Design Overview for “Rolling Ball” project

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Summary of Program

I plan to create a clone of a very famous game in the 80s, which is known as “Rolling Ball”.

The rule is that player has to keep the ball stays within the screen area, prevent it from touching the upper thorn and falling beyond the bottom of the screen. When playing, player can collect items such as extra live and shield to increase the chance of getting higher score. The game’s difficulty will be increased over time.

A sketch of sample output:

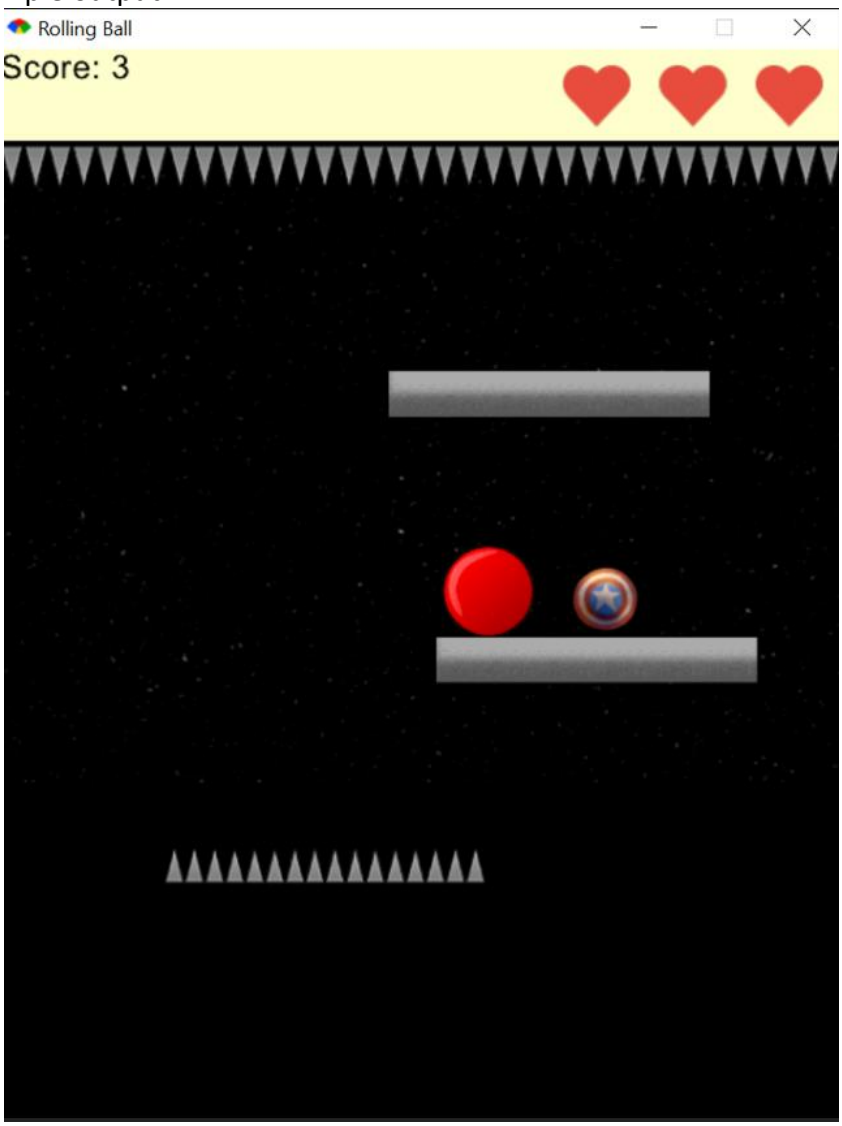

Figure 1. Sample output

Required Data Types

Describe each of the records and enumerations you will create using the following table (one per record).

Record 1: Player

Field Name	Type	Notes
:image	Gosu::Image	Image of player
:x	Integer	x-position of player
:y	Integer	y-position of player
:moving_velocity	Integer	Velocity of moving horizontally
:falling_velocity	Integer	Velocity of falling horizontally
:lives	Array	Remaining lives of player
:inventories	Array	Player's collected items
:score	Integer	Player's score

Record 2: Block

Field Name	Type	Notes
:image	Gosu::Image	Image of the block
:x	Integer	x-position of the block
:y	Integer	y-position of the block
:moving_velocity	Integer	Velocity of the block moving upwards
:is_obstacle	Boolean	Check whether this block is an obstacle

Record 3: Item

Field Name	Type	Notes
:image	Gosu::Image	Image of the item
:x	Integer	x-position of the item
:y	Integer	y-position of the item
:velocity	Integer	Velocity of the item moving upwards
:item_type	Enumeration	Type of the item

Enumeration 1: ZOrder

Value	Notes
LOWEST	z = 0
LOW	z = 1
HIGH	z = 2
HIGHEST	z = 3

Enumeration 2: ItemType

Value	Notes
LIVE	type = 0
SHIELD	type = 1

Overview of Program Structure

Moving functions:

1. move_left (player)
   - Move player to the left and keep player within the screen area.
2. move_right (player)
   - Move player to the right and keep player within the screen area.
3. fall (player)
   - Let the player falling downwards.

Game play functions:

1. spawn (player)
   - Spawn the player randomly on a non-obstacle block.
2. reduce_live (player)
   - Reduce player's number of live and spawn the player.
3. check_boundary (player)
   - Check if player has touched the top and bottom boundary of the playable screen.
4. stand_on_block (player)
   - Keep the ball stands on a block when the ball lands on it.
5. generate_blocks/items
   - Generate blocks, obstacles and different types of items randomly.
6. collect_items
   - Let player collect the items when touching them.
7. increase_difficulty
   - Increase the difficulty over time.

Structure chart: