

Detailed Game Specification: Breakout

Course: COMP 2659, Winter 2018

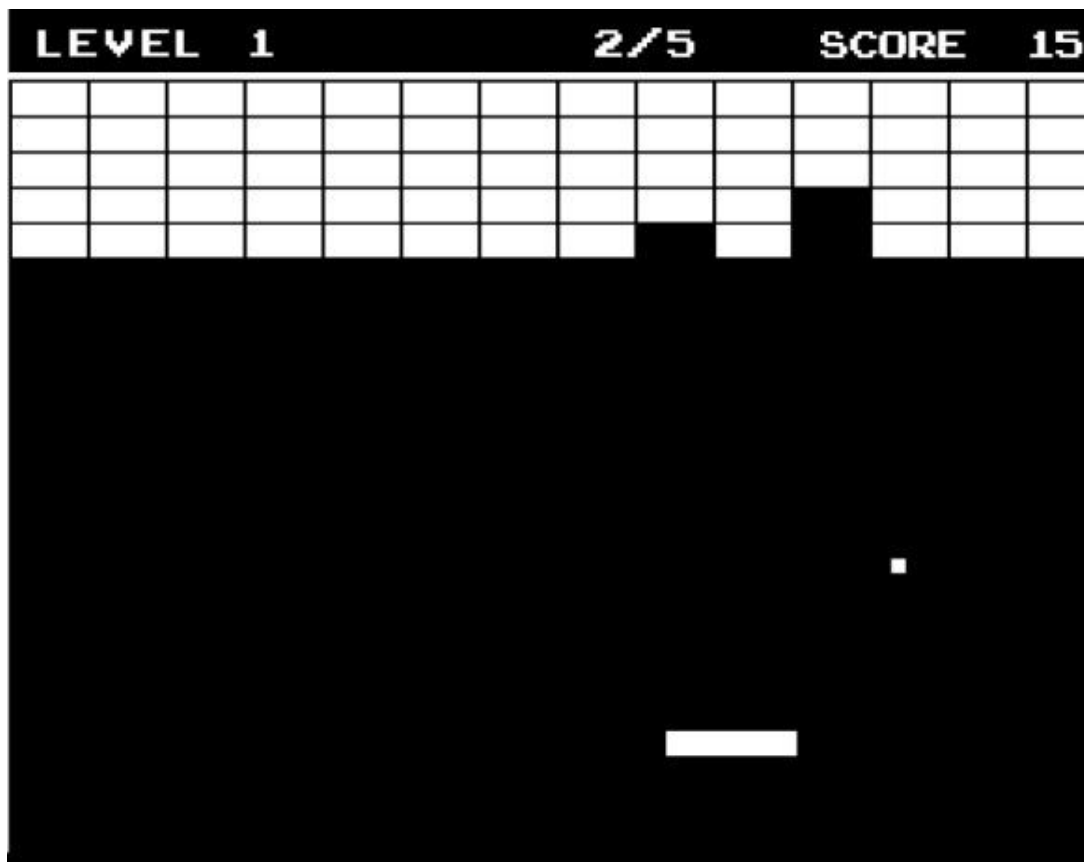
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1. General Game Overview

Breakout is a 2D side view arcade style game. In the game, several layers of bricks line the top of the screen. A ball travels around the screen, bouncing off the side and top walls, and destroys bricks when it hits them (bouncing off them as well). If the ball touches the bottom of the screen the player loses a life. The player operates a moveable paddle along the bottom of the screen to bounce the ball back upwards and prevent this from happening. The objective of the game is to destroy all of the blocks before they runs out of lives.







2. Game Play Details for Core 1-Player Version

Objectives and Rules

The game starts with the ball resting on the paddle. The player may move the paddle left or right within the game board before pressing space to launch the ball and begin the game. The ball will randomly launch either left or right at a 45° angle. The speed of the ball will increase as the game progresses.

Each brick broken will award the player five points. The player wins the game by clearing all of the bricks on the screen. There are 5 rows of bricks, each row containing 20 bricks. The player loses if they run out of lives (losing one each time the ball hits the bottom of the screen). Upon losing a life the ball will reset to resting on the paddle and the player will need to launch it again.

Objects

Object Name	Properties	Behaviours	Image
Brick (Array)	<ul style="list-style-type: none">● Position (Integer pair)● Broken (boolean)● 32 Pixels Wide● 16 Pixels High		
Ball	<ul style="list-style-type: none">● Position (Integer pair)● Velocity (Integer)● Direction (Integer Pair)● 8 Pixels wide and high	<ul style="list-style-type: none">● Bounces off paddle, bricks, side and top walls.● Increases speed	
Paddle	<ul style="list-style-type: none">● X Position● Fixed Y Position● Speed (Integer)● Direction (-1,0,1)● 60 Pixels Wide● 20 Pixels High	<ul style="list-style-type: none">● Moves left and right● Launches ball	
Board	<ul style="list-style-type: none">● 640 Pixels Wide● 360 Pixels High● Starts at y = 40		
Score	<ul style="list-style-type: none">● 32 Pixels High● Static Text● Updating 4 digit number	<ul style="list-style-type: none">● Updates the number as bricks are broken	SCORE 0958
Lives	<ul style="list-style-type: none">● 32 Pixels High● Static Text● Updating Symbols	<ul style="list-style-type: none">● Updates the symbols as the ball touches the bottom of the screen	LIVES 

Header	<ul style="list-style-type: none"> • Contains score and lives • Separation line between information and board 		
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Physics

Ball Velocity:

The ball will have an x and y velocity variables. Because the ball is in a fixed 45° angle x and y direction can only be either +1 or -1, which is then multiplied by the balls speed.

Rebounding:

While the engine is determining the next position of the ball if it hits a brick, wall, ceiling, or paddle, it instead will be rebounded. The game will have to determine if it is a vertical collision (wall or side of brick) or horizontal collision (ceiling, paddle, surface of brick). If it is a vertical collision the x velocity will be negated. If it is a horizontal collision the y velocity will be negated.

Paddle:

The paddle will have a constant velocity in either direction based on what key the user is pressing. If the right key is pressed it will have an x direction of +1, if the left key, -1. If no key is being pressed the direction is 0. The speed is then multiplied by the direction of the paddle.

Asynchronous (Input) Events

<u>Event Name</u>	<u>Triggering Input Event</u>	<u>Description</u>
Move	Left or right arrow key pressed	Paddle moves for as long as key as held, or until it hits a wall. If the left key is pressed, velocity = -1, if the right key velocity = 1.
Launch ball	Space bar pressed	Launches the ball from the paddle when the game is beginning or after the player loses a life.

Synchronous (Timed) Events

<u>Event Name</u>	<u>Trigger Timing</u>	<u>Description</u>
Ball moves	Every 1/70th of a second	Ball moves forward <i>velocity</i> pixels (where <i>velocity</i> is a property of the ball object)
Launch ball	Every 1/70th of a second and after the space bar has been pressed	Launches the ball from the paddle at a 45 degree angle
Paddle moves	Every 1/70th of a second after left or right arrow keys are pressed	Paddle moves for as long as key as held, or until it hits a wall.

Condition-Based (Cascaded) Events

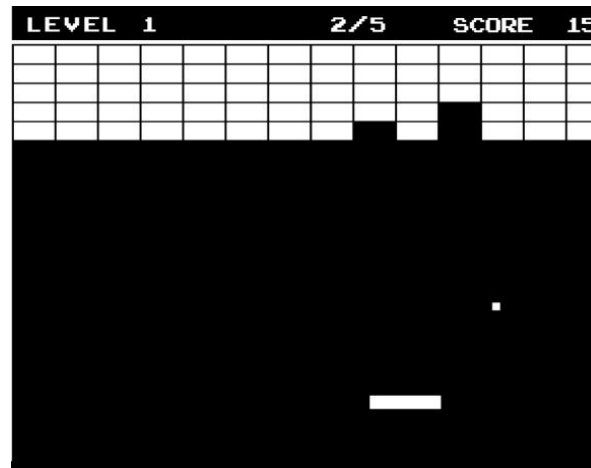
<u>Event Name</u>	<u>Triggering Condition</u>	<u>Description</u>
Ball collides	Ball hitting another object/wall	Ball retains speed but the direction is changed.
- Brick		
-Top	Ball hits top of brick	y direction is set to +1
-Bottom	Ball hits bottom of brick	y direction is set to -1,
-Side	Ball hits side of brick	x direction is reversed
- Paddle	Ball hits paddle	y direction is set to +1
- Wall		
-Side	Ball hits a side wall	x direction is reversed
-Top	Ball hits top wall	y direction is set to -1
-Bottom	Ball hits bottom wall	Player loses life, round ends
Brick is destroyed	The ball collides with a brick	The ball is deflected and the brick is removed.

Hypothetical Gaming Session

The ball starts on the players paddle. The player presses the space key and the ball is launched to the left. The ball flies until it hits the right wall, it then ricochets off the wall and flies up and to the left. The ball then hits a brick and the players score goes up by 5. While the ball is travelling down the player is maneuvering the paddle to deflect it when it comes down. The player is successful in breaking a few more bricks until one time he does not reach the ball in time and the player loses a life. The ball appears back in the paddle and awaits for the player to launch the ball. This continues until the player has zero lives and the ball touches the bottom of the screen, then a game over screen will appear and a sad song plays.

3. Game Play Details for Core 2-Player Version

Two player version of the game will be players taking turns upon losing lives and competing for a higher score.



4. Sound Effects

<u>Sound Effect Name</u>	<u>Brief Description</u>	<u>Event which Triggers Playback</u>
Brick explosion	A breaking sound	A brick is broken by the ball
Ball bounce	A sharp beep	The ball comes in contact with another object
Losing Sound	A sad melody	The ball comes in contact with the bottom of the screen
Launch Ball	A bloop	Plays when the player has the ball on paddle and the spacebar is pressed

5. Additional Features (Time Permitting)

Multiple levels of increasing difficulty.

Powerups (ie. bigger paddle, paddle can shoot bricks, etc.)

Level editor

Coloured or textured blocks

sources:

http://andrewbusch-bvsd.weebly.com/uploads/1/5/1/2/15122632/319047_orig.jpg