

Purpose: Classes**Learning outcomes:** 1, 2 and 3

Time: submit before 5pm Friday of Week 11.

Resources: MyLO: lecture notes and tutorial materials

Description:

Your programming prowess is becoming legendary! Now NASA want you to model rocket behaviours. They have provide an object-oriented model of a rocket, and want you to demonstrate how to use it.

Task:

A source file named **rocket.py** has been provided for you (as a separate link under portfolio tasks in MyLO). This file contains a class named **Rocket** that has the following data attributes:

- `model` - the type of rocket (string)
- `manufacturer` - the company who made the rocket (string)
- `speed` - how fast the rocket is moving (in metres per second) (integer)
- `landed` - whether the rocket is on the ground or flying (boolean)
- `escapeVelocity` - the speed the rocket needs to reach in order to escape Earth's gravity (integer)

You must not modify the rocket.py file.

The **Rocket** class has an `__init__` method that accepts the `model`, `manufacturer` and `escapeVelocity` values as parameters to create **Rocket** objects. The `speed` attribute is set to 0, and the `landed` attribute is set to `True`.

The class also has the following methods:

- `getIsLanded` - returns True or False if the rocket is currently landed
- `getEscapeVelocity` - returns the current escape velocity
- `takeOff` - try and take off, but only if the rocket is currently landed
- `land` - try and land, but only if the speed is zero and the rocket is not already landed
- `accelerate` - add 5 to the current rocket speed (but only if it is flying)
- `decelerate` - subtract 5 from the current rocket speed (but only if it is flying and the speed is 5 or more)
- `getSpeed` - return the current rocket speed
- `getModel` - return the type of rocket
- `getManufacturer` - return the company's name who made the rocket

Your task

You must download and modify the additional file, **rocketDriver.py** (which is provided as a separate link under portfolio tasks in MyLO) to produce the required output. This file is only partially (minimally) completed. In **rocketDriver.py** you must create and then use a **Rocket** object to meet the objectives as described in the file's comments, which are repeated below:

```
# import the class data from rocket.py
from rocket import *

# create a new rocket (feel free to the values!)
myRocket = Rocket("FalconX", "Tesla", 50)

# Print the rocket data - we need model, manufacturer and escape
velocity.
```

```
# Make sure to ask myRocket for the values!
# ... your code here

# Print the rocket status - is it landed?
# Hint - use getIsLanded and if statement
# ... your code here

# Make the rocket take off
# ... your code here

# Print the rocket status now - is it flying?
# Hint - use getIsLanded and if statement
# ... your code here

print("Rocket accelerating...")

# Make the rocket accelerate until it reaches escape velocity speed
# Hint - use a while loop
# ... your code here

print("Reached escape velocity!")

# Try to make the rocket land - you should get an error message as the
# speed is not zero!
# ... your code here

print("Rocket decelerating...")

# Make the rocket decelerate until it reaches zero speed
# Hint - use a while loop

# Try to make the rocket land - it should work now!
# ... your code here
```

Example output:

The rocket is a FalconX series rocket manufactured by Tesla
Escape velocity is set to: 50

The rocket is currently landed!

Taking off, speed is currently 0
The rocket is currently flying!

Rocket accelerating...

Rocket speed: 5
Rocket speed: 10
Rocket speed: 15
Rocket speed: 20
Rocket speed: 25
Rocket speed: 30
Rocket speed: 35
Rocket speed: 40
Rocket speed: 45
Rocket speed: 50

Reached escape velocity!

Error - cannot land as speed is not zero!

Rocket decelerating...

```
Rocket speed: 45  
Rocket speed: 40  
Rocket speed: 35  
Rocket speed: 30  
Rocket speed: 25  
Rocket speed: 20  
Rocket speed: 15  
Rocket speed: 10  
Rocket speed: 5  
Rocket speed: 0
```

```
Rocket landed!
```

Submission Details

Upload the following to the MyLO submission folder for this task:

1. The **robotDriver.py** source file (i.e. the text file containing your code)
2. A screenshot of the Python shell window that shows the **execution** results of the source code.

Assessment Criteria

A completed submission **must**:

1. Modify and then submit the file **rocketDriver.py**
2. Include comments about the program purpose and the author of the program (your name)
3. Use the Rocket class to produce the required output
4. Use meaningful names for variables, starting with a lower case
5. Submit both the source file and the screenshot of the execution of your code