Taskers

Browser-based Online Multiplayer Board Game for Improving Computational Thinking Skills

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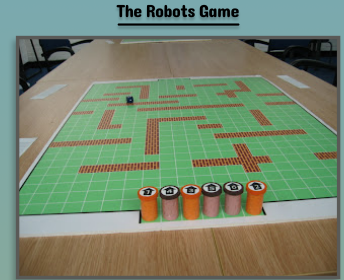University of Tartu, 2022

Overview

Taskers is a browser-based board game, which can be played online together with your friends on a mobile device on www.taskers.ee.

It is a digitized version of an existing board game, which with added modifications provides a more fast-paced and user-friendly experience on mobile devices.

Game View

Main Menu

Lobby View

Game - Terminal open

How to play

The goal of the game is to reach the red finish tiles before everybody else. In order to do that, players have to use the terminal to write instructions for their robot and submit them before the timer runs out. If a player fails to submit their tasks on time, their terminal is wiped and they need to try again the next round. When all of the players have submitted their tasks or the timer reaches zero, the robots execute their tasks and another round of task submitting begins.

Future development

Leaderboards

Alongside teaching and having fun, Taskers also offers competitiveness for those who like that. For such players who enjoy climbing the ranks and gaining more points than their friends, a global or region-based leaderboard could be implemented. It could rank the players based on different statistics, such as total victories, fastest submission time, or most boards created.

Board maker

Board maker is a tool that allows the users to create their own boards, which anyone can load into their game and play with their friends. When creating a board, a blank canvas of tiles is provided where the user can place tiles of their choice anywhere on the board. This allows the users to get creative and increase the fun factor of the game by themselves, not having to rely on the developers to create new boards for the game to not get repetitive.

Technologies

When it comes to the used technologies, Taskers is unlike most modern games, which are often built with easily accessible engines such as Unity or Godot. Taskers, on the other hand, uses a modern web development stack, which is mostly used for creating dynamic reactive websites.

Hosting

veebimajutus.ee

aws

socket.io   express

Frontend   Backend

Database

Inspiration

Taskers was inspired by "The Robots Game", a board game, that was designed as an introduction for programming classes. The author of the game, Stuart Wray, compared this game to a magician's first trick, which gets the crowd riled up. Similarly, The Robots Game would act as a gateway into an interest in programming by requiring the players to use the skill of computational thinking to achieve victory.

The Robots Game

Methods

For creating Taskers, the work was split into four different sections in order to better streamline the process.

- Base application & Multiplayer rooms
- Building the game functionality and state
- Coming up with the designs and creating them
- Implementing the designs into the frontend code
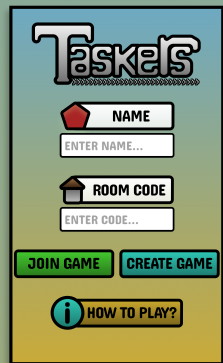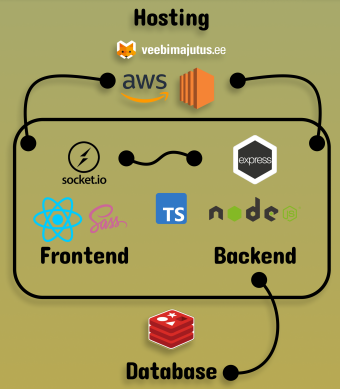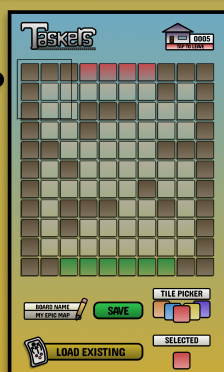
What is Computational Thinking?

Jeanette M. Wing defined CT as follows: "Computational thinking is the thought processes involved in formulating problems and their solutions so that the solutions are represented in a form that can be effectively carried out by an information-processing agent".

CT is not just one skill but rather breaks down into multiple different pieces. CT is something that in addition to basic abilities, like reading and writing, should be taught to every child, as it is a fundamental skill for everyone, not just for computer scientists.

Some of CT subskills are:

Decomposition	Collecting and Analyzing data	Abstraction & Simulations	Automatation	Paralellization

How taskers improves CT?

Terminal

Develops the player's ability to split a bigger task into multiple smaller parts (a.k.a. decomposition), as the players have to combine an array of tasks from predefined movement commands.

Time limitation

Makes the game more intense, by limiting the time in which the players have to come up with a solution. This means that a player has to be increasingly careful when picking their moves, as they wouldn't have much time to rethink them. Players would need to debug their solutions before submitting them and if spotting a mistake, the adrenaline of getting their solution correct before the timer ticks down to zero, will only increase their performance and thought speeds.

Teamwork

When Taskers is played in teams, the communication between team members also starts having an impact on the outcome. Compared to a free-for-all battle, playing in teams requires the players to explain their intentions and understand others. This means that the players have to use their analytical skills along with further debugging in order to better achieve their intentions together as a team.

Game state

Improves players' conditional state awareness in different situations, (which is also useful during actual programming), because in addition to their own position, the player also has to consider other players and their possible turns.