

# Lunar Lander Design

## Class Diagrams

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### Angle

Everything we need to know about an angle.

Angle
- radian : Double
+ Angle() + Angle(degrees : Double) + Angle(rhs : Angle) + getDegrees() : Double + GetRadians() : Double + setDegrees(degrees : Double) + setRadians(radians : Double) + setUp() + setDown() + setLeft() + setRight() + reverse() + addOnto(delta : Double) - convertToDegrees(radians : Double) : Double - convertToRadians(degrees : Double) : Double - normalize(radians : Double)

### Acceleration

Everything we need to know about acceleration.

Acceleration
- ddx : Double - ddy : Double
+ Acceleration() + Acceleration(ddx : Double, ddy : Double) + getDDX() : Double + getDDY() : Double + setDDX(ddx : Double) + setDDY(ddy : Double) + set(a : angle, magnitude : Double) + addDDX(ddx : Double) + addDDY(ddy : Double) + add(rhs : Acceleration)

### Velocity

Everything we need to know about speed.

Velocity
- dx : Double - dy : Double
+ Velocity() + Velocity(dx : Double, dy : Double) + getDX() : Double + getDY() : Double + setDX(ddx : Double) + setDY(ddy : Double) + set(a : angle, magnitude : Double) + addDX(ddx : Double) + addDY(ddy : Double) + add(rhs : Acceleration, t : Double)

## Position

Everything we need to know about the position.

Position
- x : Double - y : Double
+ Position() + Position(x : Double, y : Double) + Position(rhs : Position) + assign(rhs : Position) : Position + getX() : Double + getY() : Double + equals(rhs : Position) : Boolean + notEquals(rhs : Position) : Boolean + setX(ddx : Double) + setY(ddy : Double) + addX(ddx : Double) + addY(ddy : Double) + add(rhs : Acceleration, v : Velocity, t : Double)

## Lander

The Module, its status, velocity, angle, position, and fuel.

Lander
<ul style="list-style-type: none"> <li>- status : {PLAYING, SAFE, DEAD}</li> <li>- pos : Position</li> <li>- v : Velocity</li> <li>- angle : Angle</li> <li>- fuel : Double</li> </ul>
<ul style="list-style-type: none"> <li>+ Lander(ptUpperRight : Postion)</li> <li>+ reset(ptUpperRight : Position)</li> <li>+ isDead() : Boolean</li> <li>+ isLanded() : Boolean</li> <li>+ isFlying() : Boolean</li> <li>+ getPosition() : Position</li> <li>+ getSpeed() : Double</li> <li>+ getFuel() : Int</li> <li>+ getWidth() : Int</li> <li>+ getMaxSpeed() : Double</li> <li>+ draw(thrust : Thrust, gout : ogstream)</li> <li>+ input(thrust : Thrust, gravity : Double) : Acceleration</li> <li>+ coast(a : Acceleration, time : Double)</li> <li>+ land()</li> <li>+ crash()</li> </ul>

## Thrust

The mainEngine, the rotation, and user input of the module.

Thrust
<ul style="list-style-type: none"> <li>- mainEngine : Boolean</li> <li>- clockwise : Boolean</li> <li>- counterClockwise : Boolean</li> </ul>
<ul style="list-style-type: none"> <li>+ Thrust()</li> <li>+ rotation() : Double</li> <li>+ mainEngineThrust() : Double</li> <li>+ isMain() : Boolean</li> <li>+ isClock() : Boolean</li> <li>+ isCounter() : Boolean</li> <li>+ set(pUI : Interface)</li> </ul>