CRC Cards

PaddlePawn
Responsibilities:	Collaborators:
Move Left Move Right Collide with walls Collide with ball	Ball Powerup Player Controller AI Controller

Board
Responsibilities:	Collaborators:
Collide with Ball Collide with Paddle Delete objects leaving bottom	Ball Paddle Powerup Brick

Powerup
Responsibilities:	Collaborators:
Collide with Paddle Contain powerup effect Do powerup modifications	Ball Paddle Brick

Player State
Responsibilities:	Collaborators:
Keep track of lives	Player Controller Paddle Ball Board

Ball
Responsibilities:	Collaborators:
Move Forward Bounce off objects Collide with walls Collide with paddle Speed up over time	Brick Paddle Board Powerup

Brick
Responsibilities:	Collaborators:
Collide with Ball Be destroyed Spawn powerups	Ball Paddle Powerup

Game HUD
Responsibilities:	Collaborators:
Show score	Ball Paddle Brick

Game Mode
Responsibilities:	Collaborators:
Mouse and Control overrides Debug messages	PlayerController

Player Controller
Responsibilities:	Collaborators:
Handle inputs Pass to PlayerPaddle	Ball Powerup PaddlePawn

AI Controller
Responsibilities:	Collaborators:
Handle inputs Pass to Paddle	Ball Powerup PaddlePawn

Game State
Responsibilities:	Collaborators:
Show total score	Ball Paddle Brick

UML Class Diagram

ABreakoutGameMode

+ BeginPlay() : void

AController

APlayerController

AAIController

ABreakoutHUD
+ PlayerGuiClass :
TSubclassOf<UUserWidget>
+ PlayerGui : UUserWidget*

+ BeginPlay() : void

ABreakoutGameState
+ DefeatSound : USoundBase*
+ VictorySound : USoundBase*
+ bDefeat : bool
+ bVictory : bool
+ Lives : int

+ GetLives() : int
+ Defeat() : void
+ Victory() : void
+ IsDefeated() : bool
+ IsVictorious() : bool

APlayerPaddleController
MyPawn : APaddlePawn*
MyBoard : ABoard*

+ BeginPlay() : void
+ OnPossess(aPawn : APawn*) : void
+ OnUnPossess() : void
+ SetupInputComponent() : void
# MoveRight(float value) : void
# Exit() : void

ABreakoutAIController

+ Tick(DeltaTime : float) void

ABall
+ SphereComponent : USphereComponent*
+ BallFlipbook : UPaperFlipbookComponent*
+ Speed : float
+ MaxSpeed : float
+ BounceSound : USoundBase
+ LaunchSound : USoundBase
+ DeathSound : USoundBase*
+ bMoving : bool
# Radius : float
# MaxRadius : float
# LastHit : UPrimitiveComponent*
- sound_debounce_timer : FTimerHandle

BeginPlay() : void
+ Tick(DeltaTime : float) : void
+ Launch() : void
+ PlayBounce() : void
+ PlayLaunch() : void
+ Play Death() : void
+ BallBig() : void
+ BallSmall() : void
+ Regenerate() : void
- OnHit(PrimitiveComponent*, AActor*, UPrimitiveComponent*, FVector,const
FHitResult&) : void

ABoard
+ Bricks : ABrickPawn*[]
+ BoardRoot : USceneComponent*
+ BoardCamera : UCameraComponent*
+ BoardBacking : UPaperSpriteComponent*
+ BallCount : int
+ BrickCount : int
+ PlayerPaddle : APaddlePawn*
+ Balls : TArray<ABall>
+ BrickTemplate : TSubclassOf<ABrick>
+ BallTemplate : TSubclassOf<ABall>
- SideBottom: UBoxComponent*
- bLaunched : bool
- boardWidth : float
- boardHeight : float
- borderWidth : float

+ SpawnBall() : void
+ GetBottom() : UPrimitiveComponent*
+ Tick(DeltaTime : float) : void
+ GenerateBoard : void
# BeginPlay() : void

ABrick
+ BoxComponent : UBoxComponent*
+ BrickFlipbook : UBrickFlipbook
+ HealthPoints : float
+ PowerupChance : float
+ PowerupTemplate : TSubclassOf<APowerup>
+ BreakSound : USoundBase

BeginPlay() : void
OnHit(PrimitiveComponent*, AActor*, UPrimitiveComponent*, FVector,const
FHitResult&) : void
+ Tick (DeltaTime : float) : void
+ RollForPowerup() : void
+ UpdateSprite() : void

APowerup
+ PowerupType : EPowerupType
+ BoxComponent : UBoxComponent*
+ PowerupFlipbookComponent : UPaperFlipbookComponent*
+ PaddleTemplate : TSubclassOf<APaddlePawn>
+ ControllerTemplate : TSubclassOf<AAIController>
+ PowerupSound : USoundBase*
+ Type : EPowerupType
# Speed : float

+ Tick(DeltaTime : float) : void
# BeginPlay() : void
# OnOverlap(UPrimitiveComponent* OverlappedComponent, AActor* OtherActor,
UPrimitiveComponent* OtherComp, int32 OtherBodyIndex, bool bFromSweep, const
FHitResult& SweepResult) : void

APaddlePawn
+ PaddleLength : float
+ PaddleMax : float
+ BoxComponent : UBoxComponent*
+ PawnSpriteComponent: UPaperSpriteComponent*
+ Speed : float
+ MoveRight : float
# bActive : bool

+ Tick(DeltaTime : float) : void
+ SetupPlayerInputComponent(PlayerInputComponent : UInputComponent*) : void
+ MoveRight(Value : float) : void
+ PaddlePlus() : void
+ PaddleMinus() : void
+ Regenerate() : void
# BeginPlay() void
- OnHit(PrimitiveComponent*, AActor*, UPrimitiveComponent*, FVector,const
FHitResult&) : void

APawn