

Data Structures Final Project - Pokemon

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I. Motivation

In order to further our understanding of data structures and create an interesting end product, we have chosen to create the Pokemon battle system and a Pokemon creator in C++. This will allow us to explore the data structures we use, gain experience setting parameters, and learn more about planning longer projects. This project could be completed in many ways; the challenge comes from utilizing the data structures learned in class to quickly and efficiently store and access all of the information needed to run a Pokemon battle.

II. Challenges

The main challenges from this project came from finding the scope of the project and accounting for edge cases. Determining how much of the game would be implemented turned out to be quite difficult as many of the battle systems are integrated with each other. As the game stands, there are many unbalanced fights are possible since moves are randomized and there is no way to select for Pokemon below a certain total stat count. This, however, is acceptable in our opinion because optimization was our main concern, not balance. Finally, there are many edge cases that can have a negative impact on the game, but the most common and main ones were addressed. Addressing would take quite a long time and is not the point of this project in our eyes.

III. Data Structures Used

The three major pieces of information needed to run a Pokemon battle are information on the Pokemon themselves (name, type, stats, ect.), the data for their moves (type, power, ect.), and the affinity chart which determines how the different types interact with each other. The functionality for adding new moves and new Pokemon facilitated the need to be able to abstractly add and read through each of their data types. The Pokemon were then stored in a binary tree sorted by name which allows for requested Pokemon to be easily found. A linked list was employed to store all moves for Pokemon which allowed for an arbitrary number of moves to be implemented. The type chart was stored as an array with a logic system to determine what index to find in order to determine the attack multiplier. Finally, during the actual battles, the Pokemon in each players party are stored in a linked list which allows for arbitrarily large parties and for fast switching between party members during battle. The overall logic of the written script can be seen in the flowchart below as well as two screen shots from the functioning program.

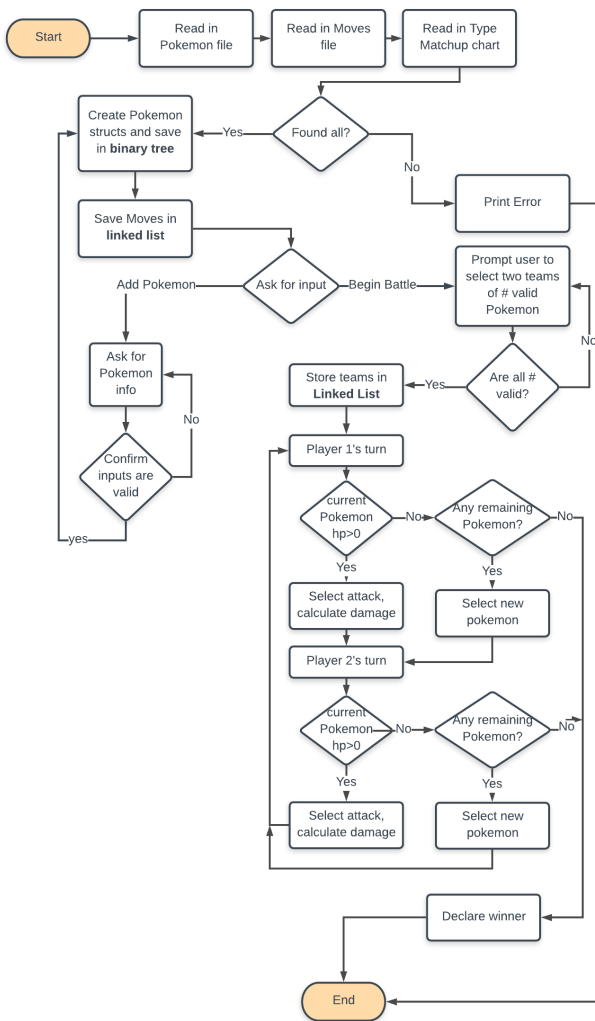


Figure 1: Logic Flowchart

```

lets battle my dudes
Pokemon Vulpix has 38 hit points remaining.
=====
Select one of Vulpix's moves:
1. Fury Swipes [Normal] power:18 accuracy:80 pp:15 damage type:ph
2. Fury Attack [Normal] power:15 accuracy:85 pp:20 damage type:ph
3. Mega Kick [Normal] power:120 accuracy:75 pp:5 damage type:ph
4. Fire Spin [Fire] power:35 accuracy:85 pp:15 damage type:sp
=====
4
Vulpix used Fire Spin
Vulpix inflicted 110 damage on Zubat
Zubat fainted!
Sending out Rhyhorn
=====
Select one of Rhyhorn's moves:
1. Lick [Ghost] power:30 accuracy:100 pp:30 damage type:ph
2. Razor Leaf [Grass] power:55 accuracy:95 pp:25 damage type:ph
3. Bubble [Water] power:40 accuracy:100 pp:30 damage type:sp
4. Poison Sting [Poison] power:15 accuracy:100 pp:35 damage type:ph
=====
1
Rhyhorn used Lick
Rhyhorn inflicted 75 damage on Vulpix
Vulpix fainted!
Sending out Voltorb
=====
Select one of Voltorb's moves:
1. Flamethrower [Fire] power:90 accuracy:100 pp:15 damage type:sp
2. Horn Attack [Normal] power:65 accuracy:100 pp:25 damage type:ph
3. Scratch [Normal] power:40 accuracy:100 pp:35 damage type:ph
4. Clamp [Water] power:35 accuracy:85 pp:10 damage type:ph
=====
4
Voltorb used Clamp
Voltorb inflicted 35 damage on Rhyhorn
Pokemon Rhyhorn has 45 hit points remaining.
=====
Select one of Rhyhorn's moves:
1. Lick [Ghost] power:30 accuracy:100 pp:29 damage type:ph
2. Razor Leaf [Grass] power:55 accuracy:95 pp:25 damage type:ph
3. Bubble [Water] power:40 accuracy:100 pp:30 damage type:sp
4. Poison Sting [Poison] power:15 accuracy:100 pp:35 damage type:ph
=====
  
```

Figure 2: Battle System

```

loading moves
finished loading moves

loading pokemon
finished loading pokemon

=====Main Menu=====
1. Add Pokemon
2. Print Pokemon List
3. Print Move List
4. Battle
5. Quit
  
```

Figure 3: Menu

```

Lets Battle!
Chose the size of the teams
2
Select 2 Pokemon for Player 1.
Name of #0 Mon:
Vulpix
Name of #1 Mon:
Voltorb
Here is team 1:
Vulpix [hp:38] Fury Swipes--Fury Attack--Mega Kick--Fire Spin
Voltorb [hp:40] Flamethrower--Horn Attack--Scratch--Clamp

Select 2 Pokemon for Player 2.
Name of #0 Mon:
Zubat
Name of #1 Mon:
Rhyhorn
Here is team 2:
Zubat [hp:40] Constrict--Ice Beam--Bite--Dig
Rhyhorn [hp:80] Lick--Razor Leaf--Bubble--Poison Sting
  
```

Figure 4: Selecting Teams