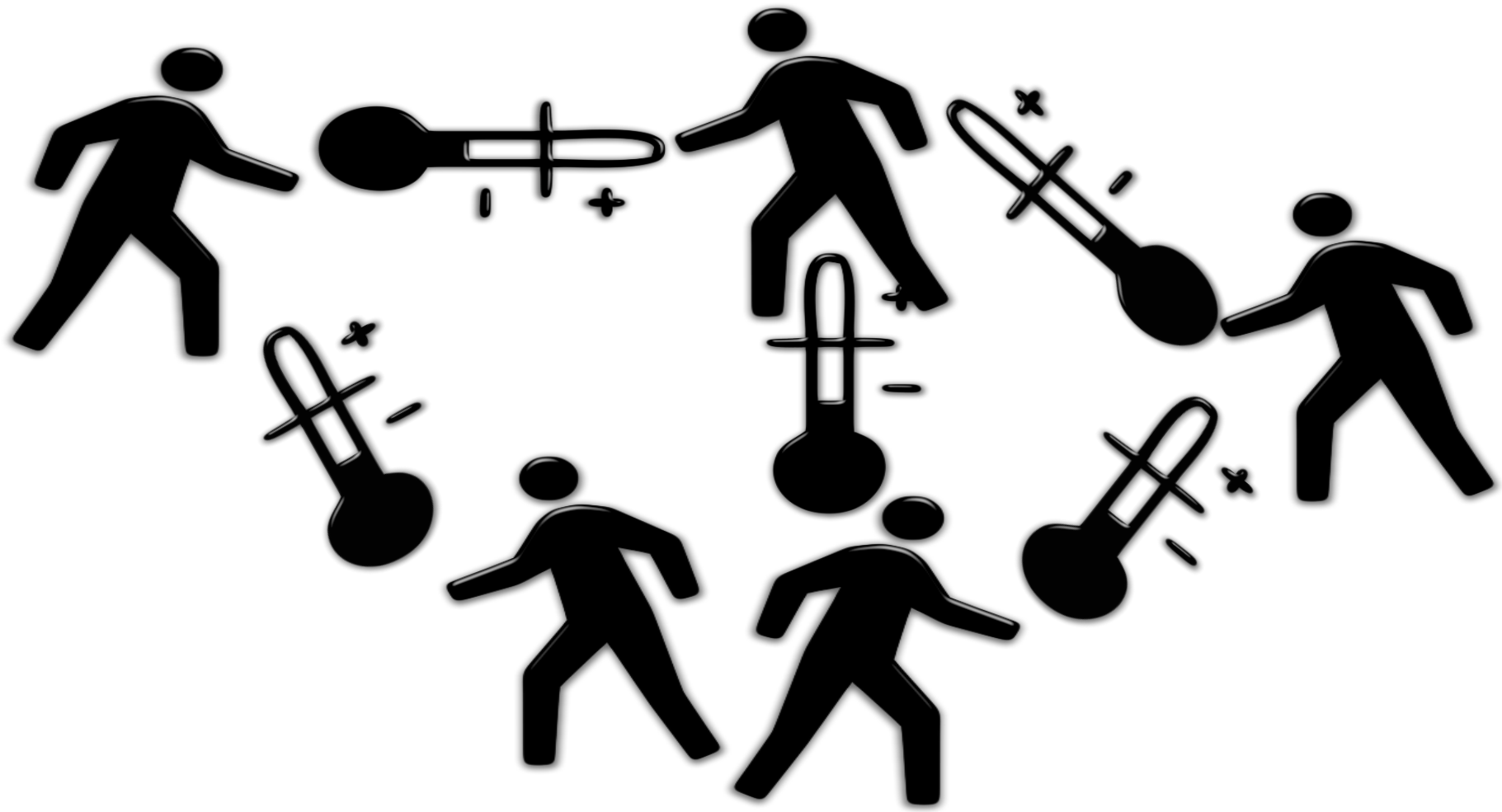
Group dynamics

Everyone is alone

1 v 1 v . . .

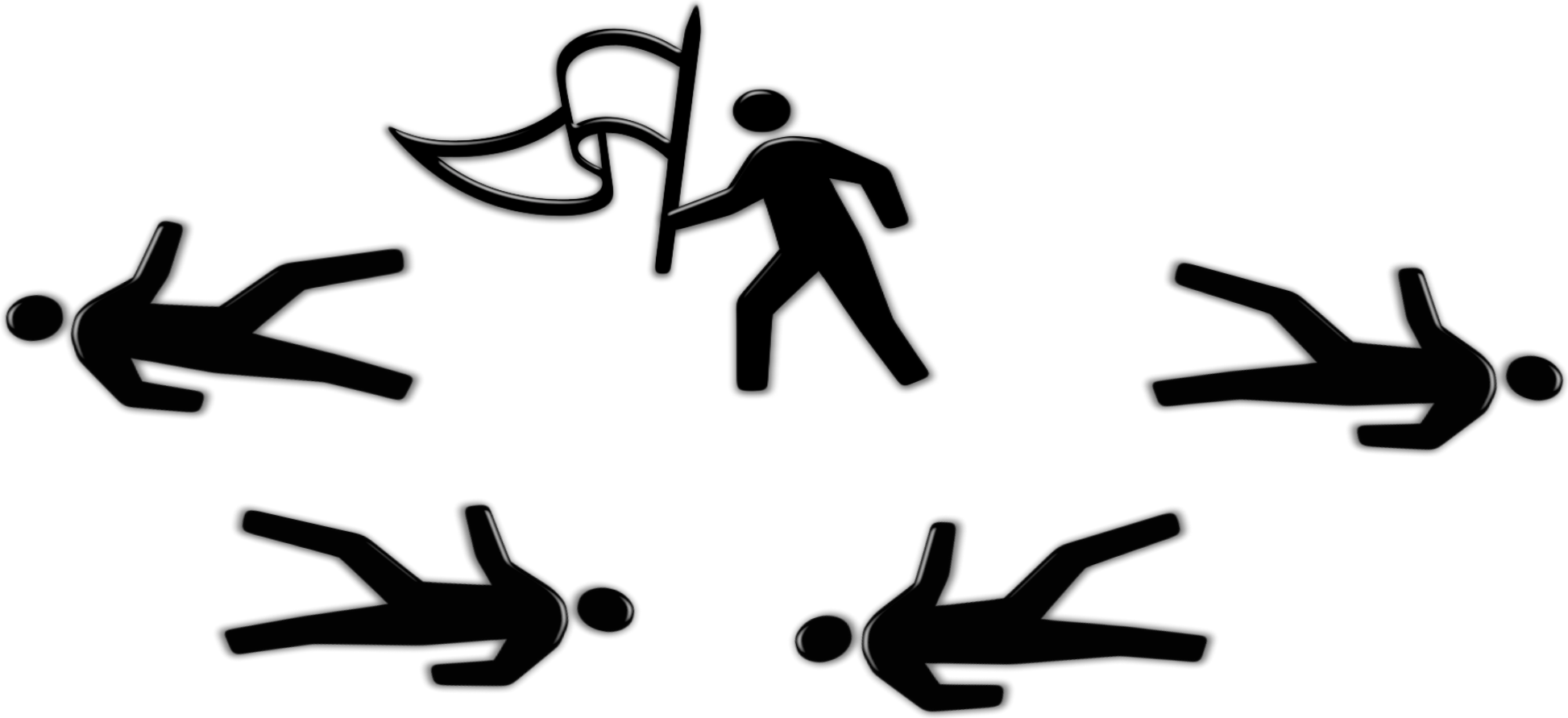


Many tugs of war



Last man standing

- Battle Royale, but also deathmatch of all sorts.



Teams

Instead of 1 v 1 (. . . v 1) we get

$$n \text{ v } n$$

Roles vs classes

Roles

- “Ways to play the game.”
- Based on strategy and responsibilities.
- Can generally switch at any time.

Classes

- “Who you are.”
- Based on what verbs you have access to. A fixed basket of abilities.
- Generally locked in place.

Roles versus classes in football

Roles

- Goalkeeper
- Center-back
- Sweeper
- Full-back
- Wing-back
- Center midfield
- Defensive midfield
- Attacking midfield
- Wide midfield
- Center forward
- Striker
- Winger

Classes

- Player.
- Goalkeeper.

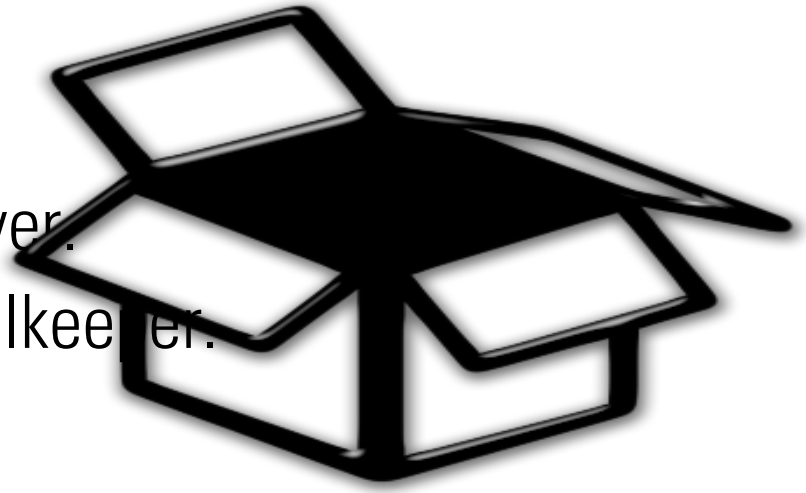
Roles versus classes in football

Roles

- Goalkeeper
- Ce… ba…
- …
- …
- Wi…
- Center midfield

- …ive
- …ard
- Striker
- Winger

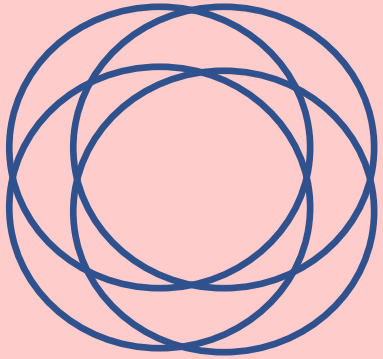
Classes

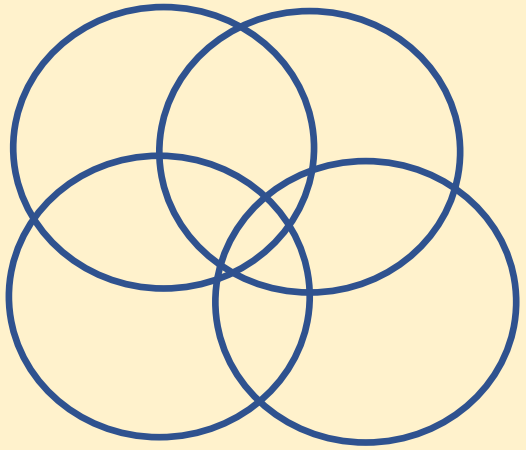


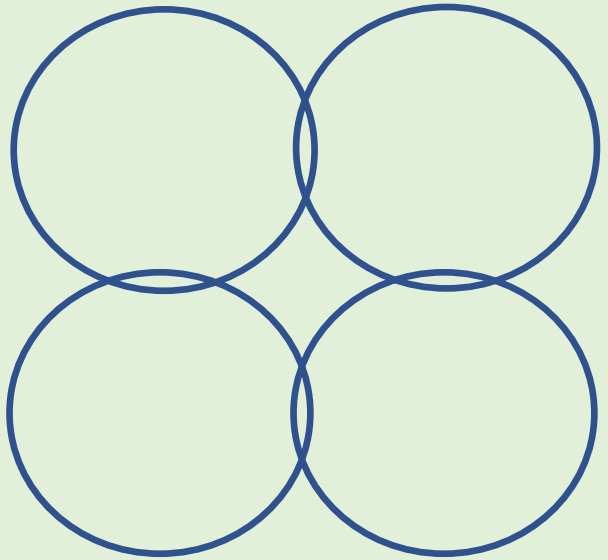
- Player
- Goalkeeper

Role overlaps

Low trust	Medium trust	High trust
Players have high overlap in their capabilities. Each player can therefore be pretty independent. Occasionally, a player might be able to do something that others cannot.	Players have specific, key overlaps. For example, an ability that all players have. But they can specialize otherwise. They may overlap in purpose, but have different tools.	Players are specialists who require other players to succeed. Role overlaps are minimal.







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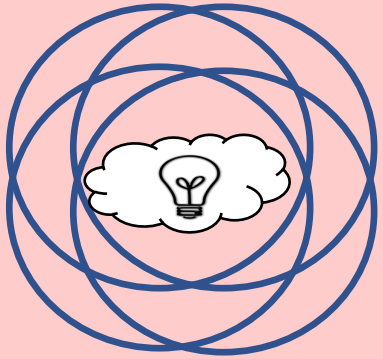
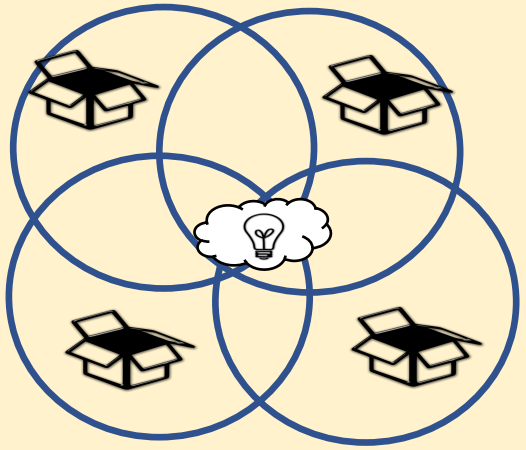
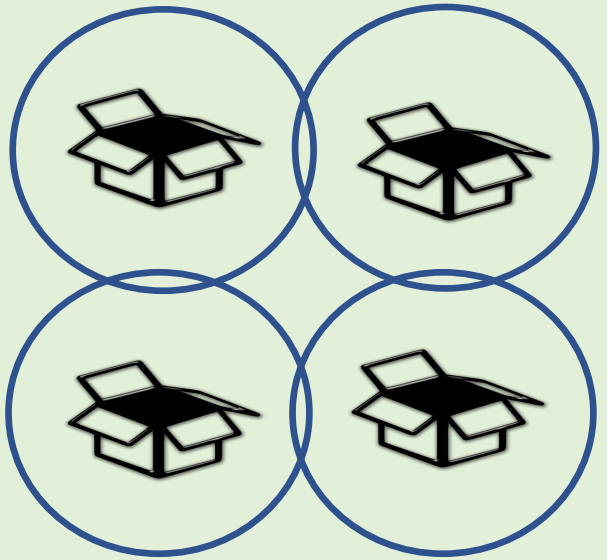




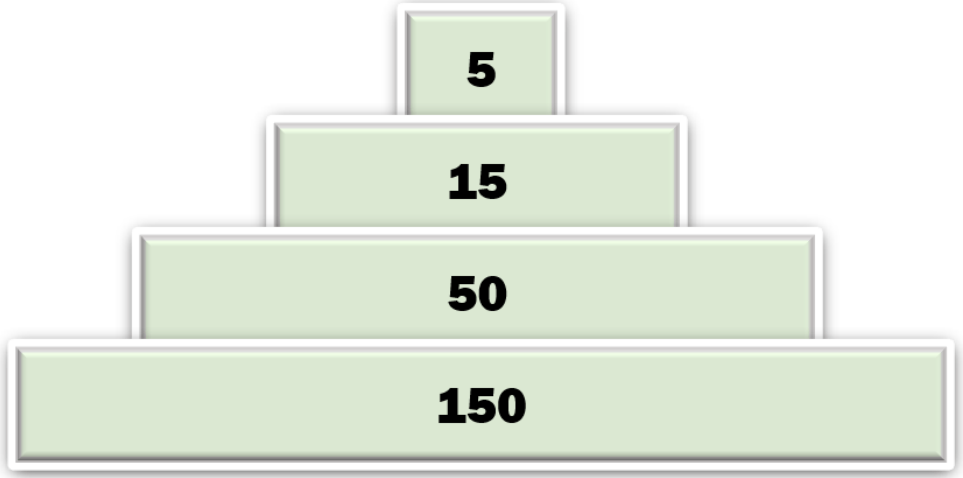


The Trust Spectrum

n can be close or far…

A trust spectrum

- Humans can only handle a certain amount of emotional intimacy.
- We set our relationships within rings.
- These rings have fixed sizes.
- You may have heard of Dunbar's Number.



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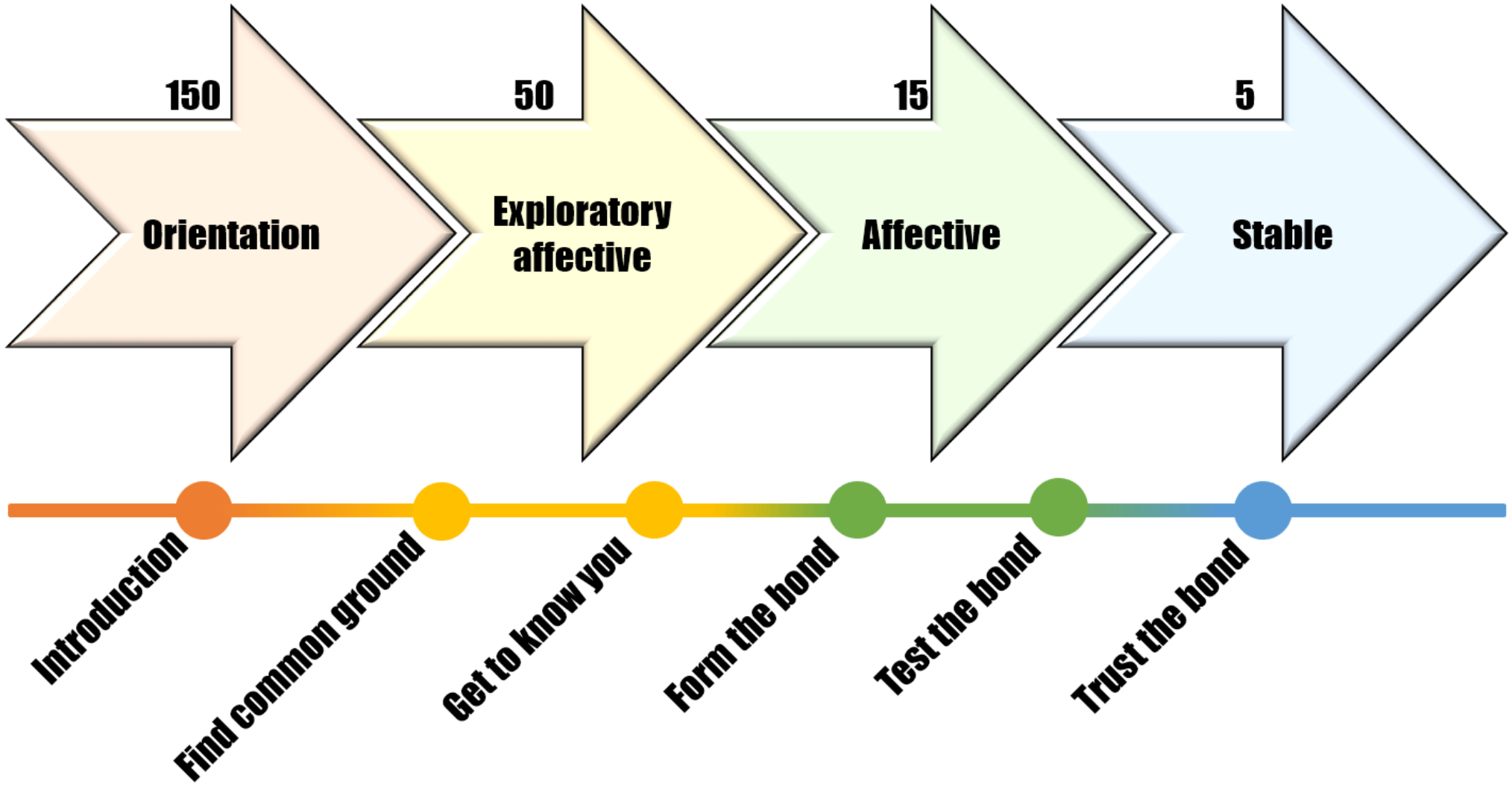
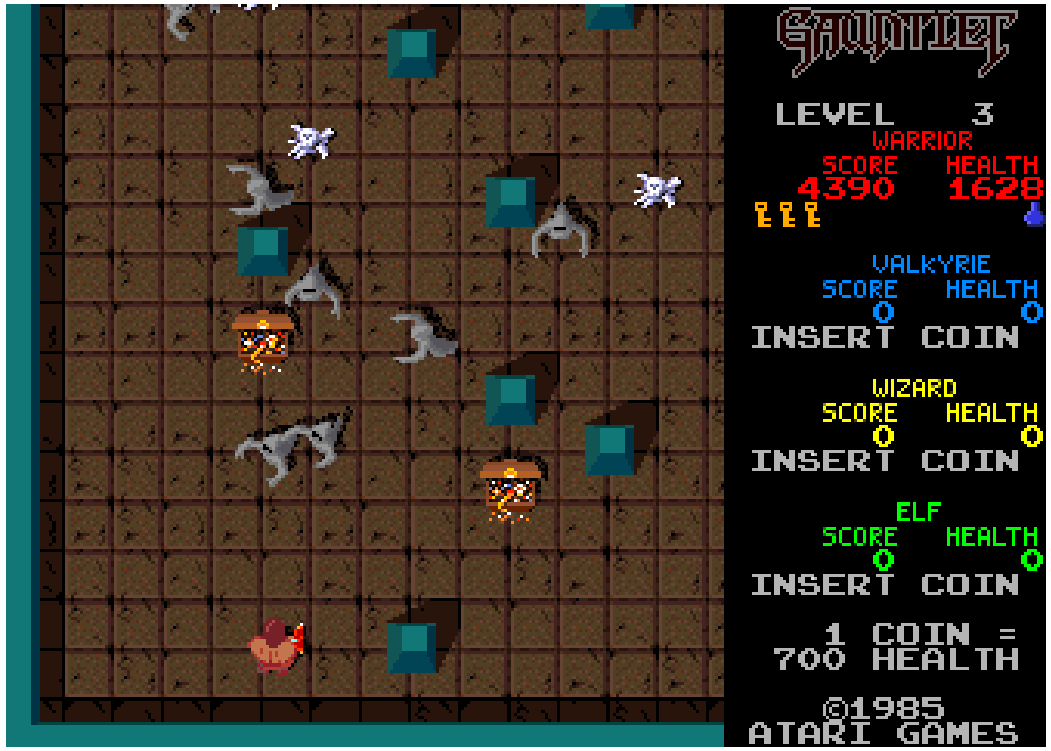


Raiden

- High parallelism. Players can do the same things.
- They have the same verbs.
- Players can negotiate roles.
- Most resource pools are independent
  - Pickups are shared until gathered.
  - The biggest shared pool is **screen space**!

Gauntlet

- Roles are pushed on players through character statistical differences.
- There's two classes, not four!
  - The warrior cannot shoot through diagonal gaps.
- Roles are not rigid
- Screen space is again the most important shared resource.
  - Pickups offer different benefits to different classes.



Trapeze

- Low parallelism.
- Verbs mostly come in pairs!
  - And they are exclusive to one another: jump vs catch.
- Shared resource pool: your life.

Trapeze

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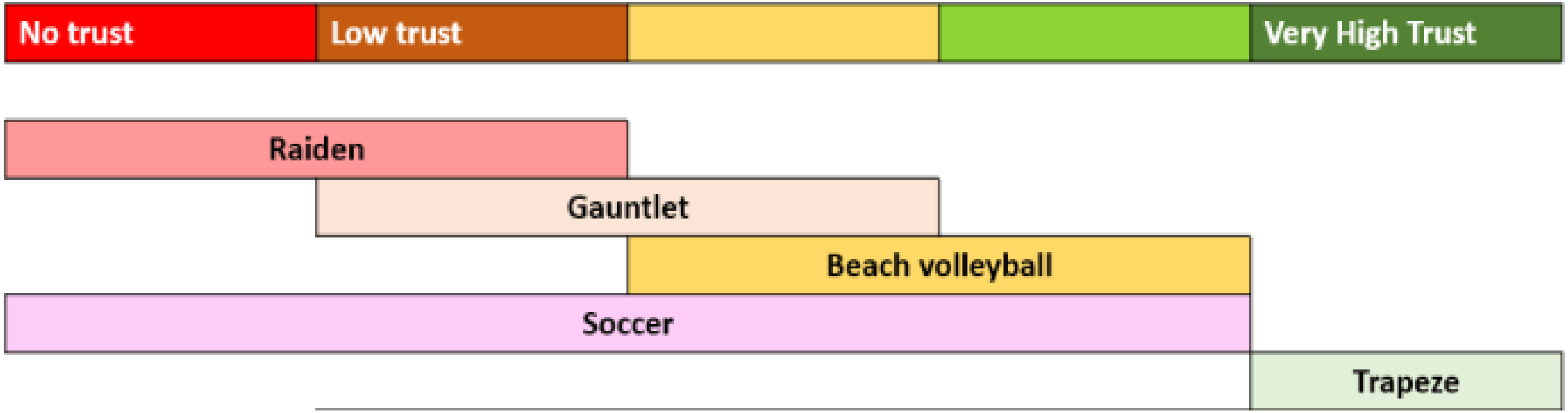
Football



Football


No trust
Low trust
Very High Trust
Raiden
Gauntlet
Beach volleyball
Soccer
Trapeze

Trust level in your game affects your game's market results

- Audience size
  - Determined by how *low* you can go on the Trust Spectrum.
- Skill ceiling
  - High trust games almost always have more depth.
- Retention
  - Purely low trust games mostly retain poorly.
  - Unless they have very deep gameplay.
- The ideal team game
  - Covers everything at once seamlessly. Expensive! Hard!

Team factors

- Risk
- Agency
- Information horizon
- Success metrics

		No trust	Low trust	Medium trust	High trust
Forms of parallelism and asymmetry	**Teams**	Probably don't exist	May exist, ad hoc	Exist	Exist and tend to persist
	Roles	Everyone can do the same things	Overlapping roles let players supplement one another	Increased dependence	Classes or other forms of high dependency
	Agency	Control over self	Can cooperate	Connected moves, combos with other players	Moves made on behalf of other players
	Success metrics	Individual metrics	Mix of individual and shared metrics	Shared metrics only	Self-sacrificing success, where teams win but individuals may suffer

Types of shared resources and liabilities	Risk	Light or no loss from a trust fail	Lose incremental status only; relatively painless	Tough penalties for trust fails	"Permadeath" style penalties, calling for perfect team coordination
	Information	Perfect information on stats and resources	Imperfect information	Imperfect info and/or time pressure causing cognitive load	No information on shared pools and resources, nor on teammate status
	Exchange	Secure trade, code-verified systems	Gifting or other altruistic actions, to drive reciprocity	Synchronous exchanges	Blind giving of one's own critical resources without knowing recipient state
	Time	Low time pressure for coordination, asynch gameplay	Escalating time pressure	Synchronous real-time play	Synchronous, in-person play, often with high time pressure
	Ownership	Separate	Separate and shared	Shared pools	Shared pools but only some teammates can access

Raiden

		No trust	Low trust	Medium trust	High trust
Forms of parallelism and asymmetry	Teams		Ad hoc		
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	Agency	Control over self			
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From 1 to n., Koster

Football

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Trapeze

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	Time				Synchronous, in-person play, often with high time pressure
	Ownership				Shared pools but only some teammates can access

Games for low trust

- Should mostly be limited to parallel play, and symmetric mechanics.
  - Of course, all solo play mechanics fit here too.
- Opposition or co-op doesn't matter. The main thing is that activities are transactional.
- Exchanges of in-game economic nature are verified in some fashion (contract, supply chain, etc).
  - Identity and status systems are important to support at this stage.
- Games may include teams, but probably not classes.
  - Games may be last-man-standing or otherwise about individual success.

Games for average trust

- Start including non-parallel play and asymmetric mechanics.
- Games can be a mix of co-op and oppositional; when oppositional, you should lean towards teams. When co-op, you should learn towards roles that shift (pickups).
- Roles overlap. A midfielder can also strike and score a goal. There's healers but also potions. This reduces the trust dependency on any one other player.
- Games with the ability to help (e.g, an exchange of in game economic value, information, even emotional support, but with no quid pro quo). Reciprocity should be enabled.
- By and large perfect information about teammates or co-op player state should be available.
- **Warning**: the Quarterback Problem tends to manifest: one player telling the team how to win. It can be mitigated by increasing time pressure or decreasing information horizon.

Games for high levels of trust

- Use “blind moves”
- Other players have information that the player does not.
- Both players must execute actions in tandem, falling into synchrony. Merely matching is good; playing “harmony” is better.
- Play where you can only make moves for other players, and they can only make moves for you, or only specific sorts of moves.
- Games where there is tightly limited information that flows between the players, and they must rely on their knowledge of the other player.
- Success states here may be about your friends succeeding, not you.

Intimate trust

- Escalating challenge where failure results in starting the task over from scratch or having no intermediate gains.
- A failure to coordinate perfectly stings. Basically, permadeath mechanics of some sort.
- Often don't provide feedback on what move the other player actually chose for a coordinated move.
  - In other words, the imperfect information gets even cloudier.

Larger scales

- Are built out of lack of trust!
  - Contacts
  - Identity
  - Economics
  - Social structures

- …but that's a whole other topic. Come talk to me if you want to discuss MMO style social design.

About me

www.raphkoster.com

Presentations or articles on this same topic:

"The Trust Spectrum" (article)

"On Trust" (article series)

"Social Mechanics" (presentation)