

Lab 8.0

The Approach

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Goals

The goal of this lab is work through the design stage of a program.

Instructions

Let us pretend that we (the class) are the software company hired to produce a simple game. Today in class we are going to talk through (whiteboard) as much of the game as possible. We will not be coding. Your task for the lab is to take notes about the agreed upon implementation. You will submit a copy of your notes for credit.

Game Description

The game is called *Blind Frogs and the Ladybug*. It consists of a 40x40 2D map. Each square on the map is one of the following: ground, block, goal, bamboo leaf, spawning pool or hole. The active components of the game are the player's *ladybug* and three *frogs*. The goal of the game is to move the ladybug from its random start to the goal. In order to open the goal, the ladybug must first find the bamboo leaf. The ladybug must avoid frogs. For each level, the map will be randomly generated.

Map Components

Here is a description of the map components:

- Ground: Normal square on the map. The ladybug and the frogs can occupy ground squares without consequences.
- Block: Impassible. Blocks movement.
- Goal: If the ladybug reaches the goal, the player wins (provided it has the bamboo leaf).
- Bamboo Leaf: The ladybug needs this to pass through the goal.
- Spawning Pool: If a frog dies, another will spawn here.
- Hole: A bottomless hole in the earth. If the ladybug or a frog moves onto a hole square, it falls in and dies.

Rules

Here are the rules of the game:

- 1 The ladybug and the frogs can only move in four directions: UP, DOWN, LEFT or RIGHT.
- 2 The ladybug moves 1 square at a time. Except, once per map, it can fly 3 squares. After that it is too tired to fly until the next map.
- 3 Frogs can move 1 or 2 squares at a time.
- 4 The ladybug can see 3 squares in all directions (regardless of terrain).
- 5 The frogs are blind.
- 6 Although the frogs are blind, they can sense if the ladybug is next to them. If they start their turn and the ladybug is next to them in ANY direction, they eat the ladybug and the game is over.
- 7 Frog movement is completely random.

Player Controls

The player does not actually play the ladybug directly. Instead, the player makes a series of rules before the game starts which govern the ladybug's actions. The rules have the format: <CONDITION> <ACTION> <PRIORITY>. Each turn, the game reads through all the conditions to see which are true and which are false. It then, ranks all the true conditions by priority and selects the highest one. If there is more than one winner, it randomly chooses one.

We must decide how to encode each part of the rules so that both the player can use them and the computer can understand them.