

CSCI E-23a

Introduction to Game Development

produced by CS50

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Assignment 5: “Legend of Zelda, The Pot Update”

Objectives

- Read and understand all of the Legend of Zelda source code from Lecture 5.
- Implement hearts that sometimes drop from enemies at random, which will heal the player for a full heart when picked up (consumed).
- Add pots to the game world (from the tile sheet) at random that the player can pick up, at which point their animation will change to reflect them carrying the pot (shown in the character sprite sheets). The player should not be able to swing their sword when in this state.
- When carrying a pot, the player should be able to throw the pot. When thrown, the pot will travel in a straight line based on where the player is looking. When it collides with a wall, travels more than four tiles, or collides with an enemy, it should disappear. When it collides with an enemy, it should do 1 point of damage to that enemy as well.

Getting Started

GitHub Classroom

In this course, we'll use GitHub Classroom to distribute projects and collect submissions. To begin Assignment 5:

1. [Click here](#) to go to the GitHub Classroom page for starting the assignment.
2. Click the green “Accept this assignment” button. This will create a GitHub repository for your project. Recall that a git repository is just a location where your code will be stored and which can be used to keep track of changes you make to your code over time.
3. Click on the link that follows “Your assignment has been created here”, which will direct you to the GitHub repository page for your project. It may take a few seconds for GitHub to finish creating your repository.
4. In the upper-right corner of the repository page, click the “Fork” button, and then (if prompted) click on your username. This will create a fork of your project repository, a version of the repository that belongs to your GitHub account.
5. Now, you should be looking at a GitHub repository titled **username/assignment5-username**, where **username** is your GitHub username. This will be the repository to which you will push all of your code while working on your assignment. When working on the assignment, do not directly push to the **games50/assignment5-username** repository: always push your code to your **username/assignment5-username** repository.

Setup

Time to pull down the starting code for Legend of Zelda! First, on your main repository page (<https://github.com/username/assignment5-username>), click on the green “Clone or download” button. Copy the “Clone with HTTPS” link to your clipboard (if familiar with SSH, you can use that instead).

Then, in a terminal window (located in `/Applications/Utilities` on Mac or by typing `cmd` in the Windows task bar), move to the directory where you want to store your project on your computer (recall that the `cd` command can change your current directory), and run

```
git clone repository_url assignment5
```

where `repository_url` is the link you just copied from GitHub. You will be prompted for your GitHub username and password

Go ahead and run `cd assignment5` to enter your repository.

A “Pot”ent Weapon

Welcome to your sixth assignment! We’ve explored the workings of a top-down adventure game in the style of Legend of Zelda and have a fair foundation for anything resembling it, be it a dungeon crawler or a vast 2D game featuring an overworld or the like. Let’s add a few pieces to this sample in order to pay homage to some of the classic Zelda titles and to give our character a shot at actually surviving his trek through the dungeon!

Your goals this assignment:

- *Implement hearts that sometimes drop from enemies at random, which will heal the player for a full heart when picked up (consumed).* Much of this we've already done in Super Mario Bros., so feel free to reuse some of the code in there! Recall that all `Entities` have a `health` field, including the `Player`. The `Player`'s health is measured numerically but represented via hearts; note that he can have half-hearts, which means that each individual heart should be worth 2 points of damage. Therefore, when we want to heal the `Player` for a full heart, be sure to increment health by 2, but be careful it doesn't go above the visual cap of 6, lest we appear to have a bug! Defining a `GameObject` that has an `onConsume` callback is probably of interest here, which you can refer back to Super Mario Bros. to get a sense of, though feel free to implement however best you see fit!
- *Add pots to the game world (from the tile sheet) at random that the player can pick up, at which point their animation will change to reflect them carrying the pot (shown in the character sprite sheets). The player should not be able to swing their sword when in this state.* In most of the Zelda titles, the hero is able to lift pots over his head, which he can then walk around with and throw at walls or enemies as he chooses. Implement this same functionality; you'll need to incorporate pot `GameObject`s, which should be collidable such that the `Player` can't walk through them. When he presses a key in front of them, perhaps `enter` or `return`, he should lift the pot above his head with an animation and then transition into a state where he walks around with the pot above his head. This will entail not only adding some new states for the

`Player` but also ensuring a link exists (pun intended) between a pot and the character such that the pot always tracks the player's position so it can be rendered above his head. Be sure the `Player` cannot swing his sword while in this state, as his hands are full!

- *When carrying a pot, the player should be able to throw the pot. When thrown, the pot will travel in a straight line based on where the player is looking. When it collides with a wall, travels more than four tiles, or collides with an enemy, it should disappear. When it collides with an enemy, it should do 1 point of damage to that enemy as well.* Carrying the pot is one thing; the next step would be to be able to use the pot as a weapon! Allow the `Player` to throw the pot, effectively turning it into a projectile, and ensure it travels in a straight line depending on where the `Player` is facing when they throw it. When it collides with a wall, an enemy, or if it travels farther than four tiles in that direction, the pot should shatter, disappearing (although an actual shatter animation is optional). If it collides with an enemy, ensure the pot does 1 point of damage. There are many ways you can achieve this; think about how you can extend `GameObject` to fit this use case, perhaps adding a `projectile` field and therefore a `dx` or `dy` to the `GameObject` to allow it to have traveling functionality. Perhaps include a `:fire` method as part of `GameObject` that will trigger this behavior as by passing in said `dx` and `dy` instead. The choice is yours, but `GameObject` is flexible enough to make it work!

How to Submit

Step 1 of 1

1. Go to the GitHub page for your **username/assignment5-username** repository (note: this is different from the **games50/assignment5-username** repository).
 2. On the right side of the screen, click the Pull request button.
 3. Make sure that the “base fork” is `games50/assignment5-username` , and the “head fork” is `username/assignment5-username` .
 4. Click “Create pull request”.
 5. On the next page, click the “Create pull request” button again.
- Congratulations! You’ve completed Assignment 5.

