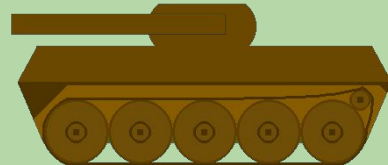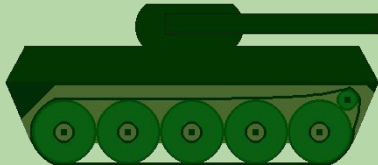# Battle City

Learn physics from real life examples!

Goal

Our primary goal is to improve the methods of physics education by using real-life scenarios that closely simulate real-world physics.

Most of the science problems from textbooks are, despite being possible to recreate in real world, are really expensive to conduct and need an enormous resources to implement. Our product terminates this problem by fitting *the world* into your pc/laptop

Idea

So it is basically a textbook, but with the ability to satisfy young people's curiosity, "what if you launch a tank bullet with the speed 100 meters per second?"
Some kid might ask after their first physics lesson about "Moving objects", well, in our program, you can find our!
Learning shouldn't be just reading and reciting, but rather being able to deeple understand the concept and know how it is applied in the real world.

Functionality

1. Theory

User is first given an explanation on the topic, using our simulator and general physics information
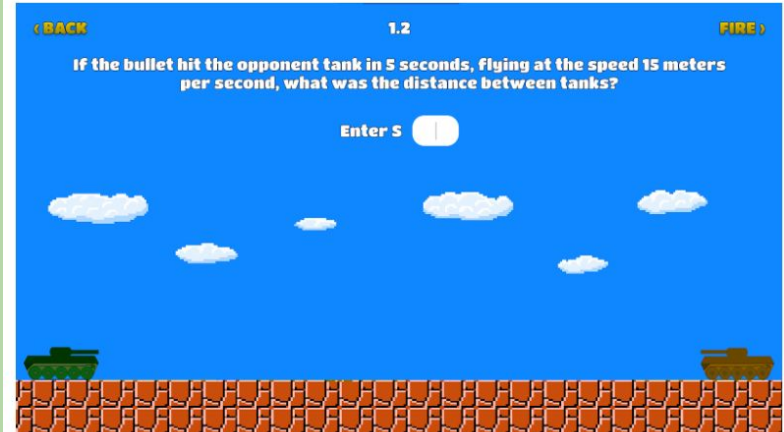
1.2

Imagine you want to estimate the distance between two cities. If you know the speed of a train that connects these cities and the duration of its journey, you can easily calculate the distance. For instance, if the train travels at 200 km/h and the journey takes 2 hours, you calculate the distance using the formula

$$distance = speed \times time$$
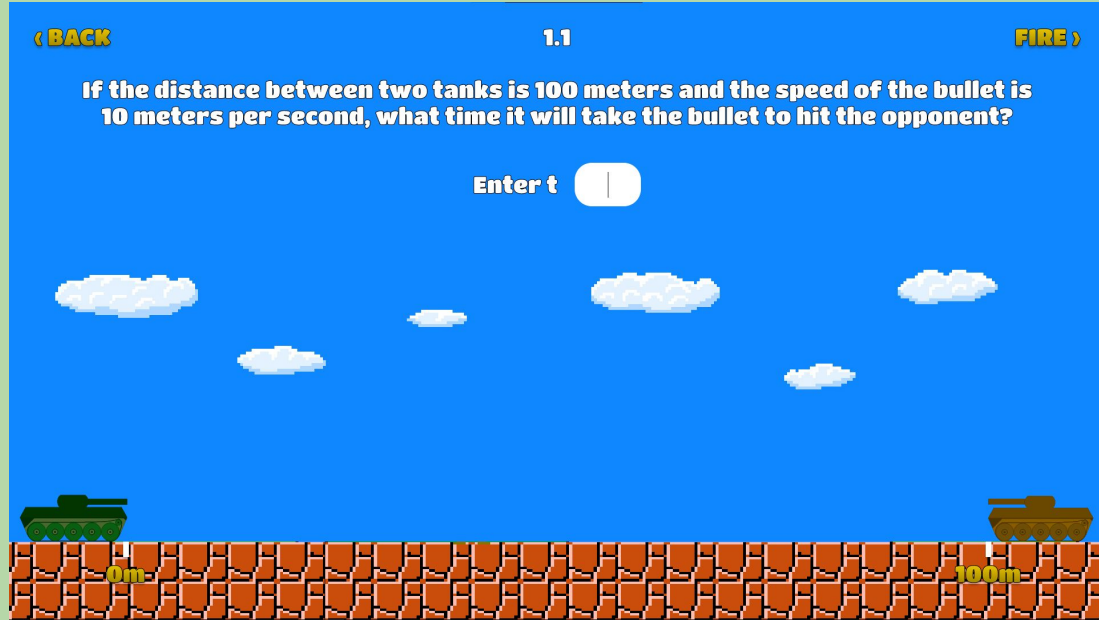
Therefore, distance = 200 km/h × 2 hours = 400 km. This formula is derived from the same principle used in the earlier task of calculating travel time, demonstrating its versatility in various scenarios involving speed, time, and distance.

In the example below we are given that t = 5s, v = 15m/s and the S is unknown. Using formula above (S = v x t), S = 5 x 15 = 75

‹ BACK   1.2   FIRE ›

If the bullet hit the opponent tank in 5 seconds, flying at the speed 15 meters per second, what was the distance between tanks?

Enter S [ ]

2. Physics problems

Then based on the information we have just given, we ask users to solve problems and input their answer

If the distance between two tanks is 100 meters and the speed of the bullet is 10 meters per second, what time it will take the bullet to hit the opponent?

Enter t

0m   100m

If the answer is right, then the tank will shoot the bullet which behaves just like in the real world, it's speed, time and distance it travels is the mini-copy of the real world.

There is a timer on the top and bullet flying according to real physics

Time: 2.50 s

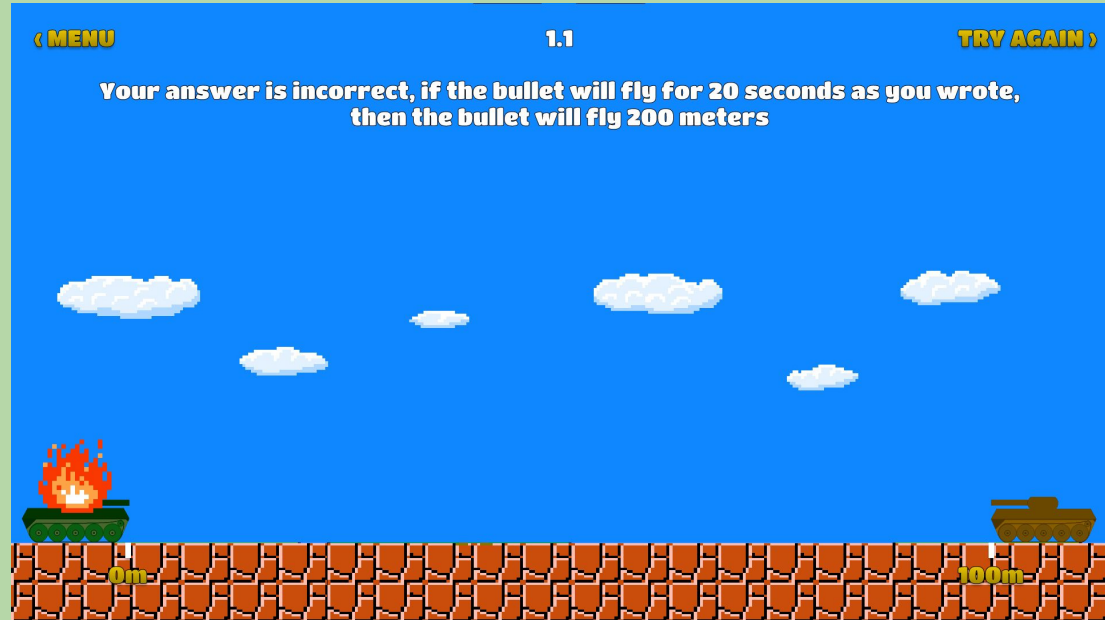0m   Xm
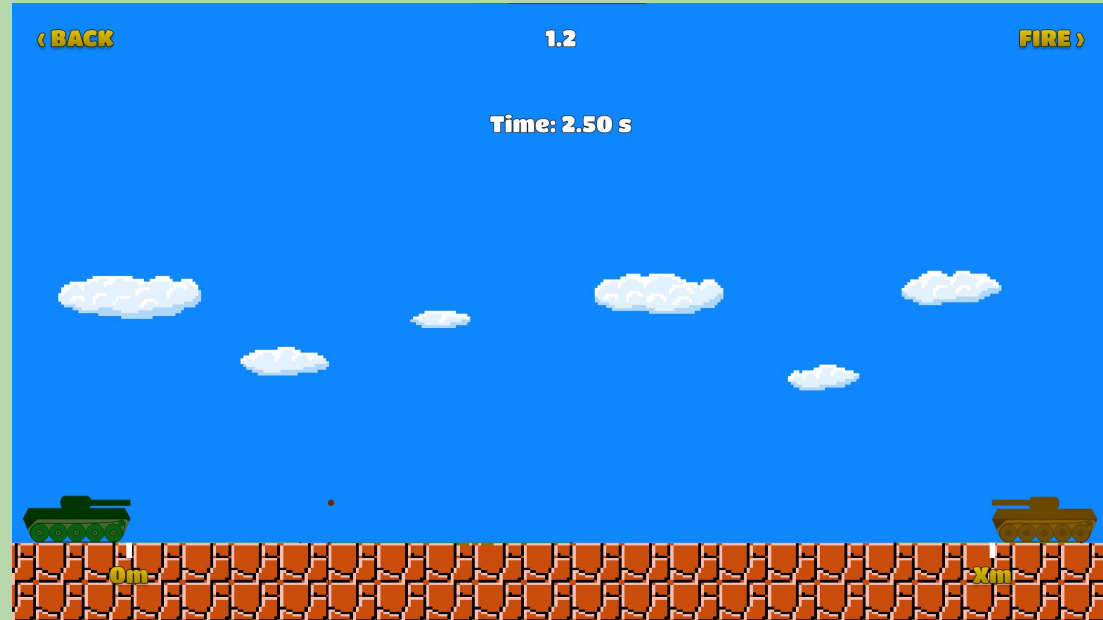
Enemy is now defeated,

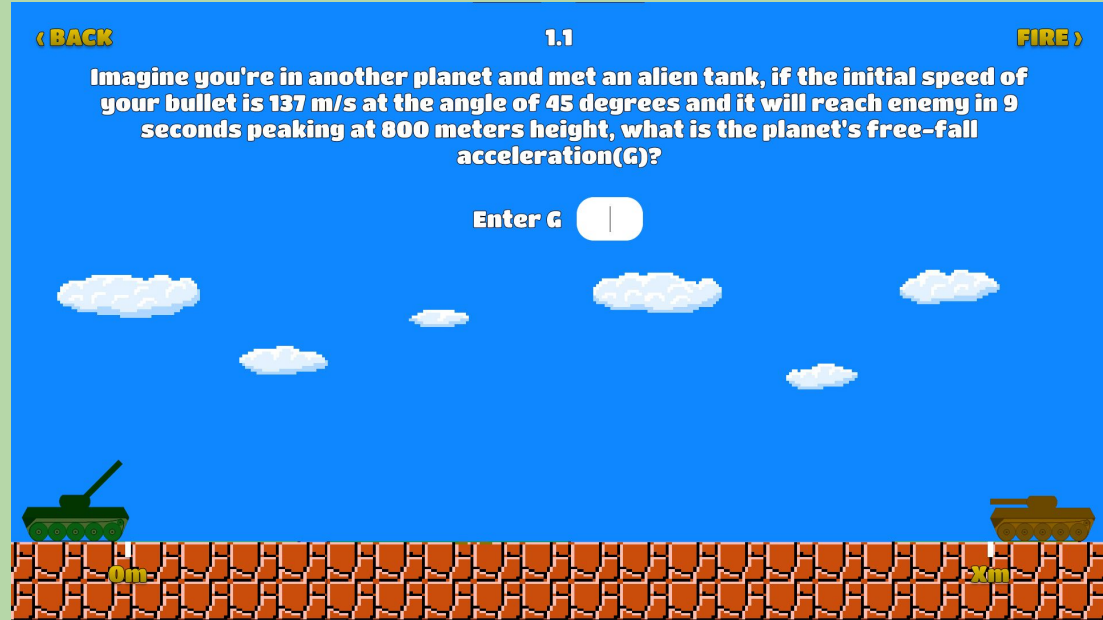If you got the answer right from the first try, it is 3 stars, if you got it right from the second time, 2 stars etc.

But what if you got it wrong? Well, you will get shot(also physically realistic)

‹ MENU   1.1   TRY AGAIN ›

Your answer is incorrect, if the bullet will fly for 20 seconds as you wrote, then the bullet will fly 200 meters

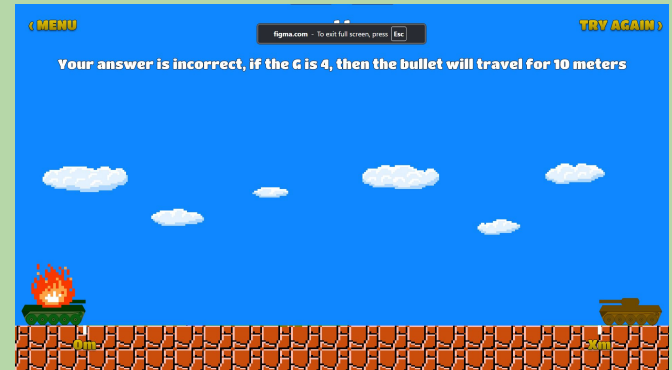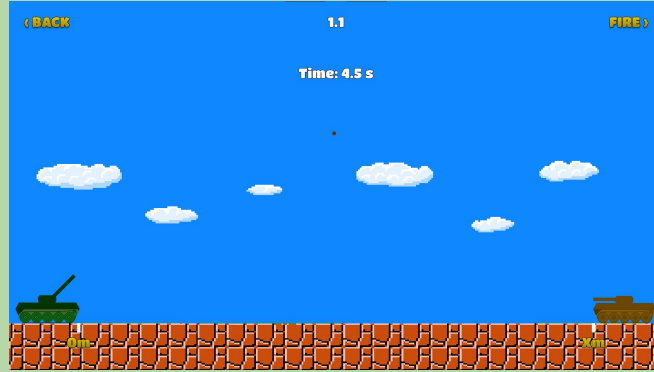0m   100m

Functionality 2

Next level, is even more interesting!
First, of course, there will be an explaining theory using our simulator, later there will be tasks, like the one on the right picture. You will need to calculate G, in order to defeat the opponent by shooting.

‹ BACK   1.1   FIRE ›

Imagine you're in another planet and met an alien tank, if the initial speed of your bullet is 137 m/s at the angle of 45 degrees and it will reach enemy in 9 seconds peaking at 800 meters height, what is the planet's free-fall acceleration(G)?

Enter G

0m·   Xm

Again, if you give a right answer, your tank shoots according to your answer, otherwise it doesn't and you will get shot back.

Time: 4.5 s

0m   Xm

‹ MENU   TRY AGAIN ›

figma.com - To exit full screen, press Esc

Your answer is incorrect, if the G is 4, then the bullet will travel for 10 meters

0m   Xm

Features

Main features:
Real life physics based on formula calculation.

Nice ui, can be used to learn physics, interesting for kids and easy to use as it is a web app.

Technological stack

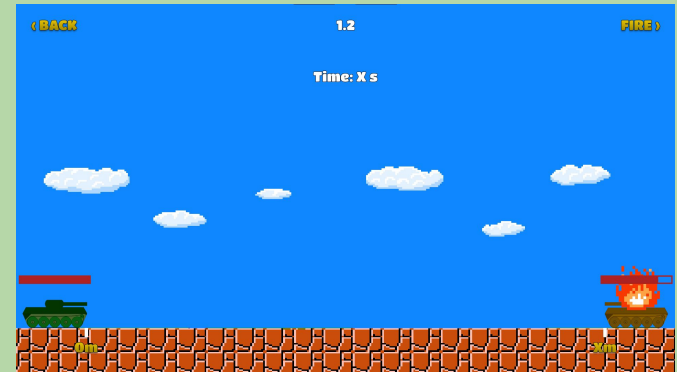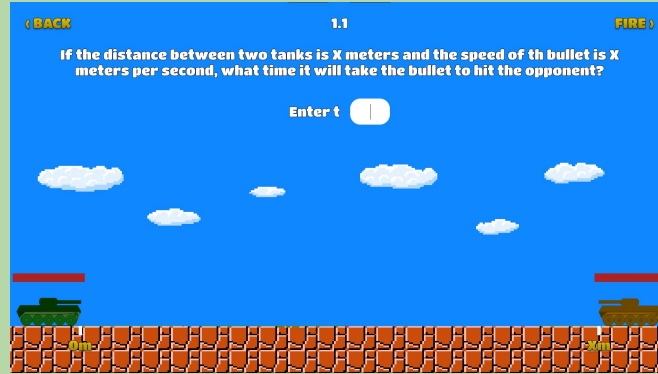It is mainly a JS web app.

Used tech:

React js, Next js, Tailwind CSS, SASS.

Plans

1. Multiplayer
2. New levels on new topics

Plans: multiplayer

Users, first will get a theory to learn, then they can compete between each other who will solve the problem first, like a quiz, the winner's tank shoots the opponent, decreasing, opponent's tank health

Winner gets certain points, which are displayed in the leaderboard, there can be custom leaderboard, like "school" leaderboard, or "class" leaderboard

Plans: new levels

We are planning on adding new levels! Like for example for the topic of Restoring force (like rubber's force).

Catapults can be used to simulate this topic, for example you will need to calculate the stiffness of the catapult to shoot it right into the opponent.