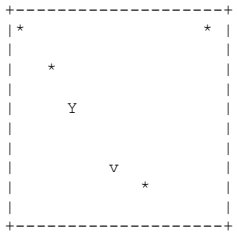
Animal Crossing Plants

Animal Crossing is a popular game on Nintendo Switch where players are able to build their dream island and invite animal friends to live with them. In this task, we will build a simple simulation of a 2-dimensional map with some simple objects such as rocks, flowers and trees.



This diagram illustrates a map with a few rocks (*), a tree (Y) and a flower(v).

Task 1.1

Implement `AC_Object` and `Plant` class according to the UML class diagram and attributes / methods specifications given.

*Note: `AC_Objct()` and `Plant()` are constructors for the classes, you should create respective `__init__()` methods for the 2 classes.

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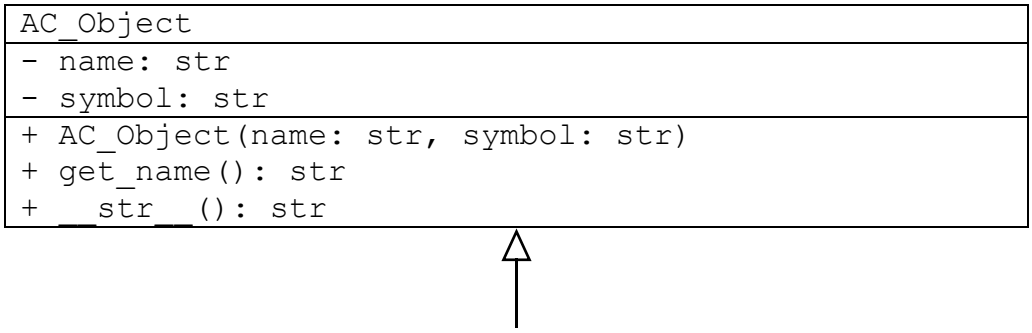

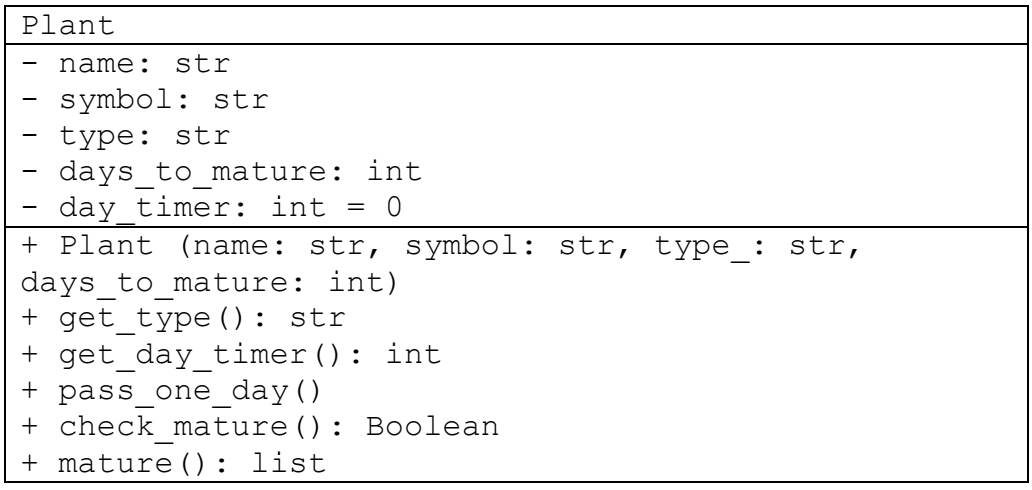

AC_Object Class	
Attributes/Methods	**Specification**
`name: str` `symbol: str`	All AC_Object will have a name and a symbol. For example, a rock object will have name as `"Rock"` and symbol `"*"`.
`get_name(): str`	Returns the `name` of the object.
`__str__(): str`	Returns the `symbol` of the object.

Plant Class	
Attributes/Methods	**Specification**
`type: str`	A string to represent the type for the plant, such as `"tree"` or `"flower"`.
`days_to_mature: int`	An integer to store how many days does it take for a plant to get matured.
`day_timer: int`	An integer to store how many days this plant has been planted. It should start with a default value of `0`.
`get_type(): str`	Returns the `type` of the plant.
`get_day_timer(): int`	Returns the current value of `day_timer`.
`pass_one_day()`	Increase the value of `day_timer` by 1.
`check_mature(): boolean`	Returns `True` if `day_timer` is more than or equals to the value of `days_to_mature`, `False` otherwise.
`mature(): list`	If the plant is yet to be matured, returns `None`. If the type of plant is `"flower"`, the symbol will change from `"v"` to `"¥"`, and returns `None`. If the type of plant is `"tree"`, it will create 3 objects of class `AC_Object` based on the name of the tree. The function returns a `list` containing these 3 objects. For example, an `"Apple Tree"` will bear 3 fruits, which are objects of `AC_Object` class with name `"Apple"` and symbol `"@"`.

Task 1.2

Implement `Map` class according to the UML class diagram and attributes/methods specifications given.

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Map
- map: list - max_row: int - max_col: int
+ Map(max_row: int, max_col: int) + add_new_obj(new_obj: AC_Object, row: int, col: int) + pass_a_day() + display()

Attributes/Methods	**Specification**

`map: list`
`max_row: int`
`max_col: int`
	`max_row` and `max_col` are 2 integer values storing how many rows and columns the map has.
	
	The `map` is a 2-dimensional `list` initiated using `max_row` and `max_col` as its dimensions and filled with `None` values.

`add_new_obj(new_obj: AC_Object, row: int, col: int)`	`add_new_obj()` takes in an object of the `AC_Object` class, and add it to the corresponding position on the `map` based on the `row` and `col` values. If the position is already occupied by any object, print the following error statement, where `xxx` is the `name` of the current object: `"Unable to add object. The position is already occupied by xxx."` If the `new_obj` is a `"tree"`, it can only be successfully planted if it is **not** at the border of the map and there are **no** other objects within the 3x3 grid with its at `(row, col)`.

`display()`	Display the current map with **borders** like the following example:
	`+--------------------+`
	`|*  * |`
	`|  |`
	`|  *  |`
	`|  @  |`
	`|  @Y@  |`
	`|  |`
	`|  |`
	`|  ¥  |`
	`|  *  |`
	`|  |`
	`+--------------------+`

`pass_a_day()`	Pass one day for all objects of class `Plant` on the map. If a plant is matured, call the `mature()` function. If a tree is matured, 3 fruits will be dropped at the top, left and right position of the tree. For example, the following tree at position `(4, 5)` produces 3 fruits, which are added to the positions of `(3, 5)`, `(4, 4)` and `(4, 6)` respectively. You may assume that no other objects will be placed within the 3x3 grid of a tree. The flower at position `(7, 9)` changed from `"v"` to `"¥"` to indicate that it turns mature.