Game Title
Design Document

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BIO-8010 Communicating Science Module 3
Visualizing your science
github.com/fjukstad/bio-8010

1 Introduction

Code Lab is a game where kids collaborate on escaping from an underground dungeon by programming their in-game characters to fight monsters, solve puzzles and collect gems. The game is played in a collaborative environment such as the Tromsø Display Wall[1], where kids program on their own devices and run the game on the large display. The display wall environment provides an interactive arena where kids can collaborate on completing the game together.

Since the kids need to program the characters to perform different tasks, they will have to learn the basics of programming. The different levels will require them to learn about *variables*, *data structures*, *functions* and *control statements* such as *for*-loops and *if*-statements. As the kids play the game, the puzzles and problems they are faced with will increase in difficulty, making it necessary to design and implement more complex solutions.

The game is intended for children 10 - 16 years old, who already have some experience with graphical programming environments such as Scratch[2]. It is intended for kids that want to learn more about programming, specifically getting started with text-based programming.

CodeLab is open-sourced at github.com/fjukstad/bio-8010.

2 Description

CodeLab takes place in a fictional dungeon, where each player is assigned a hero that he or she controls by programming their actions. The players equip their heroes with armor, weapons and other items that can help them complete the different levels. For each level, the players have to complete a set of tasks by programming their characters by using a programming language similar to the Lua programming language[1]. Players write the code on their local machine, be it a laptop or a smart phone, and see their characters perform the actions on a large shared display. Alongside the game view, the players see each others code making it possible to help out eachother if they encounter any problems.

1. lua.org

Fig. 1. A sketch of the first level of CodeLab. The goal of the level is to write code that moves the character (the circle) down to the yellow square. The player writes three commands, $moveDown$, $moveRight$ and $moveDown$ to complete the level.

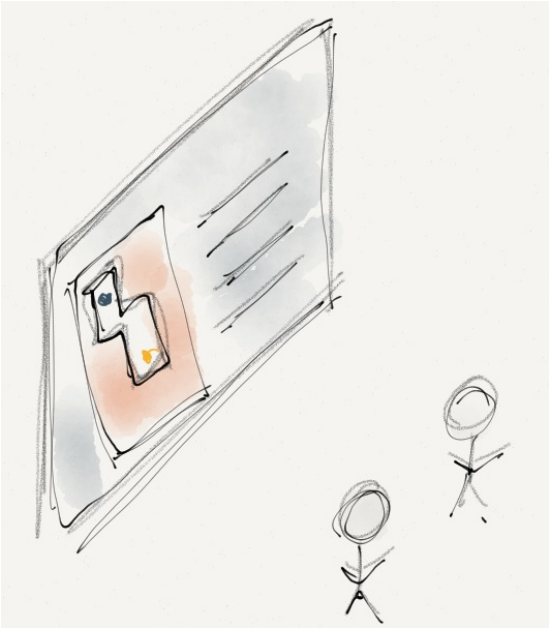

Fig. 2. The CodeLab environment. Players collaborate to solve a level. Both the graphical window where the game runs, as well as the source code is shown on a large display.

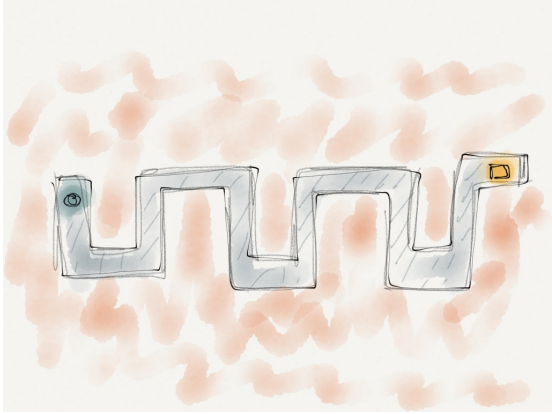

Fig. 3. A level that can be completed by writing a simple loop.

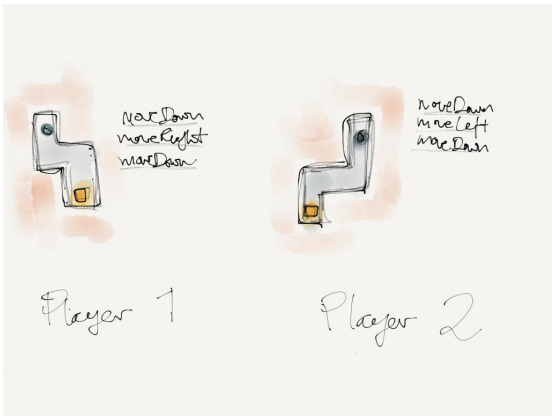

Fig. 4. Two players trying to complete the first level. This view is shown on the large display, where they can help each other write the necessary code.

[1] O Anshus, Daniel Stødle, T Hagen, Bård Fjukstad, J Bjørndalen, L Bongo, Yong Liu, and Lars Tiede. Nineyears

of the tromsø display wall, 2013.

[2] Mitchel Resnick, John Maloney, Andrés Monroy-Hernández, Natalie Rusk, Evelyn Eastmond, Karen Brennan, Amon Millner, Eric Rosenbaum, Jay Silver, Brian Silverman, et al. Scratch: programming for all. *Communications of the ACM*, 52(11):60–67, 2009.