Sanix

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Tokamak Reactor Requirement Validation Document

The Original Requirements Document

- Magnetic rods generate energy for the reaction
    a. In the middle of the ring
    b. Deuterium and tritium are fused into helium

The Validation Document

- Customer verifies that enough power has been generated
    a. Can determine how much power is required
        - Donut_Chamber.determineRequiredPower
        - assert(min_required_power>0)
    b. Can determine how much power has been generated
        - Donut_Chamber.absorbParticles
        - assert(heat>0)
        - assert(output==True)
    c. Calculates generated power from both functions

The Original Requirements Document

- Fusion occurs in a donut-shaped chamber
    a. One deuterium molecule and one tritium molecule are required in order to create one helium molecule
    b. The electrical current is 3MA (3,000,000 Amperes)

The Validation Document

- Customer verifies that the chamber is donut-shaped to produce fusion
    a. The chamber itself will be donut-shaped
    b. It will contain magnetic rods to produce power
    c. These rods can be adjusted to increase or decrease the amount of power being generated
        - Donut_Chamber.increasePower
        - assert(amount>0)
        - assert(power>=min_required_power)
        - Donut_Chamber.decreasePower
        - assert(amount>0)
        - assert(power>=min_required_power)

The Original Requirements Document

- Simulating forces on every particle

a. Strong nuclear force rips fused particles apart
b. Weak nuclear force causes particles to repel
c. Gravity pulls particles together
d. Magnetic force pulls particles together

The Validation Document

- Customer verifies that all four forces act on every particle
    a. Strong_Nuclear_Force returns the effect on each particle
        - Strong_Nuclear_Force.effect
    b. Weak_Nuclear_Force returns the effect on each particle
        - Weak_Nuclear_Force.effect
    c. Gravity returns the effect on each particle
        - Gravity.effect
    d. Magnetic_Force returns the effect on each particle
        - Magnetic_Force.effect
    e. None of the effects are able to be zero
        - assert(Force!=0)

The Original Requirements Document

- The user can manipulate the simulation
    a. Zoom in & out
    b. Single particle zoom
    c. Multiple particle zoom
    d. System View

The Validation Document

- Customer verifies that the simulation can be manipulated by the user
    a. Can verify that the zoom level has changed
        - GUI.ChangeZoom
        - assert(self.zoom!=tempZoom)
        - assert(zoom>=0)
        - assert(zoom<=150)
    b. Can zoom to view a single particle
        - GUI.ChangeZoom
        - assert(self.zoom!=tempZoom)
        - assert(zoom>=0)
        - assert(zoom<=150)
    c. Can configure the zoom to view multiple particles
        - GUI.ChangeZoom
        - assert(self.zoom!=tempZoom)

- assert(zoom>=0)
- assert(zoom<=150)

d. Changes the speed of the playback, which is 0.5 of a billionth of real-time speed to 1.5 billion times real-time speed
   - GUI.ChangeSpeed
   - assert(speed>=0.5)
   - assert(speed<=1.5)
   - assert(self.speed!=tempSpeed)