Python Programming for Data Science and Engineering

Ph.D. School in Information Engineering
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UNIVERSITÀ
DEGLI STUDI
DI PADOVA

DIPARTIMENTO
DI INGEGNERIA
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Pokémon is a series of video games developed by Game Freak and published by Nintendo and The Pokémon Company under the *Pokémon* media franchise

Pokemon Trainer

Pokemon characters
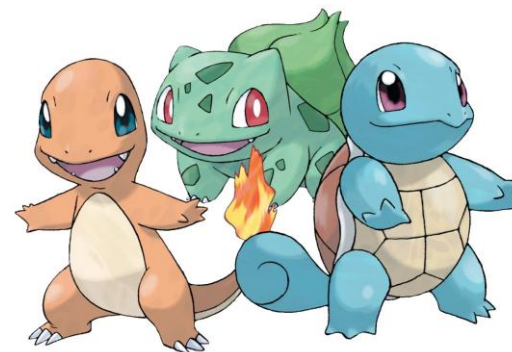
Items

Settings

The aim of **Assignment 2** is to build the *Game Engine*. Thus, to complete the assignment you must:

1. Create the *character* (similar to the Assignment 1)

2. Manage the *Story* (explore, go to Pokemon Center, etc.)

3. Manage a full *Battle* with a wild Pokemon

4. Implement a Main() for testing

Explanations on how to perform these steps are provided in the following slides.

1. Create your player:

When the game is launched, the program should allow the player to create a trainer character, similarly to what you have done in Assignment 1, as following:

- Asking the user to insert the name of the character

- Asking the user to select one among three starter pokemons (Bulbasaur, Charmender, Squirtle) to add to the trainer's *Pokemon list*

- Adding 10 *Potions* and 10 *Pokeballs* to the *Items* attribute of the Pokemon Trainer

Potions can be used only during a *Battle* and heal the active Pokemon of 20 HPs

Pokeballs can be used only during a *Battle* to catch the opponent pokemon
(see the following slides for more details)

After creating the character, the *Story* should immediately begin.

2. Story

During the story, your player is asked to perform one among 4 actions:

Explore ➔ let your trainer go around the fictional world, with a certain probability (e.g., 80%) to find a wild pokemon opponent (this will start a *Battle*).

Pokemon Center ➔ go to the Pokemon Center to restore the HP and PP of all the pokemons in the trainer's *Pokemon List* to their maximum.

Pokemon Store ➔ go to the Pokemon Store to fill all the trainer's *Items* to their maximum (i.e., 10 *Potions*, 10 *Pokeballs*).

Exit ➔ close the whole game and end the program.

3. Battle

The battle is structured in turns. At each turn the player can select an action, subsequently the enemy will fight back in response. The fight ends when:

1. the opponent is defeated (current HP = 0);
2. the opponent is catched (using a *Pokeball* item);
3. the trainer successfully run away;
4. all the trainer's pokemons are defeated.

For cases 1-3, the player returns immediately to the *Story*. For case 4, the player has lost and goes back to the *Pokemon Center* before continuing the *Story*.

At each turn of a battle, the player will have the possibility to select among:

- <u>Attack</u> (select and use a move of the active pokemon with *useMove()* of Assignment 1)
- <u>Change pokemon</u> (select the active pokemon)
- <u>Use item</u> (select and use an item from the *Items* list)
- <u>Run away</u> (success probability 60%)

After the player's action, the opponent pokemon can only attack by randomly selecting one of the available moves.

Your character can catch new Pokemons during the battles using the **Pokeball items**.

When a Pokeball is used, make a probability check (see slide 7 of Assignment 1) against the *catchProbability* value, defined as:

$$catchProbability = 1 - \frac{current\ Opponent\ Pokemon\ HP}{maximum\ Opponent\ Pokemon\ HP}$$

If the check is successful (i.e., probability < *catchProbability*), the battle ends, and the opponent Pokemon is added to the trainer's *Pokemon List*, keeping its HP and PP to their current values.
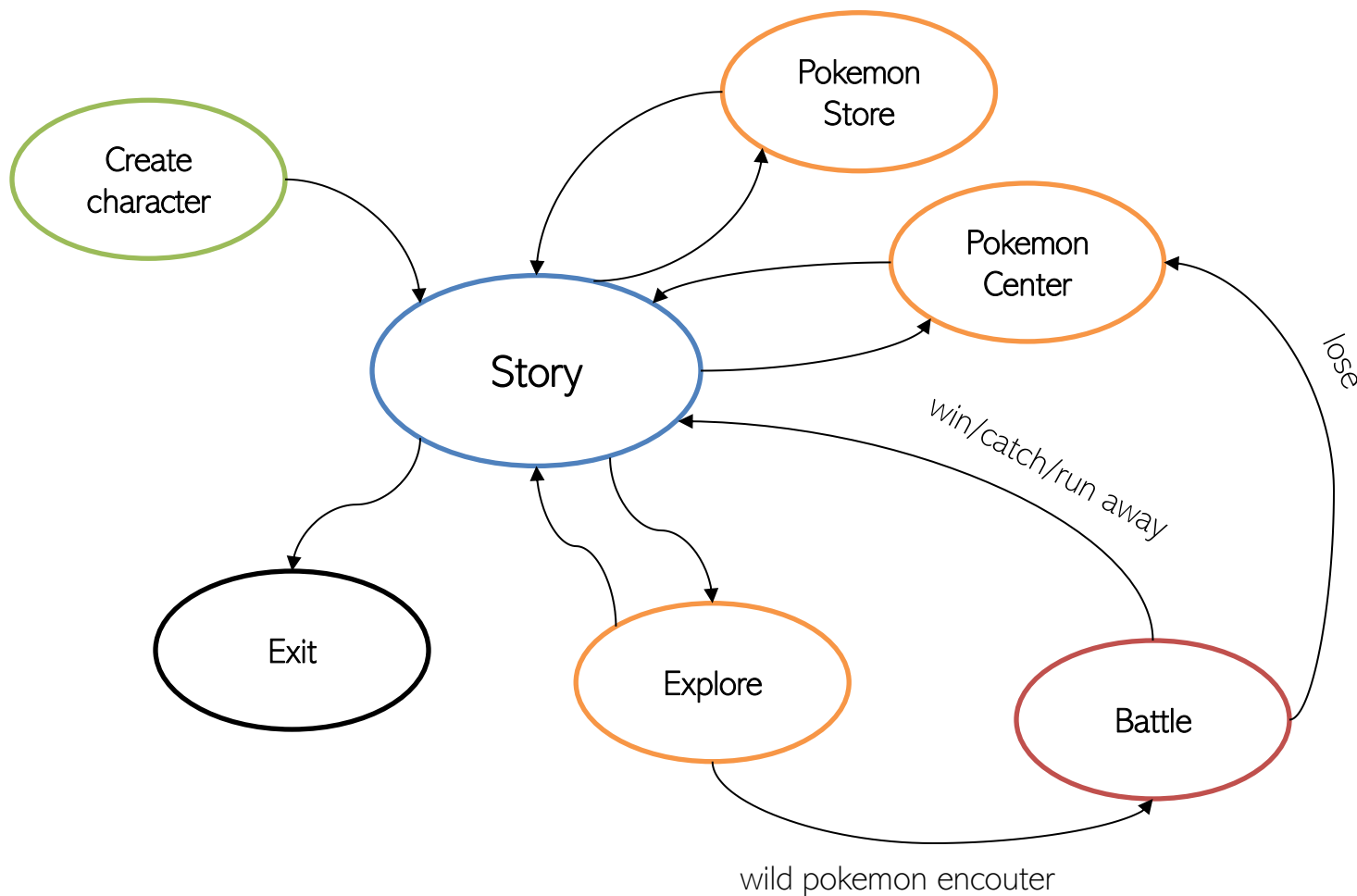
Caterpie

```
"national_pokedex_number": 10,
"name": "caterpie",
"types": ["bug"],
"baseStats": {"hp": 45, "attack": 30, "defense": 35, "speed": 45, "special": 20}
"moves" : ["twineedle"]
```

Pidgey

```
"national_pokedex_number": 16,
"name": "pidgey",
"types": ["normal", "flying"],
"baseStats": {"hp": 40, "attack": 45, "defense": 40, "speed": 56, "special": 35}
"moves" : ["tackle", "peck"]
```

Rattata

```
"national_pokedex_number": 19,
"name": "rattata",
"types": ["normal"],
"baseStats": {"hp": 30, "attack": 56, "defense": 35, "speed": 72, "special": 25}
"moves" : ["tackle"]
```

tackle

```
"name": "tackle", "type": "normal", "category": "physical",
"power": 35, "accuracy": 0.95, "pp": 35
```

peck

```
"name": "peck", "type": "flying", "category": "physical",
"power": 35, "accuracy": 1.0, "pp": 35
```

twineedle

```
"name": "twineedle", "type": "bug", "category": "physical",
"power": 25, "accuracy": 1.0, "pp": 20
```