Project 3: HTML5 game

This game is made by using Phaser3 game making library for JavaScript. I do not have a css file because I didn’t use many html elements in this application. There are 7 different class files, 6 different scene files, one game-config file and the index.html file. I created a file for each scene and class because I think that that made the code look cleaner and doing that made it easier for me to know where to find different things. The different classes and scenes are explained in tables 2 and 3.

How does it work?

Plot:
In the game the player controls a traveling UFO to help him pass a highly poisonous planet that lies on his journey. The player can collect points, shoot bullets and destroy asteroids and meteorites that get in the UFO's way.

Controls:
The player can control the UFO in a 2D game area using WASD-keys. The player can shoot bullets by pressing space and using the mouse cursor the player can define the direction where the bullets will travel.

Two different levels:
In the first level the player is required to stay alive for 60 seconds while the ufo is approaching the planet. There are meteorites and asteroids that can hurt the player if the player bumps into them. In the second level the player controls the UFO near a highly poisonous planet which causes the player to lose 5 health points per one second. This way, in the second level staying alive is harder than in the first one. In addition to hostile surroundings, there are also asteroids and meteorites similar to the first level.

Shooting bullets:
The player can shoot bullets in the game and with bullets the player can break asteroids and meteorites. Meteorites have 30 health points and asteroids have 100. One bullet deals damage worth 10 health points so it is possible to destroy a meteorite with 3 bullets and an asteroid with 10 bullets.

Items:
There are two different items in the game: emeralds and ammo boxes. The player can obtain emeralds by destroying meteorites with bullets or other meteorites. If the meteorite is destroyed using bullets, the emerald will spawn with 40% probability. If it is destroyed using other meteorites, it will spawn with 70% probability. Collecting one emerald grants the player 20 health points. Ammo boxes can be obtained by destroying asteroids. Breaking one asteroid spawns one ammo box which will grant the player full ammo.

The player can also collect score points in the two different levels, but I didn’t have time to finish it. Right now the feature of collecting score points is in the game only for the players own entertainment.

Different items give points according to the following table:

How to get score points?	**Amount**
Player destroys asteroid using 2 meteorites	+ 50
Player destroys meteorite using bullets	+ 10
Player destroys asteroid using bullets	+ 20
Player collects an emerald	+ 10
Player collects an ammo box	+ 10

Table 1: How to get score points?

Classes and scenes

Class name	A brief description
AmmoBox	Creates ammobox game sprites and has methods for collecting and spawning them.
Asteroid	Creates asteroid game sprites and has methods for different collisions (payerCollision, meteoriteCollision, asteroidCollision, bulletCollision), respawning the asteroid and a movement method that is run all the time to respawn the asteroids when they leave the playing area.
Background Items	Different background items can be created here and their movement is defined in a method that is run all the time (just like in the Asteroid class).
Bullets	The bullets group is created in the constructor and there is a method for when the player wants to shoot a bullet.
Emerald	Emeralds are created here and there are methods for collecting and spawning them.
Meteorite	In the constructor the meteorites are created and placed randomly in the game area. There are methods for respawning, movement and different collisions (just like in asteroid class).
Player	In this class a single sprite is created for the player and through this class (and the sprite) it is possible to control the player's health, ammo, and score. There are methods for controlling (movement) and killing the player, as well as adding health or ammo and one for shooting bullets.

Table 2: Different classes

Scene name	What it does
GameScene	This is the main game scene for level 1. In this scene all of the different classes are called and controlled. The whole game during level 1 is built in this scene.
GameScene2	This is the same as GameScene but in this scene there are more meteorites and the environment is made hostile towards the player.
NextLevelScene	This is the scene that happens after completing the first level. Here the player gets a quick briefing about what is different in level 2.
restartScene	If the player dies, they can restart the level in this scene.
resultsScene	When the player has completed both levels, the restart scene starts and congratulates the player for winning the game.
startScene	This is the first scene the player will see in this game. In this scene there is a start button and if the player presses it, the game will start.

Table 3: Different scenes

Points justification:

Here is a list of features that I'm asking to get points from. I added a brief justification when I thought it was necessary.

Feature	**Max points**
Well written PDF report	**3**
Application is responsive and can be used on both desktop and mobile environment	**4**
Application works on Firefox, Safari, Edge and Chrome	**3**
The application has clear directory structure and everything is organized well	**2**
<Your own feature: describe why should it be accepted>* - I made all of the images and music for the game by myself.	**1**

Feature	**Max points**
There is a clear plot in the game. It has a start and end. - The plot is explained in this report.	**3**

There are different (more than 1) objects to collect - There are emeralds and ammo boxes that the player can collect.	**2**
There are moving parts in the game area (other than the player and enemies, so e.g. some floors fall apart) - Asteroids and meteorites are not necessarily enemies and they are moving. Also the background items are moving but they have no collision with the player.	**3**
There are more than one map - There are two different levels in this game.	**3**
Gamer needs to use both keyboard and mouse to meaningfully control the player character - The player moves the UFO using WASD-keys, shoots using space-key and defines shooting direction with the mouse cursor.	**3**
Game uses physics engine, so that there are falling parts / enemies / players - There are a lot of moving parts in my game including the player, meteorites and asteroids.	**2**
There are enemies that can hurt the player - If asteroids and meteorites are considered enemies because they can hurt the player, then yes.	**3**
There is music and sound effects when player shoots/jumps or anything like that - I made the music by myself using BeepBox!	**3**

Sources:

All of the sources I used while creating the game can be found in game-config.js file as well as in the list below:

1. Lecture video (mainly for getting started):
https://www.youtube.com/watch?v=O6zoZAq86io
2. Help with changing arrow keys to wasd for movement:
https://photonstorm.github.io/phaser3-docs/Phaser.Input.Keyboard.KeyboardPlugin.html
3. (I did not use this source after all, but changing the numbers of every reference from here would be rather difficult so I'll leave this as an explanation)
4. Help with creating groups:
https://github.com/photonstorm/phaser-examples/blob/master/examples/groups/add%20a%20sprite%20to%20group.js
5. Help with iterating through groups:
https://phaser.discourse.group/t/how-work-method-iterate-for-group/4422
6. Help with shooting:
https://gamedev.stackexchange.com/questions/13326/how-do-i-generate-projectiles-toward-the-mouse-pointer
7. Help dealing with direction vectors (in Player.js):
https://rexrainbow.github.io/phaser3-rex-notes/docs/site/vector2/

8. Help with ammo regeneration:
https://gamedev.stackexchange.com/questions/182242/phaser-3-how-to-trigger-an-event-every-1-second
9. Help with adding music: https://phaser.io/examples/v2/audio/play-music
10. Help with passing score variable to next scene:
https://stackoverflow.com/questions/53356039/how-do-i-pass-data-from-scene-to-scene-in-phaser-3
11. I learnt using children.iterate from here:
https://phaser.io/tutorials/making-your-first-phaser-3-game/part8
12. Overall I used a lot of phasers own documentations and tutorials:
https://phaser.io/examples