Data Worksheet: "Breakout"

Describe the problem.

A single ball stays within the bounds of the board and destroys blocks when hit, adding to the user's score. A single user controlled paddle moves based on input to bounce the ball towards the top of the board. The game ends when the ball goes below the board.

What is the common case of the problem?

The ball is always moving around the board. Collisions become less frequent as more blocks are destroyed.

Data

Data	Type	Quantity	Read Frequency	Write Frequency	Why do you need this data?
Position	float2	1 Ball Many Blocks 1 Paddle	Ball:Every Frame Blocks: Every Frame for Physics Paddle: Every Frame	Ball: Every Frame Blocks: Once on init Paddle: Every Frame	We need to track where the ball is
Size	float2 (width and height)	1 Ball Many Blocks 1 Paddle	Ball: Every Frame Blocks: Every Frame Paddle: Every Frame	Once on init	We need a width and height for each object in order to calculate collisions
Speed	float	1 Ball 1 Paddle	Ball: Every Frame Paddle: Input Change	Once on init	Combined with Direction can give you the entity's velocity, separated components because Direction will update while Speed doesn't
Direction	float2	1 Ball 1 Paddle	Ball: Every Frame Paddle: Input Change	Ball: On Collision Paddle: Input Change	Combined with Speed can give you the entity's velocity, separated because Direction will update while Speed doesn't
Color	float4	Many Blocks	Rendering Only	Once on init	This could be a component to allow for different colored blocks
Score	int	1 Ball	UI Updates when Score Updates	On Ball/Block Collision	We need to keep track of the current score to display to the player
Board	float2 (width and height)	1 Board	Read by Ball and Paddle to stay inbounds of the board	Once on init	We need to know the size of the game board to constrain the paddle and ball to move within the boundaries
PaddleTag		1 Paddle	Read when updating the Paddle's movement	Once on init	We need a way to differentiate movement driven by player input

Data Transformations

Data Input	Output	System	When and how frequently does this occur?	What other data do you need?	

Position Speed Direction Board Not PaddleTag	Position Direction (If at edge of board)	Ball Movement	Once every frame, Position always updated, Direction updated if hits edge of the board (Dies if hits the bottom)	
Size Position	Direction (Ball) Destroy Block (If hit)	Block Collision Score (If hit)	Once every frame	Ball Direction Score
Position Speed Direction Size PaddleTag	Direction (If input) Position Speed (0 when no input)	Paddle Movement	Once every frame	Input.Axis
Board	Position Size Color	Block Spawning	Once on init	Block Prefab Number of Rows
Position Direction Speed	Position Direction Speed Size	Ball Spawning	Once on init	Ball Prefab Any authoring data
Position Direction Speed	Position Direction Speed Size PaddleTag	Paddle Spawning	Once on init	Paddle Prefab Any authoring data
Position Size Color	Draw calls	Rendering	Once every frame	Some entities (e.g. Ball, Paddle) don't have a Color component. Default to white.