

Computing

Lesson 1: Computational Thinking

Algorithms

Kashif Ahmed

Materials from the Teach Computing Curriculum created by the National Centre for Computing Education



Task 1 - Planning a game

A game is being developed that allows the player to move their character around the world, collect items, and cast spells. Help solve the problem using computational thinking.



Task 1 - Planning a game - part 1

Decomposition: break down the problem

The character in the game needs to be able to perform certain actions, and each action needs to be handled differently by the game.

One of the requirements is that the player needs to be able to move using the commands forward, turn left, and turn right. The player should be able to pick up, use, and drop an item. The player should also be able to cast a spell and learn new spells.



Task 1 - Planning a game - part 1

The actions the player can perform have started to be broken down into smaller problems so that they are easier to solve. Complete the table for the required player actions.

Move	Item	Spell



Task 1 - Planning a game - part 2

Abstraction: remove unnecessary information

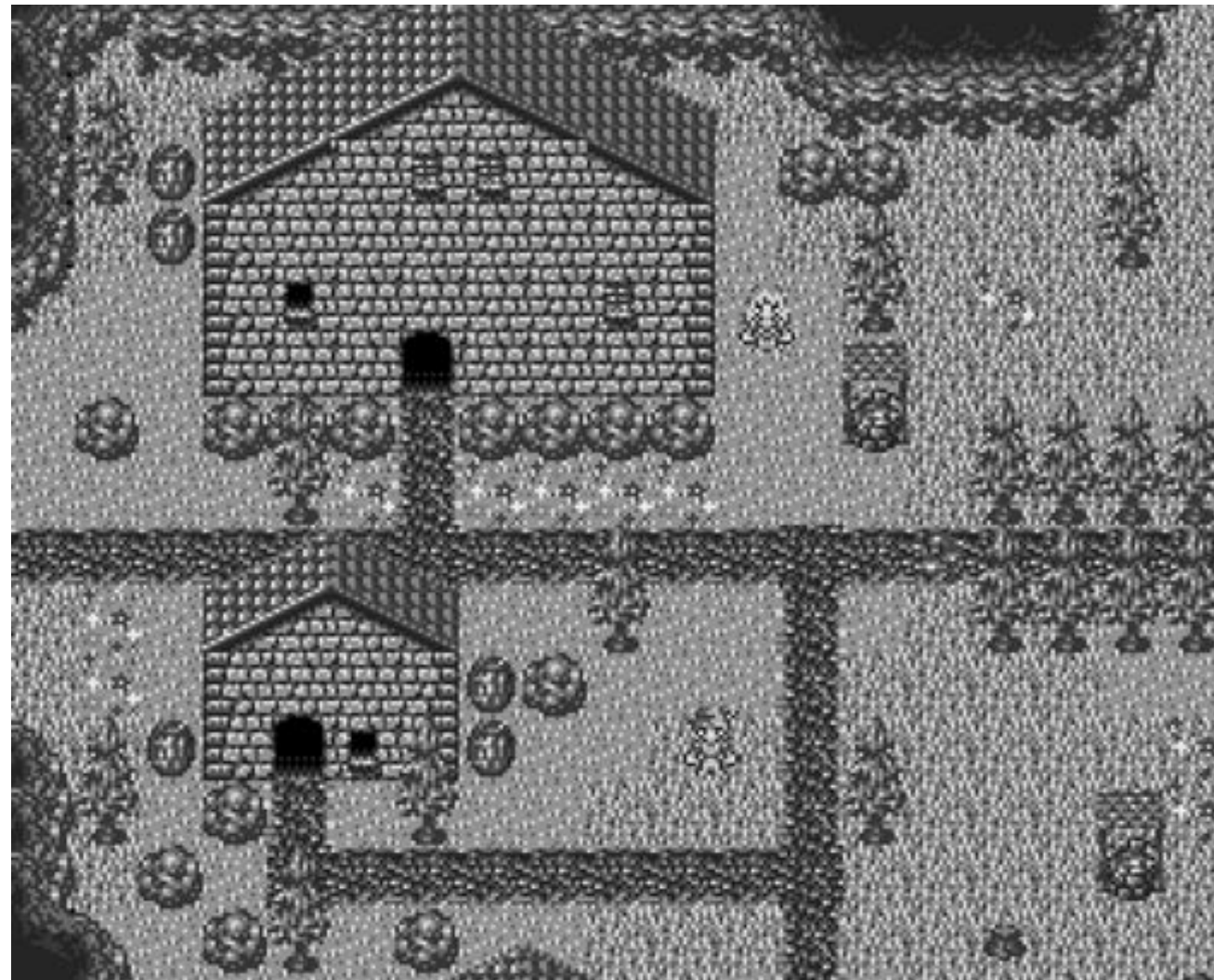
A graphic artist has designed part of the town that the player can explore, shown below.

The programmers want to test the movement of the player around this part of the town. They don't need all of the town details, just the buildings and paths.



Task 1 - Planning a game - part 2

On the next slide, draw a simpler version of the map below with all unnecessary information removed.



Task 1 - Planning a game - part 2



Task 1 - Planning a game - part 3

Algorithmic thinking: write a step-by-step solution.

The command **forward** can be used to move the character forward in the direction that it is currently facing, and the character will stop moving forward if it reaches a split in the path, or a door.

The commands **turn left** and **turn right** can also be used to change the direction relative to the character; for example, if the character is facing to the left, the command **turn right** will result in the character facing up.



Task 1 - Planning a game - part 3

Write down the order of the movements that the character should follow to go from the large building to the small house, travelling along the path.

