1. Data Structures and Classes

1.1. Serialization Framework (`serialization.srsf.*`)

The following data structures involve the serialization and organization of data in the program. The `serialization.srsf.*` API supports saving and loading data to and from *Simple Relational String Format* data files, see **Appendix A** for format specifications.

1.1.1. *serialization.srsf.*SerializationContext

Description

The context in which the collection of objects is loaded. `Lazy<T>` should be used in conjunction with `LazyResolver<T>` to resolve object references within the context, thus, object references in serialized SRSF text format must be self-contained within the `SerializationContext`.

Fields

Field Name	Field Type	Field Description
directory	`String`	The root directory of the serialization context
serializers	`HashMap<String, Serializer>`	The serializers, keyed on the name of the class it is responsible for. See `Serializer`
collection	`HashMap<String, List>`	The loaded collections of objects, keyed on the name of the class of each collection.

Methods

`<T> void addSerializer(Serializer<T>, Class<T>)`
Adds a Serializer of type T to the serialization context. All serializers must be added before loading any object collections.

`<T> void loadCollection(Class<T>)`
Loads the collection of type T from the file Name.srsf in the context directory, where Name is the simple name of the class T. For example, the class pokemon.data.PokemonType must load its information from PokemonType.srsf in the context directory.

```
lines = loadFile(directory + class.getName() + ".srsf");
currentBlock = new HashMap<String, KeyValuePair>();
for line in lines:
    if line is "===" getCollection(class).add(currentBlock)
    else
    value = line.split("|")
    currentBlock.add(value[0], new KeyValuePair(value[0], value[1]))
```

`<T> void saveCollection(Class<T>)`
Saves the collection of type T to the file Name.srsf in the context directory, where Name is the simple name of the class T. For example, the class pokemon.data.PokemonType will save it's information to PokemonType.srsf in the context directory.

```
file.writeline("!!" + class.getName())
for object in getCollection(class.getName()):
  for kvp in serializers.get(class.getName()).deserialize(object):
```

```
    file.writeline(kvp.key + "|" + kvp.value)
  file.writeline("---")
```

`<T> List<T> getCollection(Class<T>)`
Gets the loaded collection of items of type T as a List.

1.1.2. interface *serialization.srsf.*LazyResolver

Description

An interface that represents a factory object used to resolve, or provide an instance of, an object at a later time, thus deferring initialization after object initialization for use with Lazy.

Methods

`T resolve()`
Resolves the lazy object by creating a new instance of the object. This method acts as a factory for objects of type *T*.

```
  return new SomeObject()
```

1.1.3. *serialization.srsf.Lazy*

Description

Represents a lazily evaluated object type. By providing a `LazyResolver<T>` as an object factory, `Lazy<T>` provides an object only upon request, this can be thought of as a promise to instantiate an object. Once instantiated, the instance is cached, and subsequent requests for the object must return the same instance.

Fields

Field Name	Field Type	Field Description
resolver	`LazyResolver<T>`	The resolver for this `Lazy<T>`.
isCreated	`boolean`	Whether the value has been created or not.
value	`T`	The cached value.

Methods

`T getValue()`
Returns the cached or instantiates a new value of type T with the provided LazyResolver

```
if not isValueCreated():
    value = resolver.resolve()
return value
```

`boolean isValueCreated()`
Returns whether or not the instance or value has been created with the LazyResolver, in other words whether `getValue()` had previously been called.

1.1.4. *abstract* serialization.srsf.Serializer

Description

Represents a serializer to convert from the key value pair representation of an SRSF block to objects of type T, and vice versa.

Fields

Field Name	Field Type	Field Description
context	`SerializationContext`	See `getContext()`

Methods

`protected serialization.srsf.SerializationContext getContext()`
Gets the SerializationContext associated with this serializer.

`abstract T deserialize(HashMap<String, KeyValuePair>)`
Converts from the key value pair representation of an SRSF block to an instance of T.

`abstract HashMap<String, String> serialize(T)`
Converts from the instance of T to a hashmap of String/Value pairs ready for saving.

1.1.5. *serialization.srsf.*KeyValuePair

Description

A helper class to represent a single SRSF key value pair (`$name|value`).

Fields

Field Name	Field Type	Field Description
value	`String`	The string value of the pair
key	`String`	The string key of the pair

Methods

`String getKey()`
Gets the key of the key value pair.

`String asString()`
Gets the value as a string. If the string `value` is equal to the magic string `@@NULL@@`, returns `null`.

`String[] asStringArray()`
Gets the value as a string array. If the string `value` is equal to the magic string `@@NULL@@`, returns `null`.

`int asInt()`
Attempts to get the value as an integer. If the string `value` is equal to the magic string `@@NULL@@`, returns `0`.

`int[] asIntArray()`
Attempts to get the value as an integer array. If the string `value` is equal to the magic string `@@NULL@@`, returns `null`.

`double asDouble()`
Attempts to get the value as a double. If the string `value` is equal to the magic string `@@NULL@@`, returns `0`.

`double[] asDoubleArray()`
Attempts to get the value as a double array. If the string `value` is equal to the magic string `@@NULL@@`, returns `null`.

`boolean asBoolean()`
Attempts to get the value as a boolean. If the string `value` is equal to the magic string `@@NULL@@`, returns false.

`boolean[] asBooleanArray()`

Attempts to get the value as a boolean array. If the string `value` is equal to the magic string `@@NULL@@`, returns `null`.

1.2. Simple Relational String Format Schema (`serialization.srsf.schema.*`)

1.2.1. *serialization.srsf.schema*.Schema

Description

Represents the SRSF Schema. See **Appendix A** for details.

Fields

Field Name	Field Type	Field Description
schemaProperties	`HashMap<String, String>`	See `getSchemaProperties()`
schemaName	`String`	See `getSchemaName()`
outputType	`String`	See `getOutputType()`

Methods

`HashMap<String, String> getSchemaProperties()`
Gets the field names (properties) and types as String/String key value pairs. See **Appendix A** for details.

`String getSchemaName()`
Gets the name of the schema.

`String getOutputType()`
Gets the output type of the schema.

1.2.2. *serializations.srsf.schema*.SchemaSerializer *extends Serializer*

Description

A serializer to convert from the schema SRSF format to a `Schema` object.

Methods

`@Override Schema deserialize(HashMap<String, KeyValuePair>)`
Converts schema SRSF files to `Schema` objects

`@Override HashMap<String, String> serialize()`
Converts the schema to string/string key value pairs.

1.3. Text-based Menu Framework (`menu.text.*`)

The following classes assist with building text-based menus, allowing options to be separately run and tested.

1.3.1. *menu.text.MenuBuilder*

Description

Represents a menu with various options. Menus may contain options that spawn sub-menus. Exposes a fluent API to prepare various menu options, and a menu loop to display and execute the menu options.

Fields

Field Name	Field Type	Field Description
options	`List<MenuOption>`	The list of all menu options for this menu
exit	`MenuOption`	The menu option used to exit this menu. Will cease the menu loop, and go back to the previous menu, or exit the application. The exit option is always run when the user selects a menu option less than 1.
error	`ErrorHandler`	The general handler for uncaught exceptions, usually displays an error message to the user

Methods

`MenuBuilder option(MenuOption)`
Adds the given option to this menu, and returns the updated `MenuBuilder`

`MenuBuilder exit(MenuOption)`
Sets the given option to the menu exit option, and returns the updated `MenuBuilder`

`MenuBuilder error(ErrorHandler)`
Sets the given error handler menu error handler, and returns the updated `MenuBuilder`.

`void run()`
Starts the menu loop, and run until the user chooses to exit.

```
do until user exits:
    for index, option in options:
       print index + option.getName()
    optionNumber = input
    try:
      options.get(optionNumber).run()
    catch Exception e:
      error.handle(e)
exit.run()
```

`@Override toString()`
Returns the string representation of the menu to be displayed to the user.

1.3.2. *abstract menu.text.MenuOption*

Description

An abstract class to represent an option in a menu.

Fields

Field Name	Field Type	Field Description
name	`String`	See `getName()`

Methods

`String getName()`
Gets the name of the menu option to be displayed to the user

`abstract void run()`
Runs the menu option once.

1.3.3. *abstract menu.text.ErrorHandler*

Description

An abstract class to represent an error handler.

Methods

`abstract void handle(Exception)`
Handles the given exception.

1.4. Pokémon Data Structures (`pokemon.data.*`)

1.4.1. *pokemon.data.*PokemonSpecies

Description

PokemonSpecies defines a single species of Pokemon, and include all relevant information. **PokemonSpecies** should be immutable upon creation, none of the properties of the object or child objects should be publically mutable after creation.

Fields

Field Name	Field Type	Field Description
number	`int`	See `getNumber()`
name	`String`	See `getName()`
primaryType	`Lazy<PokemonType>`	See `getPrimaryType()`
secondaryType	`Lazy<PokemonType>`	See `getSecondaryType()`
weight	`double`	See `getWeight()`
evolution	`Lazy<PokemonSpecies>`	See `getEvolution()`
preEvolution	`Lazy<PokemonSpecies>`	See `getPreEvolution()`

Methods

`String getName()`
The name of the Pokémon species, for example, 'Pikachu'. This name should be the same for instances of the same Pokémon Species.

`PokemonType getPrimaryType()`
The primary type of the Pokémon species.

`PokemonType getSecondaryType()`
The secondary type of the Pokémon species.

`double getWeight()`
The average weight of the Pokémon

`int getNumber()`
The unique Pokédex number of the Pokémon species. This number must be unique for each different species.

`PokemonSpecies getNextEvolution()`
The Pokémon species next in the evolutionary chain of the Pokemon. This merely indicates the Pokémon next in the evolutionary chain, and does not specify the requirements for the Pokémon species to evolve into it's evolution. If this Pokémon species is the final stage in the evolutionary chain, then this property returns null.

`PokemonSpecies getPreviousEvolution()`
The Pokémon species previous in the evolutionary chain of the Pokemon. This merely indicates the Pokémon previous in the evolutonary chain, and does not specify the requirements for the previous evolution species to evolve into the current Pokémon species. If this Pokémon species is the first in its evolutionary chain, then this property returns null.

`boolean equals(PokemonSpecies)`
`PokemonSpecies` defines it's own equality by comparing the species number `getNumber()`. Two `PokemonSpecies` are equal if they have the same number, although in practice there should only be one instance of each unique `PokemonSpecies` throughout the lifetime of the application.

`@Override boolean equals(Object)`
Default `equals(Object)` override, defers to `equals(PokemonSpecies)`.

1.4.2. *pokemon.data.PokemonMove*

Description

Represents a single move along with its base damage, type, and name of the move.

Fields

Field Name	Field Type	Field Description
name	`String`	See `getName()`
type	`Lazy<PokemonType>`	See `getType()`
baseDamage	`double`	See `getBaseDamage()`
selfAfflictedDamage	`double`	See `getSelfDamage()`

Methods

`String getName()`
The name of the move, for example, 'Hyper Beam'.

`int getDamage()`
The damage of a move before any multipliers. Can be negative to apply a healing effect.

`int getSelfDamage()`
The damage applied to the Pokémon that uses this move. Can be negative to apply a healing effect.

`PokemonType getType()`
The type of the move. The type is important in figuring out the damage given to the other Pokémon in battles as each type is strong and weak to other types.

`boolean equals(PokemonMove)`
`PokemonMove` defines it's own equality by it's name. Two moves are equal if they have the same name `getName()`, ignoring case, however in practice there should only be a single instance of a unique move throughout the lifetime of the application.

`@Override boolean equals(Object)`
Default `equals(Object)` override. Defers to `equals(PokemonMove)` for equality.

1.4.3. *pokemon.data.PokemonTeam*

Description

The team is a collection of individual `Pokemon`, usually up to 6.

Fields

Field Name	Field Type	Field Description
pokemon	`Lazy<ArrayList<Pokemon>>`	The `ArrayList` holding the six pokemon.

Methods

`void switchPosition(int, int)`
Swaps the positions of the Pokémon in the two specified slots.

`List<Pokemon> getPokemon()`
Get all Pokémon in the team.

`Pokemon getActivePokemon()`
Gets the first Pokémon in the team.

`void setActivePokemon(int)`
Sets the active Pokémon to the Pokémon at the given index. This has the effect of swapping the Pokémon at the given index with the first Pokémon in the team.

1.4.4. *pokemon.data.PokemonType*

Description

Representing a certain typing of Pokemon, `PokemonType` stores the name of the type and it's weaknesses to other types (e.g Fire weak to Water, Rock, Ground), its strengths (e.g Fire strong against Grass, Ice, Bug), and its immunity (e.g. Ground is immune to Electric type). `PokemonType` is immutable upon creation.

Fields

Field Name	Field Type	Field Description
strongAgainst	`Lazy<List<PokemonType>>`	See `getStrengths()`
weakAgainst	`Lazy<List<PokemonType>>`	See `getWeaknesses()`
immuneAgainst	`Lazy<List<PokemonType>>`	See `getImmunity()`
name	`String`	See `getTypeName()`

Methods

`List<PokemonType> getStrengths()`
Gets the types this type is strong against.

`List<PokemonType> getWeaknesses()`
Gets the types this type is weak against.

`List<PokemonType> getImmunities()`
Gets the types this type is immune against.

`boolean isWeakAgainst(PokemonType)`
Checks if the given type is weak against this type.

`boolean isStrongAgainst(PokemonType)`
Checks if the given type is strong against this type.

`boolean isImmuneAgainst(PokemonType)`
Checks if the given type is immune against this type.

`String getName()`
Gets the name of the type.

`boolean equals(PokemonType)`
`PokemonType` defines it's own equality based on whether or not two types have the same name `getName()`, ignoring case, although in practice there should only be one instance of a certain `PokemonType` throughout the instance of the application.

`@Override boolean equals(Object)`
Default `equals(Object)` override. Defers to `equals(PokemonType)` for equality.

1.4.5. *pokemon.data.Pokemon*

Description

Represents an individual Pokémon belonging to the user or player character, including all information, such as species, move set, nickname, level, and health points.

Fields

Field Name	Field Type	Field Description
species	`Lazy<PokemonSpecies>`	See `getSpecies()`
moves	`Lazy<List<PokemonMove>>`	See `getMoves()`
name	`String`	See `getNickname()`
level	`int`	See `getLevel()`
id	String	

Methods

`PokemonSpecies getSpecies()`
Gets the species of this Pokemon

`List<PokemonMove> getMoves()`
Gets the list of moves for this Pokemon

`String getNickname()`
Gets the given nickname of this Pokemon. If not set, then return the name of the Pokémon species.

`void setNickname(String)`
Sets the given nickname of this Pokemon. To unset, set the nickname to the empty string.

`int getLevel()`
The level of this Pokemon. The higher the level is, the greater the base damage of each Pokemon. Also, the health point increases every time the Pokémon levels up.

`void setLevel(int)`
Sets the level of this Pokemon.

`int getHP()`
Gets the amount of health points of this Pokemon.

`void setHP(int)`
Sets the amount of health points of this Pokemon.

`boolean isFainted()`
The status of the Pokémon that indicates whether it is alive or fainted. If the Pokemon's the health point is zero, the Pokémon is fainted thus it returns true. Otherwise, it returns false.

1.5. Pokémon Core Facilities (`pokemon.core.*`)

The following classes contain the behavior of the program regarding Pokedex and Battle functionality, and are not meant to be saved to a file.

1.5.1. *pokemon.core.Pokedex*

Description

Represents a sortable and searchable collection of `PokemonSpecies`.

Fields

Field Name	Field Type	Field Description
pokemonSpecies	`List<PokemonSpecies>`	The list of Pokémon species defined in this Pokedex.

Methods

`List<PokemonSpecies> searchPokemonByType(PokemonType)`
Searches for and returns all `PokemonSpecies` with the given `PokemonType`.

`List<PokemonSpecies> searchPokemonByName(String)`
Searches for and returns all `PokemonSpecies` with a name matching the given string.

`List<PokemonSpecies> getAllPokemon()`
Gets all the Pokémon in the Pokedex.

`PokemonSpecies getPokemon(int)`
Gets the Pokémon with the given number.

`static void sortByName(List<PokemonSpecies>)`
Sorts the given list of `PokemonSpecies` by their name in lexicographical order. See `PokemonSpeciesNameComparator`

`static void sortByNumber(List<PokemonSpecies>)`
Sorts the given list of `PokemonSpecies` by their number in ascending order. See `PokemonSpeciesNumberComparator`

`static void sortByWeight(List<PokemonSpecies>)`
Sorts the given list of `PokemonSpecies` by their weight in ascending order. See `PokemonSpeciesWeightComparator`

1.5.2. *pokemon.core.battle.BattleState*

Description

An enumeration of possible battle states.

Enumeration

Enumeration	Description
`PLAYER_ONE_MOVE`	The battle is waiting for the first player to select their move
`PLAYER_TWO_MOVE`	The battle is waiting for second player
`PLAYER_ONE_FAINTED`	Player one has a fainted Pokémon and must select a new one from their team.
`PLAYER_TWO_FAINTED`	Player two has a fainted Pokémon and must select a new one from their team.
`PLAYER_ONE_VICTORY`	The battle has been completed, player two has exhausted their team, and player one is the victor.
`PLAYER_TWO_VICTORY`	The battle has been completed, player one has exhausted their team, and player two is the victor.

1.5.3. *pokemon.core.battle.BattleManager*

Description

Manages a battle between two `PokemonTeamS`. `BattleManager` is a state machine intended to be run in a loop until one team has encountered a victory state.

Fields

Field Name	Field Type	Field Description
state	`BattleState`	The current state of the battle
teamOne	`PokemonTeam`	The Pokémon team of the first player
teamTwo	`PokemonTeam`	The Pokémon team of the second player

Methods

`BattleState getState()`
Gets the current state of the battle.

`PokemonTeam getTeamOne()`
Gets the first team of Pokémon in the battle.

`PokemonTeam getTeamTwo()`
Gets the second team of Pokémon in the battle.

`void applyMove(PokemonMove, Pokemon, Pokemon)`
Applies the effects of the given move to the casting and target Pokemon. This method calculates the amount of damage dealt to each Pokémon after the move is applied, and determines the new `BattleState` after damage calculations.

```
if state == BattleState.PLAYER_ONE_MOVE
  isWeakTo = pokemonTwo.getSpecies().isWeakAgainst(move.Type())
  isStrongTo = pokemonTwo.getSpecies().isStrongAgainst(move.Type())

  if isWeakTo multiplier = 2
  if isStrongTo multiplier = 0.5
  else multiplier = 1

  pokemonTwo.setHp(pokemonTwo.getHp() - multiplier * move.getDamage())
  boolean loss = false
  for pokemon in getTeamTwo():
     loss = loss || pokemon.isFainted()
  if loss state = BattleState.PLAYER_ONE_VICTORY else
  if pokemonTwo.isFainted() state = BattleState.PLAYER_TWO_FAINTED
  else state = PLAYER_TWO_MOVE
  return
...
repeat for player two move state.
```

1.6. Pokémon Serialization Classes (`pokemon.serialization.*`)

Pokemon Serializer Classes

The following classes extend `serialization.srsf.Serializer` and are used to serialize their specified types. Provided is a schema and an example, see **Appendix A** for format details.

1.6.1. *pokemon.serialization.*PokemonTypeSerializer extends Serializer

Serializes `pokemon.data.PokemonType`

Schema

```
$schemaName|PokemonType
$outputType|pokemon.data.PokemonType
@name|string
@strongAgainst|[string!!PokemonType]
@weakAgainst|[string!!PokemonType]
@immuneAgainst|[string!!PokemonType]
---
```

Example

```
$name|WATER
$strongAgainst|[FIRE]
$weakAgainst|[GRASS]
$immuneAgainst|[]
---
```

Methods

`@Override PokemonType deserialize(HashMap<String, KeyValuePair)`
Converts from a block of the above example to a `PokemonType`.

`@Override HashMap<String, String> serialize(PokemonType)`
Converts from a `PokemonType` object to it's key value pair representation.

1.6.2. *pokemon.serialization.*PokemonSpeciesSerializer extends Serializer

Serializes `pokemon.data.PokemonSpecies`

Schema

```
$schemaName|PokemonSpecies
$outputType|pokemon.data.PokemonSpecies
@name|string
@index|int
@primaryType|string!!PokemonType
@secondaryType|string!!PokemonType
@weight|double
@evolution|int!!PokemonSpecies
@preevolution|int!!PokemonSpecies
---
```

Example

```
$index|1
$name|Bulbasaur
$primaryType|GRASS
$secondaryType|@@NUL@@
$weight|10
$evolution|2
$preevolution|0
---
```

Methods

`@Override PokemonSpecies deserialize(HashMap<String, KeyValuePair)`
Converts from a block of the above example to a `PokemonSpecies`. `$evolution` and `$preevlotion` are represented as the Pokémon number.

`@Override HashMap<String, String> serialize(PokemonSpecies)`
Converts from a `PokemonSpecies` object to it's key value pair representation.

1.6.3. *pokemon.serialization.*PokemonMoveSerializer extends Serializer

Serializes `pokemon.data.PokemonMove`

Schema

```
$schemaName|PokemonMove
$outputType|pokemon.data.PokemonMove
@name|string
@type|string!!PokemonType
@baseDamage|int
@selfDamage|int
---
```

Example

```
$name|Hyper Beam
$type|NORMAL
$baseDamage|100
$selfDamage|50
---
```

Methods

`@Override PokemonMove deserialize(HashMap<String, KeyValuePair)`
Converts from a block of the above example to a `PokemonMove`. `$evolution` and `$preevlotion` are represented as the Pokémon number.

`@Override HashMap<String, String> serialize(PokemonMove)`
Converts from a `PokemonMove` object to it's key value pair representation.

1.6.4. *pokemon.serialization.*PokemonSerializer extends Serializer

Serializes `pokemon.data.Pokemon`

Schema

```
$schemaName|Pokemon
$outputType|pokemon.data.Pokemon
@species|int!!PokemonSpecies
@nickName|string
@level|int
@moves|[string!!PokemonMove]
@hp|int
@id|string
---
```

Example

```
$species|1
$nickName|Bulby
$level|10
$moves|[LEECHSEED,TACKLE,@@NULL@@,@@NULL@@]
$hp|100
$id|A9810DJ12D
---
```

Methods

`@Override Pokémon deserialize(HashMap<String, KeyValuePair)`
Converts from a block of the above example to a `Pokemon`

`@Override HashMap<String, String> serialize(Pokemon)`
Converts from a `Pokemon` object to it's key value pair representation.

1.6.5. *pokemon.serialization.*PokemonTeamSerializer extends Serializer

Serializes `pokemon.data.PokemonTeam`

Schema

```
$schemaName|PokemonTeam
$outputType|pokemon.data.PokemonTeam
@pokemon|[string!!Pokemon]
---
```

Example

```
$pokemon|[A9810DJ12D]
---
```

Methods

`@Override PokemonTeam deserialize(HashMap<String, KeyValuePair)`
Converts from a block of the above example to a `PokemonTeam`. Pokémon are stored as references by the unique Pokémon ID.

`@Override HashMap<String, String> serialize(PokemonTeam)`
Converts from a `PokemonTeam` object to it's key value pair representation.

Pokemon Resolver Classes

Resolves loaded Pokémon information from a serialization context.

1.6.6. *pokemon.serialization.*PokemonTypeListResolver implements >

Lazily resolves a list of Pokémon types from their type names.

Fields

Field Name	Field Type	Field Description
context	`SerializationContext`	The context to resolve the types from
typeNames	`String[]`	The names of the types

Methods

`@Override List<PokemonType> resolve()`
Resolves the list of loaded types from the serialization context

1.6.7. *pokemon.serialization.*PokemonSpeciesResolver implements >

Lazily resolves a Pokémon species from the Pokémon number

Fields

Field Name	Field Type	Field Description
context	`SerializationContext`	The context to resolve the types from
number	`int`	The Pokémon number

Methods

`@Override PokemonSpecies resolve()`
Resolves the Pokémon species from the serialization context

1.6.8. *pokemon.serialization.*PokemonIdResolver implements >

Lazily resolves a Pokémon from the Pokémon ID

Fields

Field Name	Field Type	Field Description
context	`SerializationContext`	The context to resolve the types from

Field Name	Field Type	Field Description
id	`String`	The Pokémon ID

Methods

`@Override Pokémon resolve()`
Resolves the Pokémon from the serialization context

1.6.9. *pokemon.serialization.*PokemonTypeResolver implements >

Lazily resolves a single Pokémon types from their type names.

Fields

Field Name	Field Type	Field Description
context	`SerializationContext`	The context to resolve the types from
typeName	`String`	The name of the type

Methods

`@Override PokemonType resolve()`
Resolves the types from the serialization context

1.7. *Menu Options (`pokemon.menu.*`)*

The following classes extend `menu.text.MenuOption` to provide the UI for the application.

1.7.1. *pokemon.menu.PokedexMenu*

A menu option to display and search the Pokedex.

Fields

Field Name	Field Type	Field Description
pokedex	`Pokedex`	The Pokedex to use

Methods

`@Override run()`
Runs the Pokedex menu option.

1.7.2. *pokemon.menu.TeamMenu*

A menu option to manage your Pokémon Team

Fields

Field Name	Field Type	Field Description
team	`PokemonTeam`	The Pokémon team to manage

Methods

`@Override run()`
Runs the Pokémon team menu option.

1.7.3. *pokemon.menu.BattleMenu*

A menu option to start a Pokémon Battle. Is responsible for managing the `pokemon.core.battle.BattleManager`

Fields

Field Name	Field Type	Field Description

Field Name	Field Type	Field Description
battleManager	`BattleManager`	The Pokémon battle manager to run the battle menu.

Methods

`@Override run()`
Runs the Pokémon battle with the battle manager.

1.7.4. *pokemon.menu.*MainMenu

The main menu or application entry point

Methods

`static void main(String[])`
The entry point for the application. Responsible for initial loading of types, instantiation of the `SerializationContext` and `MenuBuilder`, and managing the overall lifecycle of the program. The main method should instatiate the `SerializationContext` in the `data` folder of the application startup directory, which will contain the `Schema.srsf` file.

1.8. Pokémon Comparators (`pokemon.data.comparators.*`)

The following classes implement `Comparator<T>` for Pokémon Data Types

1.8.1. *pokemon.data.comparators*.PokemonSpeciesNameComparator implements Comparator

Compares two `PokemonSpecies` by their name in lexicographical order.

Methods

`int compare(PokemonSpecies, PokemonSpecies)`
Compares two Pokémon species by their name `getName()` in lexicographical order. Defers to `String.compare` for comparison.

1.8.2. *pokemon.data.comparators*.PokemonSpeciesNumberComparator implements Comparator

Compares two `PokemonSpecies` by their Pokémon number.

Methods

`int compare(PokemonSpecies, PokemonSpecies)`
Compares two Pokémon species by their number `getNumber()` Defers to `Integer.compare` for comparison.

1.8.3. *pokemon.data.comparators*.PokemonSpeciesWeightComparator implements Comparator

Compares two `PokemonSpecies` by their weight.

Methods

`int compare(PokemonSpecies, PokemonSpecies)`
Compares two Pokémon species by their weight `getWeight()` Defers to `Double.compare` for comparison.

2. Algorithms and concepts

2.1. Accessors

Methods to get an access or to get the value of a field within a class

```
    <data type> get<fieldName>()
        return <fieldName>
```

2.2. Mutators

Methods to change the value of a field within a class

```
<data type> set<fieldName>(<variable>)
```

2.3. Binary Search

This will be used when searching for a specific Pokémon using the ID in a list of Pokémon sorted by ID.

```
<item> BinarySearch(list L, item)
    middle = middle value of list
if middle's Field = item's Field
        Then return item;
    If middle's Field > item's Field
        Then
list L2 = first half of L
        return BinarySearch(L2, item)
    If middle's Field <  item's Field
        Then
list L2 = second half of L
        return BinarySearch(L2, item)
```

2.4. Sequential Search

This will be used search for a Pokémon by name and type.

```
    SequentialSearch(list L, String x)
        For each item in the list
            If (y matches x)
                Return y;
```

2.5. Bubble Sort

This will be used to sort Pokémon in Pokedex by name, ID, and weight

```
    BubbleSort (List L)
        for upperbound equals L.length - 1 down to 1 and sorted is false
Set sorted to true
for j from 0 to upperbound - 1
    If j > j + 1
        set sorted to false
        swap j and j + 1
```

2.6. Recursion

This will be used as part of the Binary Search Refer to Binary Search

2.7. File Input/Output

This will be used to store or load teams of Pokémon.

2.8. Generics

This concept is used during serialization for Lazy instantiation (`Lazy<PokemonType>`), use of dynamic arrays (`List<Pokemon>`), and hash maps (`HashMap<String, String>`). A generic class or algorithm allows the types to be specified later when needed.

2.9. Dynamic Arrays

A dynamic array or a List is a resizable array of indefinite size. Used to store Pokemon, types, and allow lazy instanatiation of array-like types.

2.10. Interfaces

A contract for a class to implement. Used to define the `LazyResolver<T>` interface used during serialization. Also used for `PokemonSpecies` comparators.

2.11. Hash Maps

A data structure that maps keys to values. Used during serialization to represent key value pairs.

2.12. Appendix A — Simple Relational String Format

Simple Relational String Format, or SRSF defines a generic method to load and save a collection of objects into text files. Objects are loaded into a root serialization context from formatted '.srsf' record files, and are accessible as collections of loaded objects. In order to resolve self-references, object references are lazily evaluated and resolved within the context before being produced into objects by the converter. Record files are expected to contain a collection of objects of the same type, and will be serialized as a list or array.

2.13. Serialization Context

The serialization context is the root context in which a set of SRSF files are loaded into. Each serialization context should be self contained in a folder, and contain at least a `Schema.srsf`, specifying the schema of the data files contained in the folder, and one or more `.srsf` record files describing the actual records. Saving and loading should occur only in the specified context folder, and all `.srsf` files in the context folder must be named as the simple name of the class it represents, for example, data representing instances of `pokemon.data.PokemonType` must be saved and loaded from `PokemonType.srsf`.

2.14. SRSF Tokens

Token	Example	Description
`~~!srsf~~`	`~~!srsf~~`	The magic header required at the beginning of all valid SRSF record files.
`!!`	`!!PokemonType`	The type descriptor, describing the Java type this record file is a collection of. If used after a primitive descriptor in a schema, indicates an object reference of the type.
`$`	`$name	Pikachu`	
`@`	`@name	string`	

Token	Example	Description
`	`	`$name
[]	[WATER, GRASS]	For a value, indicates that the value represents an array of primitives.
,	[WATER, GRASS]	In an array value, separates the values of the array.
---	---	Block marker delimiter, indicates the end of a record block.
@@NULL@@	`$name	@@NULL@@`
#	#Some comment is is written here.	Indicates that the line begins a comment.

2.15. SRSF Record Format

An SRSF file begins with the magic string `~~!srsf~~`, followed by the type marker `!!`, a type, and the block end marker. Thus, the first "block" in any SRSF format specifies the schema type for the rest of the file. Files may contain any amount of blocks delimited by the block marker delimiter, and each block must contain the data required to instantiate one instance of the type specified.

```
~~!srsf~~
!!PokemonType
---
$name|GRASS
$strongAgainst|[WATER,GROUND]
$weakAgainst|[FIRE]
#todo add more types
---
```

This example file denotes a collection of `PokemonType` objects, with a single instance. Containing the header block and one record block, the record block has the properties `name`, `strongAgainst`, and `weakAgainst`. `strongAgainst` and `weakAgainst` are string arrays, but as specified in a separate schema file, are in actuality typed to be `PokemonType`s themselves, and must be deserialized accordingly.

2.16. SRSF Schema Files

The SRSF Schema format defines a schema for every single record file in the serialization context. Named `Schema.srsf`, this file should be the first to be loaded in any serialization context. One can consider the schema file to be a special case of Record, as they are serialized just the same as a normal record. However, they are privileged in that the `Schema.srsf` need not a schema specified for itself, and the Schema format is the only format specified to have metadata in it's definitions; thus each record shape will be different, unlike normal records. These schema files are usually used for deserialization, and for machine parsing of various record formats.

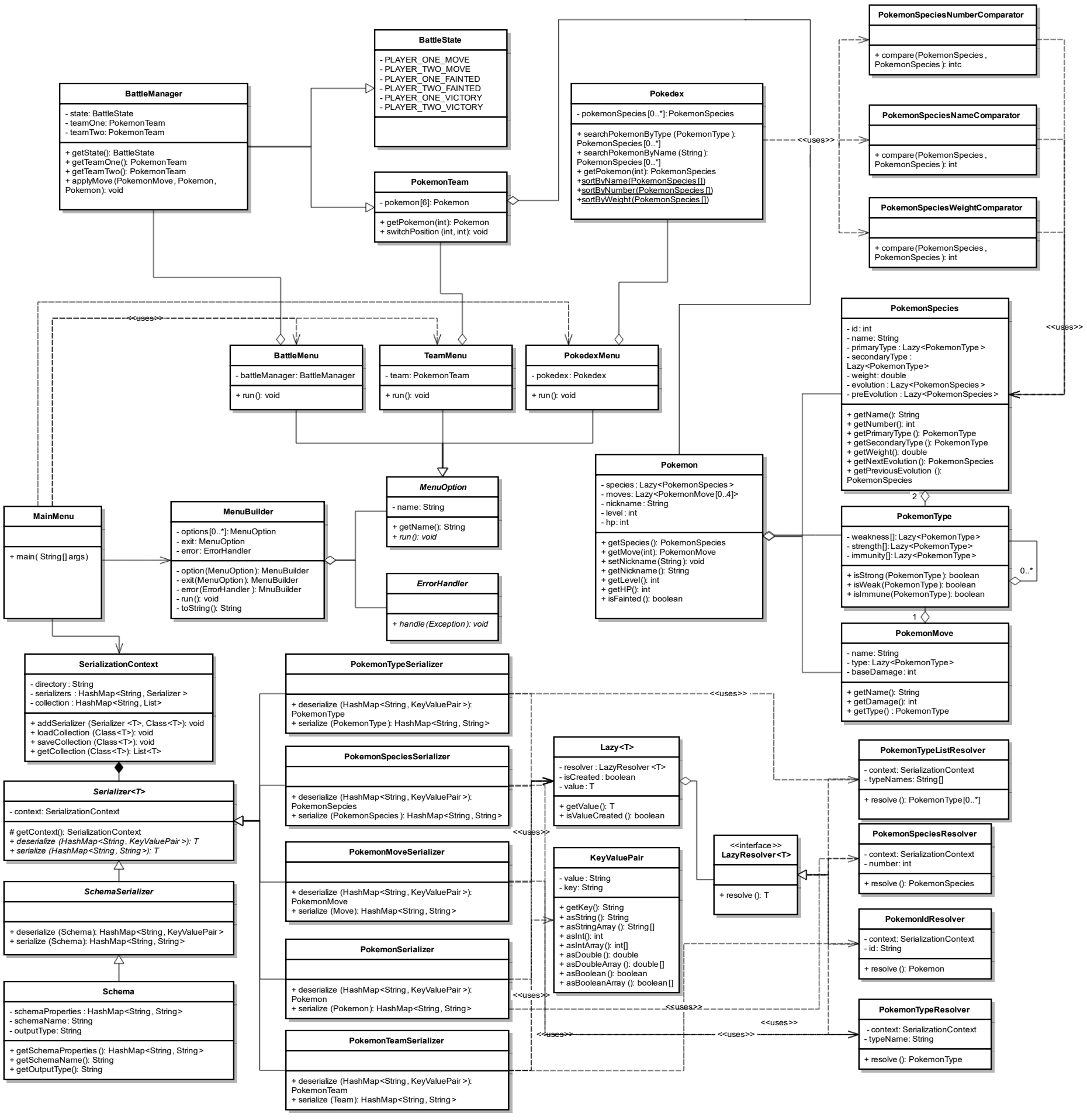
```
!!schema
---
$schemaName|PokemonType
$outputType|pokemon.data.PokemonType
@name|string
@strongAgainst|[string!!PokemonType]
@weakAgainst|[string!!PokemonType]
---
```

This schema defines the type for the previous `PokemonType` example. A schema has two required field, `schemaName`, indicating the name of the schema, generally the

simple name of the type, and `outputType`, indicating the fully qualified name of the Java type it represents. The entries that begin with `@` are metadata properties and are used to define the shape of the schema. Rather than have values, they must contain either a primitive type, or a primitive that will be serialized into an object reference. SRSF primitives are not exactly the same as Java primitives, the list of SRSF primitives is defined as follows

SRSF Primitive	Definition	Java Equivalent
`string`	A string-like type.	`java.lang.String`
`bool`	A true or false value represented by the string literals `true` or `false`.	`boolean`
`int`	A machine-length integer guaranteed to be at least 30 bits large.	`int`
double	An IEEE-754 double precision floating-point number	`double`

Thus, each SRSF must be composed of, or have objects references derived, on the responsibility of the Serializer, these four SRSF primitive types.


BattleState
- PLAYER_ONE_MOVE
- PLAYER_TWO_MOVE
- PLAYER_ONE_FAINTED
- PLAYER_TWO_FAINTED
- PLAYER_ONE_VICTORY
- PLAYER_TWO_VICTORY
BattleManager
- state: BattleState
- teamOne: PokemonTeam
- teamTwo: PokemonTeam
+ getState(): BattleState
+ getTeamOne(): PokemonTeam
+ getTeamTwo(): PokemonTeam
+ applyMove (PokemonMove, Pokemon, Pokemon): void
PokemonTeam
- pokemon[6]: Pokemon
+ getPokemon(int): Pokemon
+ switchPosition (int, int): void
Pokedex
- pokemonSpecies [0..*]: PokemonSpecies
+ searchPokemonByType (PokemonType): PokemonSpecies [0..*]
+ searchPokemonByName (String): PokemonSpecies [0..*]
+ getPokemon(int): PokemonSpecies
+sortByName(PokemonSpecies [])
+sortByNumber(PokemonSpecies [])
+sortByWeight(PokemonSpecies [])
<<uses>>
PokemonSpeciesNumberComparator
+ compare(PokemonSpecies , PokemonSpecies): intc
PokemonSpeciesNameComparator
+ compare(PokemonSpecies , PokemonSpecies): int
PokemonSpeciesWeightComparator
+ compare(PokemonSpecies , PokemonSpecies): int
<<uses>>
BattleMenu
- battleManager: BattleManager
+ run(): void
TeamMenu
- team: PokemonTeam
+ run(): void
PokedexMenu
- pokedex: Pokedex
+ run(): void
PokemonSpecies
- id: int
- name: String
- primaryType : Lazy<PokemonType >
- secondaryType : Lazy<PokemonType>
- weight: double
- evolution : Lazy<PokemonSpecies >
- preEvolution : Lazy<PokemonSpecies >
+ getName(): String
+ getNumber(): int
+ getPrimaryType (): PokemonType
+ getSecondaryType (): PokemonType
+ getWeight(): double
+ getNextEvolution (): PokemonSpecies
+ getPreviousEvolution (): PokemonSpecies
<<uses>>
MainMenu
+ main(String[] args)
MenuBuilder
- options[0..*]: MenuOption
- exit: MenuOption
- error: ErrorHandler
- option(MenuOption): MenuBuilder
- exit(MenuOption): MenuBuilder
- error(ErrorHandler): MnuBuilder
- run(): void
- toString(): String
MenuOption
- name: String
+ getName(): String
+ run(): void
ErrorHandler
+ handle (Exception): void
Pokemon
- species : Lazy<PokemonSpecies >
- moves: Lazy<PokemonMove[0..4]>
- nickname : String
- level : int
- hp: int
+ getSpecies (): PokemonSpecies
+ getMove(int): PokemonMove
+ setNickname (String): void
+ getNickname (): String
+ getLevel (): int
+ getHP(): int
+ isFainted (): boolean
2
PokemonType
- weakness[]: Lazy<PokemonType>
- strength[]: Lazy<PokemonType>
- immunity[]: Lazy<PokemonType>
+ isStrong (PokemonType): boolean
+ isWeak (PokemonType): boolean
+ isImmune (PokemonType): boolean
0..*
1
PokemonMove
- name: String
- type: Lazy<PokemonType>
- baseDamage: int
+ getName(): String
+ getDamage(): int
+ getType() : PokemonType
SerializationContext
- directory : String
- serializers : HashMap<String, Serializer >
- collection : HashMap<String, List>
+ addSerializer (Serializer <T>, Class<T>): void
+ loadCollection (Class<T>): void
+ saveCollection (Class<T>): void
+ getCollection (Class<T>): List<T>
Serializer<T>
- context: SerializationContext
getContext(): SerializationContext
+ deserialize (HashMap<String, KeyValuePair >): T
+ serialize (HashMap<String, String>): T
SchemaSerializer
+ deserialize (Schema): HashMap<String, KeyValuePair >
+ serialize (Schema): HashMap<String, String>
Schema
- schemaProperties : HashMap<String, String>
- schemaName: String
- outputType: String
+ getSchemaProperties (): HashMap<String, String>
+ getSchemaName(): String
+ getOutputType(): String
PokemonTypeSerializer
+ deserialize (HashMap<String, KeyValuePair >): PokemonType
+ serialize (PokemonType): HashMap<String, String>
PokemonSpeciesSerializer
+ deserialize (HashMap<String, KeyValuePair >): PokemonSepcies
+ serialize (PokemonSpecies): HashMap<String, String>
PokemonMoveSerializer
+ deserialize (HashMap<String, KeyValuePair >): PokemonMove
+ serialize (Move): HashMap<String, String>
PokemonSerializer
+ deserialize (HashMap<String, KeyValuePair >): Pokemon
+ serialize (Pokemon): HashMap<String, String>
PokemonTeamSerializer
+ deserialize (HashMap<String, KeyValuePair >): PokemonTeam
+ serialize (Team): HashMap<String, String>
Lazy<T>
- resolver : LazyResolver <T>
- isCreated : boolean
- value : T
+ getValue(): T
+ isValueCreated (): boolean
KeyValuePair
- value : String
- key: String
+ getKey(): String
+ asString (): String
+ asStringArray (): String[]
+ asInt(): int
+ asIntArray (): int[]
+ asDouble (): double
+ asDoubleArray (): double[]
+ asBoolean (): boolean
+ asBooleanArray (): boolean[]
<<interface>>
LazyResolver<T>
+ resolve (): T
PokemonTypeListResolver
- context: SerializationContext
- typeNames: String[]
+ resolve (): PokemonType[0..*]
PokemonSpeciesResolver
- context: SerializationContext
- number: int
+ resolve (): PokemonSpecies
PokemonIdResolver
- context: SerializationContext
- id: String
+ resolve (): Pokemon
PokemonTypeResolver
- context: SerializationContext
- typeName: String
+ resolve (): PokemonType
<<uses>>