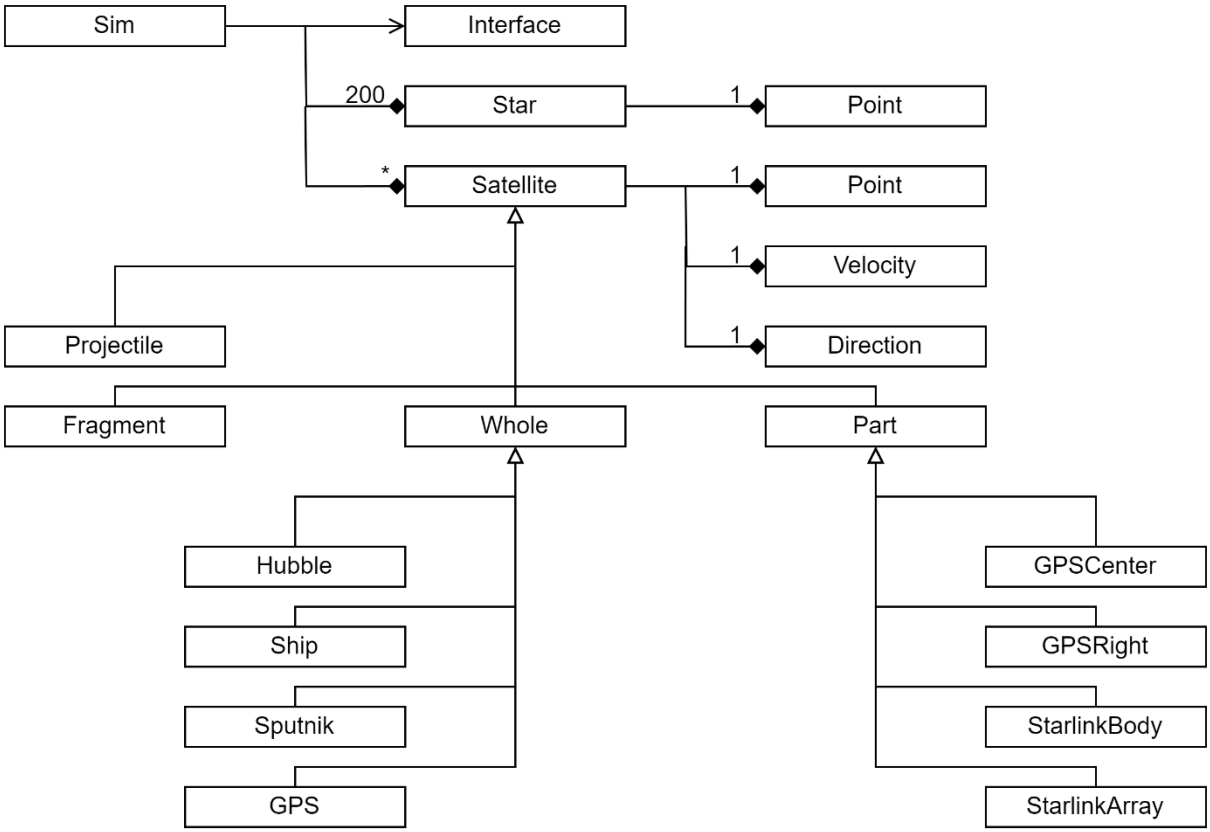
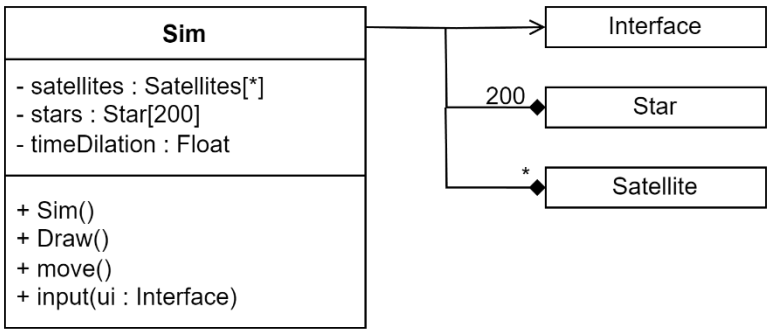
Orbital Design

Class Diagrams

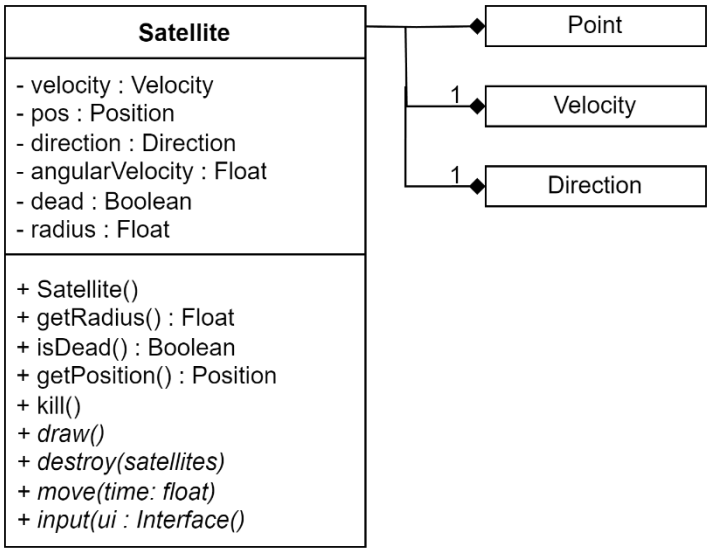
Overview



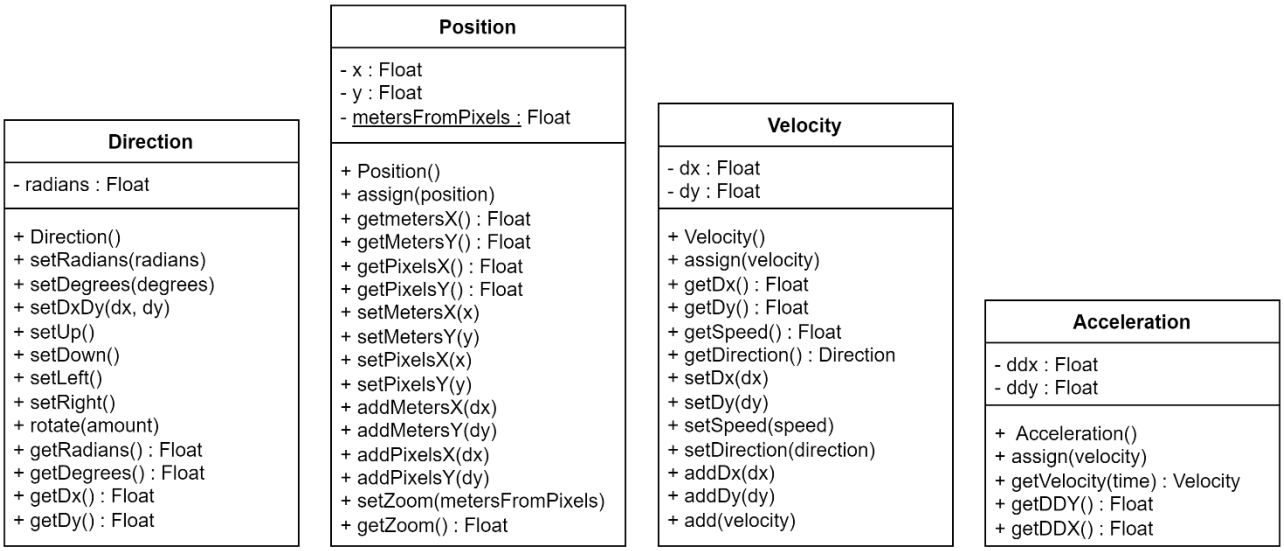
Sim



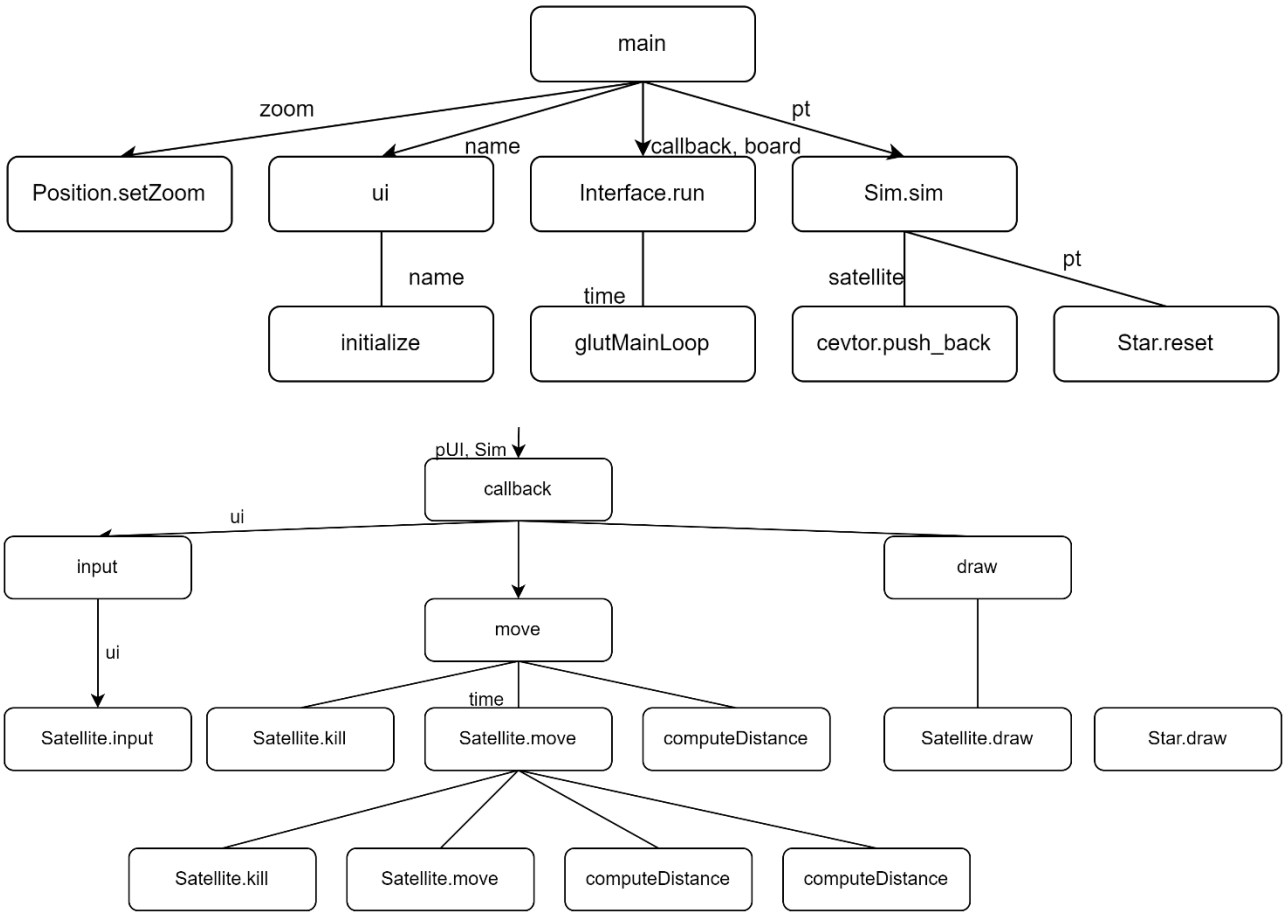
Satellite



Direction, Position, Velocity, and Acceleration



Structure Chart



Pseudocode

Sim::Sim()

```
Sim.Sim(ptUpperRight)
   Framerate ← 30
   hoursPerDay ← 24
   minutesPerHour ← 60
   secondsPerMinute ← 60
   secondsPerDay ← hoursPerDay x minutesPerHour x secondsPerMinute

   timeDilation ← hoursPerDay x minutesPerHour

   FOR i ← 0 … 200
      Stars[i].reset(ptUpperRight)

   radiansInADay ← -2π
   radiansPerFrame ← (radiansInADay / framerate) x (timeDilation / secondsPerDay)
   satellites.push_back(Earth(radiansPerFrame))

   FOR i ← 0 … 6
      Satellites.push_back(GPS(i))
   Satellites.push_back(Starlink)
   Satellites.push_back(Hubble)
   Satellites.push_back(Sputnik)
```

```
   Satellites.push_back(Dragon)
```

Sim::move()

```
Sim.move()
   Time ← timedilation / framerate

   FOR satellite IN satellites
      Satellite.move(time)

   FOR it1 ← satellites.begin() … satellites.end()
      FOR it2 ← it1 + 1 … satellites.end()
         IF NOT it1.dead and NOT it2.dead
            Distance ← computeDistance(it1.position, it2.position)
            IF distance < it1.radius + it2.radius
               It1.kill()
               It2.kill()

   FOR it ← satellites.begin() … satellites.end()
      IF it.dead()
         It.destroy(satellites)
         It ← satellites.erase(it)
```

Satellite::move()

```
Satellite.move(time)
   aGravity ← getGravity(pos)
   updateVelocity(velocity, aGravity, time)
   updatePosition(pos, velocity, gravity, time)
   direction.rotate(angularVelocity)
```

GPS::destroy()

```
GPS.destroy(satellites)
   Satellites.push_back(GPSCenter(this, Direction(90)))
   Satellites.push_back(GPSLeft(this, Direction(0)))
   Satellites.push_back(GPSRight(this, Direction(180)))
   Satellites.push_back(Fragment(this, Direction(330)))
   Satellites.push_back(Fragment(this, Direction(250)))
```

GPSRight::destroy()

```
GPSRight.destroy(satellites)
   Satellites.push_back(Fragment(this, Direction(115)))
   Satellites.push_back(Fragment(this, Direction(325)))
```

Ship::input()

```
Ship.input(ui, satellites)
   Direction.rotate((ui.isRight() ? 0.1) + (ui.isLeft() ? -0.1))

   IF ui.isDown()
      Acceleration ← 30, direction
      Velocity += acceleration

   IF isSpace()
      vBullet ← 9000, direction
      satellites.push_back(Projectile(position, vBullet))
```