

Game Design

Brickbreaker Game

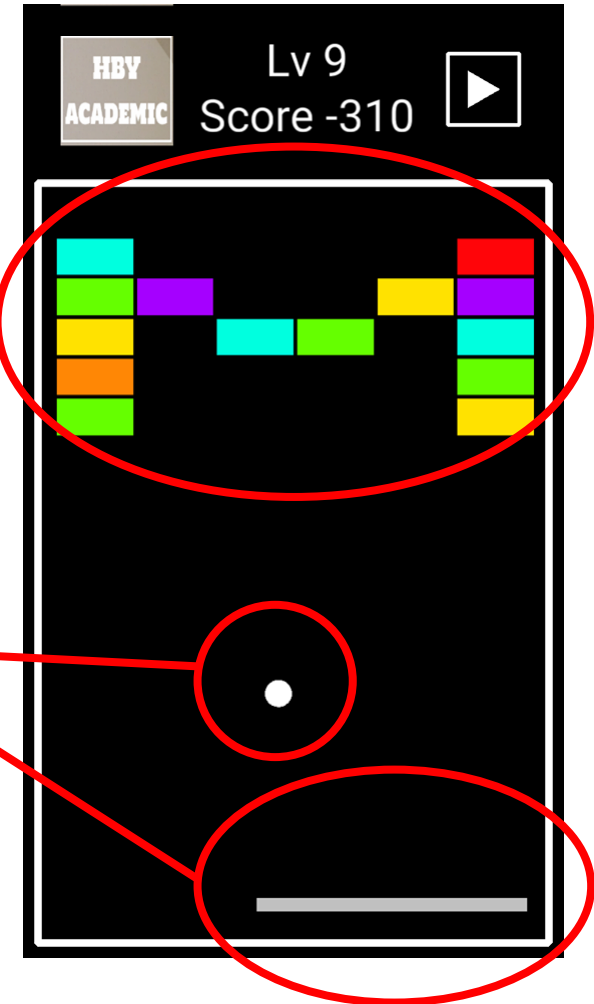
Author: HBY coding academic

Outline

- Structure analysis
 - ▣ Ball structure
 - ▣ Brick structure
- System flowchart

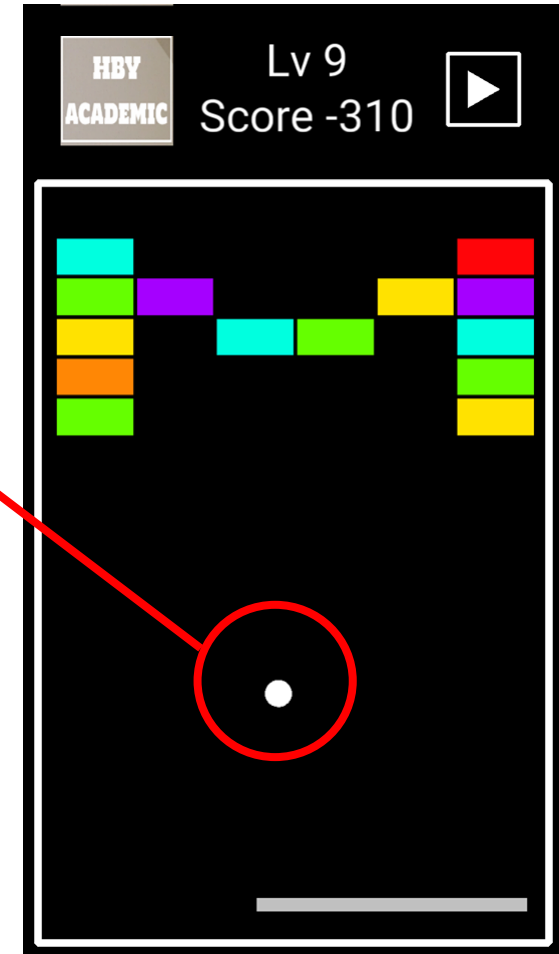
Brickbreaker

- Two structures
 - ▣ Brick structure
- ▣ Ball structure



Ball structure

- **Ball(bX, bY, bR, sX, sY, bC)**
 - ▣ x position of a ball: bX
 - ▣ y position of a ball: bY
 - ▣ ball radius: bR
 - ▣ horizontal velocity of a ball: sX
 - ▣ vertical velocity of a ball: sY
 - ▣ ball color: bC
- **Balls: consists of multiple ball structures**



Functions of ball structure

- **drawBall()**

- ▣ draw a ball with the radius bR at (bX, bY)

- **update()**

- ▣ update the position of a ball with velocities sX and sY

- **reset()**

- ▣ reset the initial position and velocities of a ball

Functions of ball structure (cont'd)

- **CollideWithWall()**

- **ball velocity changes** when colliding with a wall (left, right, top, bottom)
- return a “**true**” Boolean flag when a ball **fall to the bottom** of the wall

- **drawAnimatedBall()**

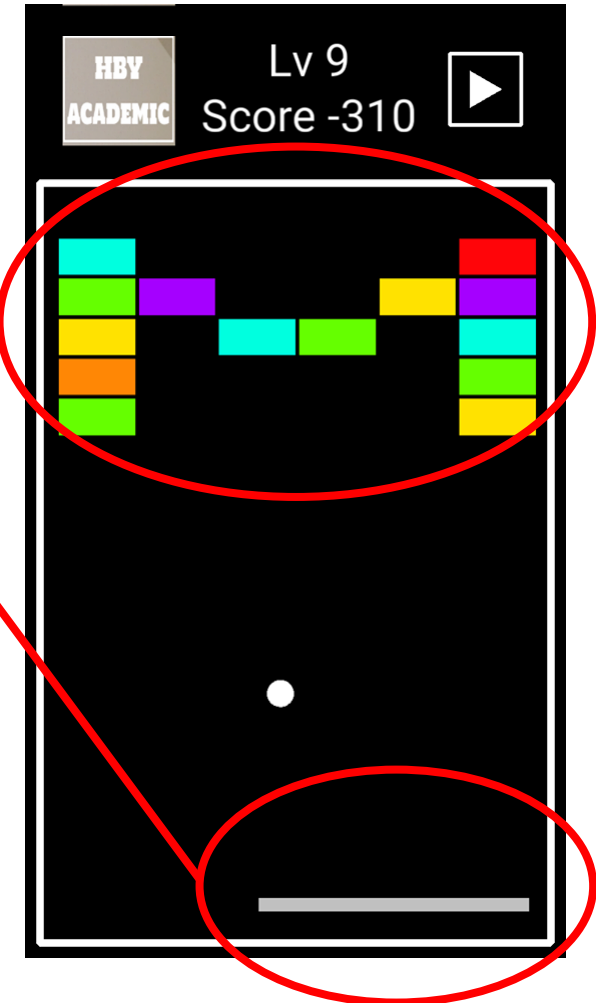
- drawBall() → update()
- if a ball CollideWithWall() return a “true” Boolean flag, then this ball reset()

Brick structure

□ **Brick(brX, brY, brW, brH, brC, nbL)**

- ▣ x position of a brick: brX
- ▣ y position of a brick: brY
- ▣ brick width: brW
- ▣ brick height: brH
- ▣ brick color: brC
- ▣ number of lives (hits): nbL
 - some bricks need more than one hit

□ **Bricks: consists of multiple brick structures**



Functions of brick structure

□ drawBrick()

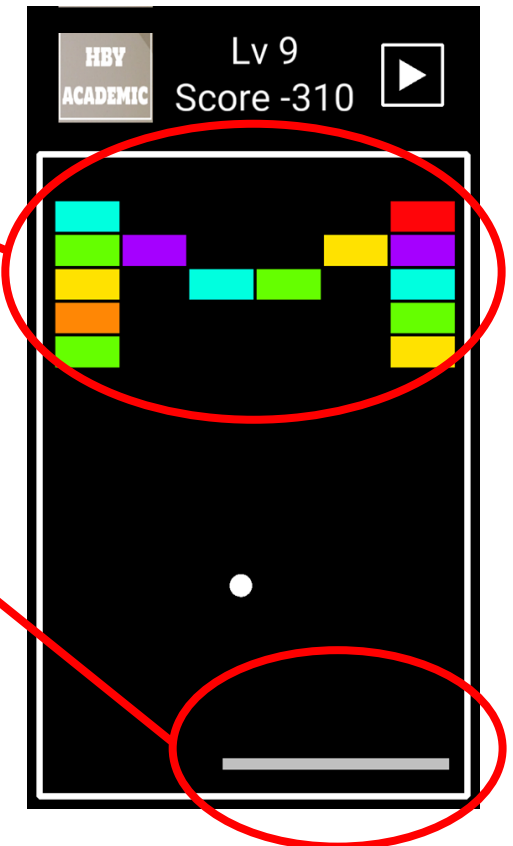
- ▣ draw a brick with the size (brW, brH) and color brC at (brX, brY)
- ▣ not to draw a brick when its nbL is zero

□ movePaddle()

- ▣ prevent the paddle being outside the game borders (walls)

□ CollideWithBall(Ball ball)

- ▣ ball velocity changes when colliding with a brick
(left, right, top, bottom)



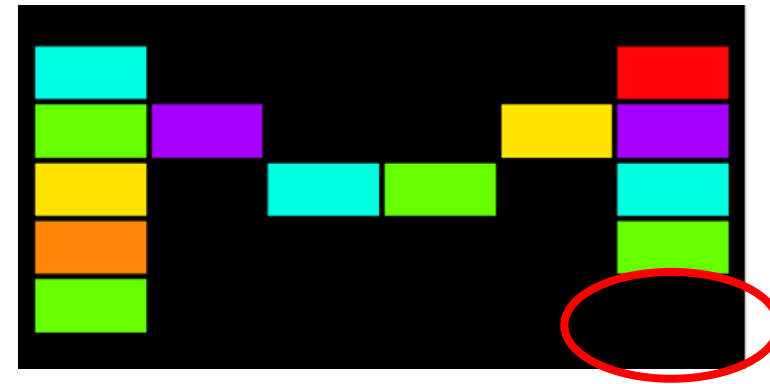
Functions related to brick

- **updateBricks()**
 - ▣ drawBrick()
 - ▣ if a brick CollideWithBall(Ball ball), then its **nbL** is decreased by 1
 - ▣ if a brick with **nbL** ≤ 0 , then removing this brick from Bricks
 - consider to **multiple hits simultaneously** by balls



Bricks

If this brick collided with a ball and its $nbL = 0$



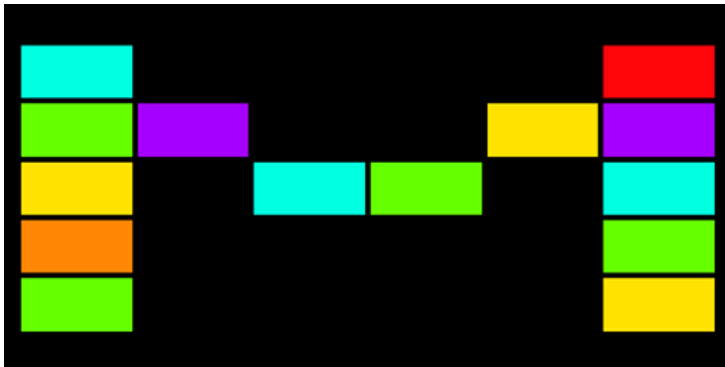
Bricks

remove this brick from Bricks

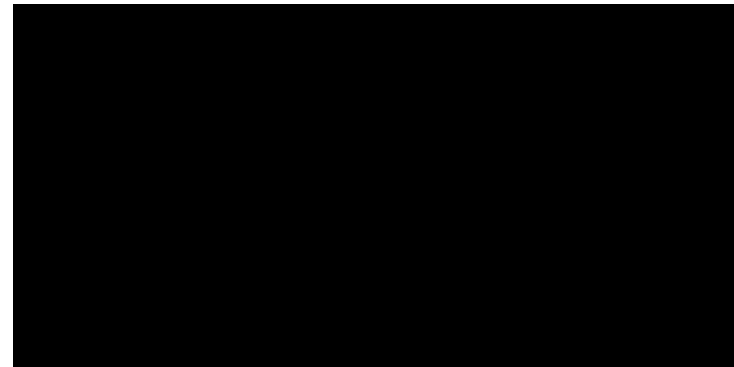
Functions related to brick (cont'd)

□ levelUp()

- ▣ if the current Bricks is empty, then going to the next level



Bricks



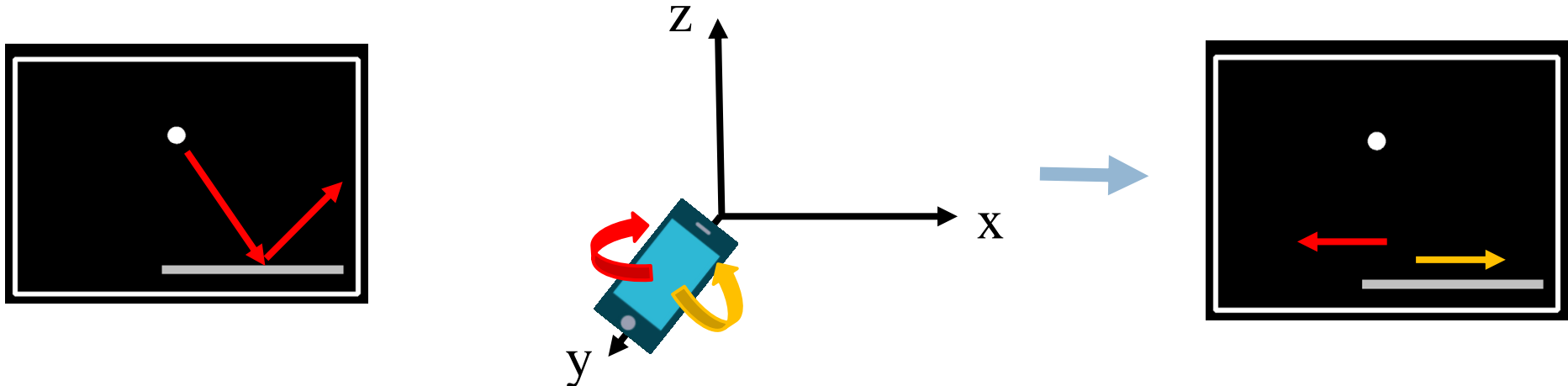
Bricks



next level

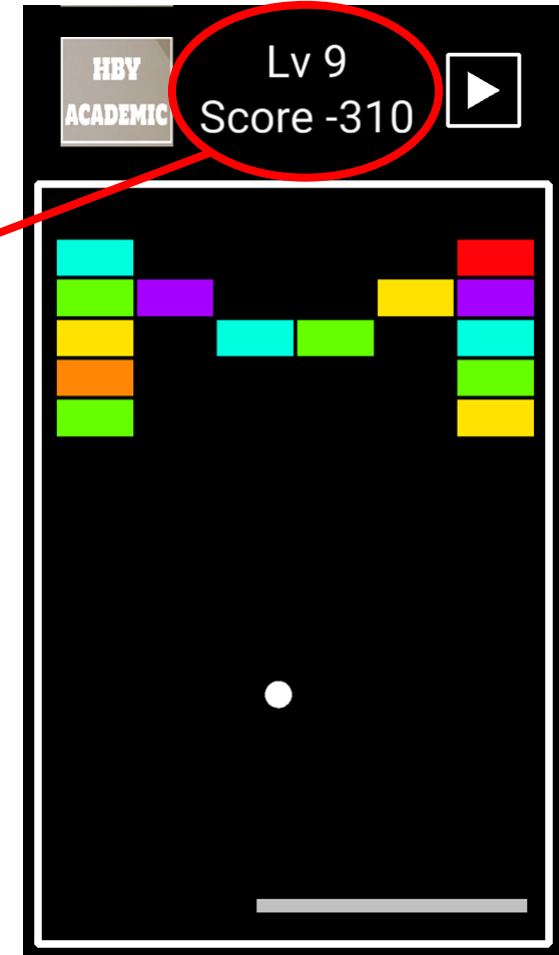
Function related to paddle

- **drawAnimatedPaddle()**
 - ▣ drawBrick()
 - ▣ movePaddle()
 - ▣ update x position of the paddle with **accelerometerX** information
 - tile to the left (right), move to the left (right)
 - ▣ if a ball is CollideWithBall(Ball ball), then this ball velocity changes



Other functions

- **checkFinished()**
 - ▣ check if the player finished all levels
- **showInfo()**
 - ▣ show the current level and score
- **drawBorder()**
 - ▣ draw the game borders (white, bold lines)



System flowchart

