Circalize

Author: Sherry Yuan

Program Description:

Circalize is a game where a ball swings around a pin (circular motion), once the mouse is pressed, the ball will be released and undergo projectile motion. By pressing the mouse again, the ball can re-connect to the nearest pin, if the ball's instantaneous path is tangent to the circle around the pin, the ball can successfully attach the pin and undergo circular motion.

IPO Chart

Input	Processing	Output
Mouse events -click buttons -game control Key Events -g	Detach ball from pin/re-establish connection to a pin. If the ball is connected but not in circular motion, then check if the ball's path is tangent to the circle. Key Events: Switch to gravitational mode	-welcoming screen -instruction screen -game screen

List of Knowns & Unknown

Known	Unknown
G (gravitational acceleration 0 / 0.13) Shadow (always follows that path of the ball) Pin's position is random, moving from right to left	Game state (0-5) control by the user Ball's speed (according to the game's process) Game over (to be determined by the game process)

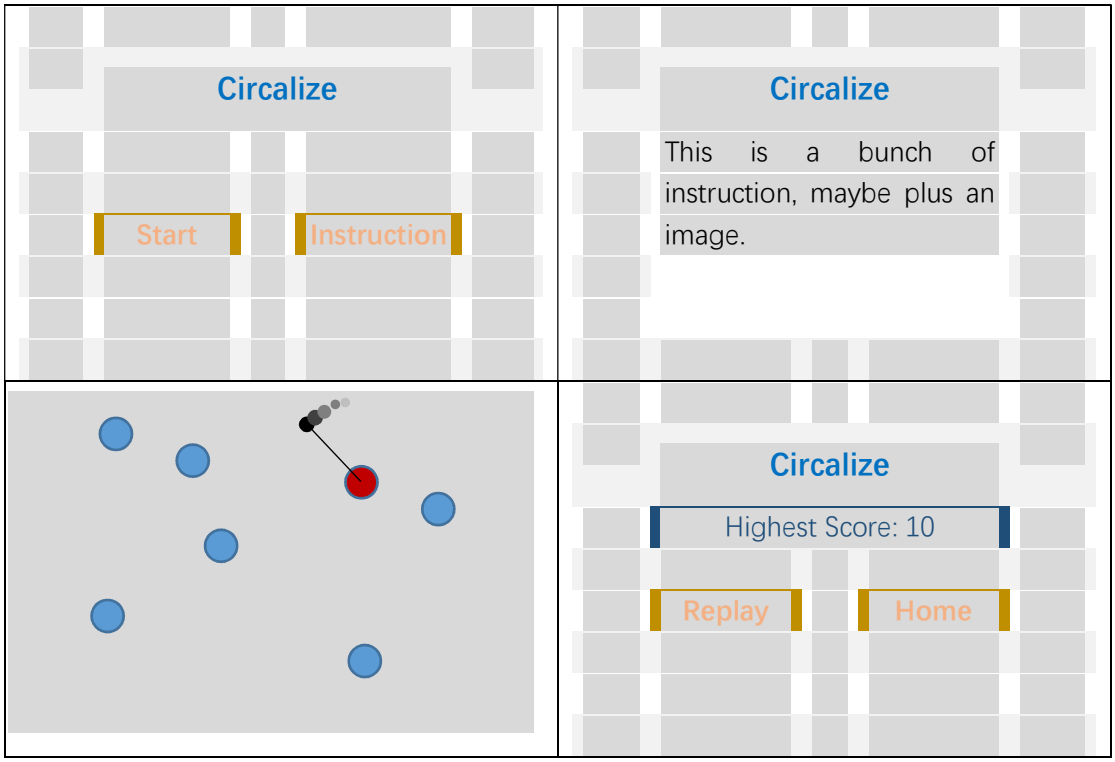
Methods

tangent	Check if ball's path is tangent to the nearest center
intro	Draw game intro page
instruct	Draw the instruction page
game	Draw game page
game over	Draw game over page
radian	Convert from degree to radian
degree	Convert from radian to degree

Classes

Center	Store position of the pin
Shadow	Store position of the shadow
Paint (inherited JPanel)	Class for drawing and displaying
var	Class for storing variables for all class
Main	Run and execute the whole program
Events	Mouse / key Listeners

Output Screen Sketch



Simple Flow Chart

Main page → click start → game page → game over page (if loss) → Main / Game page
Main page → instruction page→ main / game page → game over page (if loss) → Main / Game page
If mouse-clicked → start = 1 (game started) → ball in free fall → if the mouse clicked again → connect to nearest pin. It does not undergo circular motion unless the motion path is tangent.
If ball off the screen and not in circular motion → game over page → Main / Game page

Test/Debugging

1. Test if tangent can be found accurately by running the game.
2. Test for the accurate gravitational acceleration on screen
3. Test for relationship between angular velocity and linear velocity
4. Test if center of the spin matches the position of current pin
5. Test the allowance angle for tangent check is enough
6. Test if pins & block with position less than 0 on x-axis is deleted

7. Boundary check on collision of the ball with the block

Drawbacks/Limitation:
The relationship between linear velocity and angular velocity is now still an approximate estimate.
Hard for the balls to attach at the tangent
Crude graphics of pin & block