

Sonic Classic Heroes

Prologue.

In an alternate universe, South Island gets completely taken over by Dr.Robotnik and his devious creations.

All four zones of this Island are filled with his mechanical creations and treacherous traps.

Despite this situation, three heroes are determined to win their home back.

Help Sonic the Hedgehog, Tails the Fox, and Knuckles the echidna, to defeat the evil plans of Dr.Robotnik.

General Information:

- The whole game is divided into three levels and a boss level.
- Levels will be based on the game grid structure.
- A level is won when all the rings are collected and the player reaches the end of the level.
- A level is lost when the player runs out of health points or the timer runs out.
- The player can switch characters mid-game with the 'z' button.
- Each level must contain a section related to each character, such as a high-speed section (sonic), a flight section (tails), a section with breakable walls (knuckles), etc.
- You are expected to calculate and display the high score. It can be calculated according to whatever merit you wish.

Code-related information:

- All classes must be made following your submitted UML.
 - The game is to be created in C++ with SFML.
 - Only use the allowed SFML objects and functions.
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Game Movement and Mechanics:

The game is a simple platformer with gravity, acceleration, and deceleration. You **DON'T** need to implement complicated curves and slopes. Instead, get creative with the game-grid structure and work with simple blocks.

The screen must scroll left and right according to the position of the player. (See the given videos for reference). There is **NO** need to implement vertical scrolling.

Playable Characters:

Sonic The Hedgehog: He needs no introduction, his biggest strength is his speed. He is the fastest among all his friends. He is best suited for high-speed sections.

Tails The Fox: He is Sonic's best friend. Tails can fly with his two tails. He might not be as fast as Sonic, but he can fly the whole team for as long as 7 seconds.

Knuckles The Echidna: He is the muscle of the group. His special ability is to punch breakable walls to find new paths and hidden objects.

General Player Information:

- Each character has its own speed and a special ability.
- Say, the player has 3 health points. The health points will be shared among all characters. This means that if you take damage 3 times, you will die, regardless of the character equipped.
- When a player gets hit, he becomes invincible for one second only, meaning he can't take damage during that time.
- Also, contrary to the actual game, the player-controlled character DOES NOT lose rings when hit, instead, he loses an hp.

Computer-controlled Player Information:

- All 3 characters need to be onscreen, the selected character will be controlled by the player and the rest will follow a simple following code. The computer-controlled characters will follow the main character. When the computer-controlled characters take damage, they won't lose a life, they'll just display the damage sprite (or animation). When the

computer-controlled characters die(only in case of falling into a bottomless pit), they get instantly respawned.

- (Refer to the provided video).

character	speed	ability
	18(float)	highest speed
	10(float)	flight (7 seconds)
	12(float)	punching breakable walls

Enemies:

Bat Brain: A robot that can fly, it follows the player slowly. HP is 3.

Bee-Bot: A robot that can fly, it flies in a zig-zag pattern across a section in a level and shoots projectiles every 5 seconds. HP is 5.

Motobug: A crawling robot, similar to the bat-brain, he follows the player across a section in a level. HP is 2.

CrabMeat: A crawling robot, similar to the bee-bot. It moves left to right across a section in a level and shoots projectiles. HP is 4.

Egg stinger (Final Boss)

He is the final boss, he has a simple attack pattern. He flies left to right, above the player. After

every 10 seconds, he comes down to the position of the player to destroy the block of ground beneath him. The player must dodge him, and then attack him. Contact with the boss in the non-ball form will decrease an hp. Contact with the spike in any form will decrease an hp.

General Enemy Information:

Each enemy(except the boss) has its own hp. When the player contacts the enemy (in non-ball form) or its projectile, the player loses one hp.

The boss gets destroyed in 15 hits.

Levels

Level 1: The first level is the labyrinth zone. It has an easy difficulty level. This level is 200 by 14 cells (x by y).

Level 2: The second level is the ice cap zone, a snow-based level, thus the friction here is going to be a lot less than level 1. The players will have a higher acceleration/deceleration. It has a medium difficulty and is 250 by 14 cells.

Level 3: The third level is the Death Egg zone. It takes place in space. Thus this level will have a low gravity and low player speeds. It has a high difficulty and is 300 by 14 cells.

Boss Level: This level has a boss only, defeat the egg stinger to win the game.

Level-General Instructions:

Create the level with the help of the level layout given, it will provide convenience in level design.

Obstacles :

Bottom-less pits: Be careful not to fall in them, otherwise instant death.

Spikes: When the player-controlled character hits the spikes (from above i.e. the pointed side), he loses a health point. Other characters only display the damage sprite (or animation), they don't

lose an hp.

Walls(Ground): This block type forms the ground and the walls which have collision from all sides.

Platforms: They are the platforms that the player can jump on. They only check collisions from above.

You can create more obstacles by using your own characters in the game grid.

collision checking



wall/ground



platform

Collectibles:

Rings: Rings are the main collectible in the game, each ring must be collected and then the end of the level must be reached. Rings must be placed in challenging locations.

Extra lives: Extra lives are hidden throughout the level, attaining these can give you an additional hp.

Special Boost: Gain a boost in speed ability: +4 speed for sonic, +4s flight for tails, and invincibility (for 15 seconds) for knuckles. (One of these will be activated, depending on which character got the powerup.)

Creativity:

Use your creativity in level design and music selection. The sprite sheets are provided, but feel free to use your own sprite sheets if you want. You can use the given template to design your

levels with some convenience.

Create level triggers, such as when the player crosses a certain point in a level, the ground in front of him collapses and tails should be equipped to fly across the gap.

This is NOT a bonus.

Menu:

A menu screen must be displayed at the start of the game. It must have the following options:

- New Game (starts a new game from level 1)
- Options (Toggle the music and sound volume etc).
- Continue (Loads the saved game) -if this bonus has been implemented
- Leader Board (Shows the high score leader board) -if this bonus has been implemented

Each new game must ask for the player's name (for the leaderboard)

Hitboxes:

Hitboxes are not necessarily an object or a class, rather they are used to determine collision. Both the players and the enemies have their own hitboxes. To see how to implement it, see the hitbox video.

Bonus:

Level Save:

The level should be saved when the game is closed and the saved game must be loaded when the game is turned back on. Do this via file handling. It should save:

- The hp
- The character
- The position in the level
- The number of rings collected
- The enemies defeated
- The score
- The player's name

The game should save the state if the game is closed. The next time the game is booted, the saved game must be loaded when continue is selected on the menu.

High Score Leaderboard:

The top ten high scores should be saved and displayed in the leaderboard option.

Animation :

Create an animation class to animate all the characters and enemies. The sprite sheets will be provided. However, feel free to use your own.

Video Links:

<https://youtu.be/JyF41nWGyTU>

<https://youtu.be/Y4uF4a8c39o>

Have fun

