**Supplementary Specification**

Group: Fark Etmez

**Introduction**

This document is the repository of all KUVid 302-Phase 1 Requirements not captured in the use cases.

**Functionality**

The System does lots of actions in the Game time (Dropping molecules, powerups, etc.). The details are explained in Application-Specific Domain Rules.

**Usability**

Human Factors

The Player should be able to see all the game items easily while looking at the screen.

Colors should be distinctly different to ease understanding.

The system should give warnings when the Player does something wrong.

The system must be able to react in a short time interval to the Player’s actions.

**Reliability**

Recoverability

If there is a failure, Player can restart the Game.

**Performance**

As mentioned above, our aim is to react to the Player’s actions quickly. Also, the Game must not crash.

**Supportability**

Adaptability

The Game should adapt to changing features easily.

Configurability

The Player can configure the Game in Building Mode.

**Implementation Constraints**

KUVid-302 Project Team uses Java (standard Java libraries, Java Swing, etc.) to implement the Game.

**Application-Specific Domain Rules**

General Game Rules:

* L is the default distance unit in the game. All the dimensions are going to be driven from this unit. By default, L is 10% of the game view height. However, it is configurable in the game building mode.
* The shooter will move in L/secs.
* The width of the shooter is 0.5 L while the height is 1L.
* There are Alpha-, Beta-, Sigma-, Gamma- molecules. Each molecule has the corresponding atom, reaction blocker, and powerup.
* All have nonlinear forms. Alpha- and Beta- also have linear forms.
* There are two main behaviors while objects fall from the sky, namely:
  + Straight: falling with a speed of L/sec, perpendicular to the ground.
  + Zig-zag: falling with a speed of L/sec, but with a 45 degree angle to the vertical plane, in alternating fashion, i.e. 45 degree angle to the left followed by 45 degree angle to the right, changing direction after a distance of L is travelled.
* The molecules fall from the sky in the following manner:
  + Alpha- molecule: Zig-zag all the way through the gameview height.
  + Beta- molecule: Straight for a quarter of gameview height, zig-zag for the rest of the way.
  + Gamma- molecule: Straight for half the gameview height, zig-zag for the rest of the way.
  + Sigma- molecule: Straight throughout the gameview height.
* The reaction blockers, Alpha-b, Beta-b, Gamma-b, and Sigma-b, block the reactions between their corresponding atoms and molecules that are within 0.5L of them.
* The reaction blockers also explode when they reach the ground, creating a blast zone of 2L and destroying any object in that zone, while decreasing the player’s health by a factor of (gameview width / distance to the shooter) if the shooter was in the blast zone.
* The reaction blockers follow the same pattern with their corresponding molecule while falling through the sky.
* The power-ups, also in the four types mentioned above, are used to destroy the reaction blockers.
* Power-ups are collected by the shooter being in the same place where the power-up is falling, and stored in the player’s inventory. Also, the power-ups always fall in straight lines.
* To use a power-up, the player clicks on the desired power-up icon, which then appears on the atom shooter and can be shot like an atom.

Building Mode Rules:

* Player chooses between “easy”, “medium”, “hard” difficulty levels.
* Difficulty levels indicate the falling speed of objects. In easy mode the falling speed is 1 secs, in medium mode the falling speed is ½ secs, in hard mode falling speed is ¼ secs. (Falling speed indicates the object occurring speed in the screen)
* Player can specify the number of atoms, reaction blockers, powerups, molecules.
* Player can choose molecule shapes for Alpha Beta.
* Default values:
  + 100 atoms of each type
  + 100 molecules of each type and of any structure
  + 10 reaction blockers of each type
  + 20 powerups of each type

Pick Atom:

A random atom will be displayed on top of the shooter.

Whenever the player presses the “C” button on the keyboard the existing atom will change into a random atom.

The process will only work for the “C” button, there will be no change in the atom if the player presses an arbitrary button on the keyboard.

Rotate Shooter:

Shooters will be rotated if the player presses the “A” or “D” button on the keyboard.

Player presses the “A” button and the shooter will be rotated 10 degrees to the left.

Player presses the “D” button on the keyboard and the shooter will be rotated to the right.

If the shooter is already 90 degrees rotated to the left and the player presses “A”, the shooter will not be rotated.

If the shooter is already 90 degrees rotated to the right and the player presses “D”, the shooter will not be rotated.

The rotation speed of the shooter is 90 degrees/sec.

This process will only work for “A” and “D” buttons on the keyboard, the shooter will not rotate if the player presses any other arbitrary button.

Powerups:

Player presses Arrow-up to shoot powerup.

The powerup number is increased by 1 when powerup is caught.

The powerup number is decreased by 1 when powerup is shot.

Powerups destroy Reaction Blockers which enter Powerup’s field (radius 0.5L) only if the type of Reaction Blocker is the same as the type of Powerup.

Powerup is placed by clicking on the Powerup icon and shot by “Arrow-Up” key.

If the Player clicks on a powerup type that Player does not have, System gives a warning.

Powerup must be placed at the top of Shooter after picking.

Hit a Molecule:

The shooter will be triggered with the Up-Arrow.

Move Shooter:

Shooter will be moved left or right as the player presses the “Left Arrow” or “Right Arrow” buttons on the keyboard.

Player presses the “Left Arrow” key and the shooter will be moved to the left as long as the key is pressed.

Player presses the “Right Arrow” key and the shooter will be moved to the right as long as the key is pressed at the speed of L/sec.

If the shooter is at most left of the game screen and the player presses the “Left Arrow”, the shooter will not be moved.

If the shooter is at most right of the game screen and the player presses the “Right Arrow”, the shooter will not be moved.

The moving speed of the shooter is L/sec.

This process will only work for “Left Arrow” and “Right Arrow” buttons on the keyboard, the shooter will not move if the player presses any other arbitrary button.