Nano Virus Simulation

User manual

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**Introduction.**

The Nano Virus Simulation was created in order to simulate the human body and how a Nano Virus could possibly kill all tumorous cells. The Nano virus is able to perform one of three possible tasks. Move up, kill or replicate. Other cells which are included in the simulation are White blood cells and Red blood cells. The Nano Virus has to wait its turn to kill a tumorous cell. The Nano Virus may only move up 2000units at a time. A formula will be used in order to calculate the distance between two cells. A Nano Virus cell can replicate, causing two Nano Virus cells to divide into two cells which can move independently of one another. A Tumorous cell will take its turn and kill the nearest Red blood cell, until there are no more Red blood cells available to kill. After which it will start killing White blood cells. Tumorous cells are never able to target Nano Virus cells. The program will be saved after each cycle of turns, in the form of a text file. Once all the tumorous cells are killed, the Nano Virus wins and the program ends. If only tumorous cells remain the program ends.
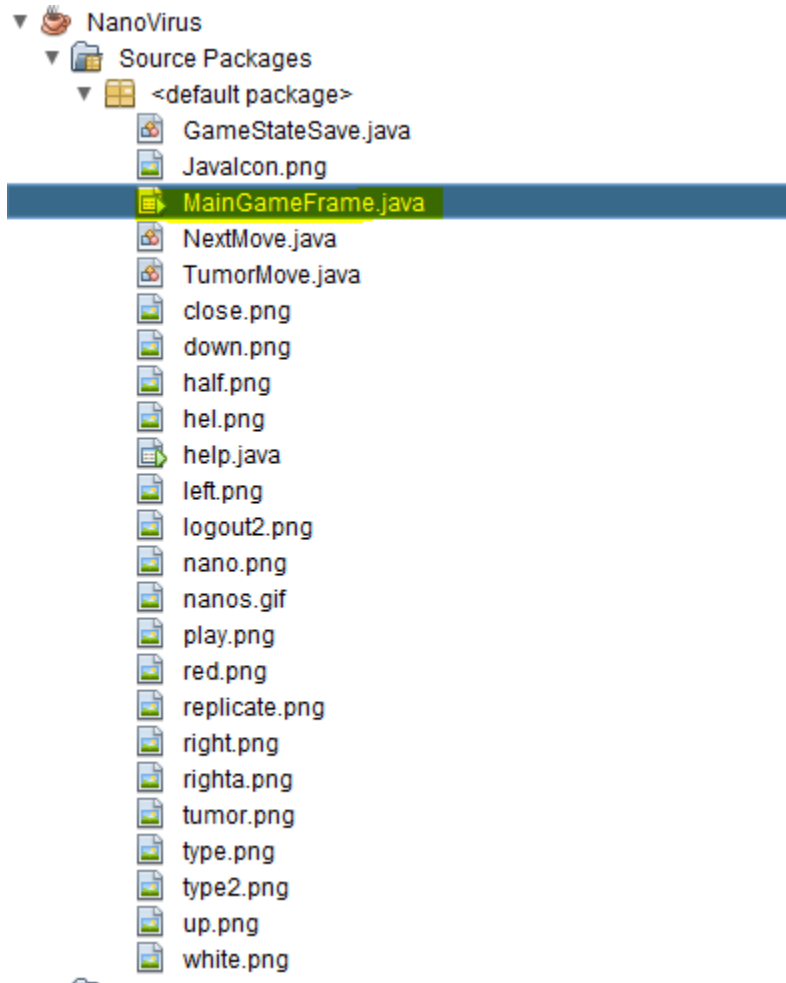
Decompress file to begin:

Decompress the file: find the Nano Virus Java file
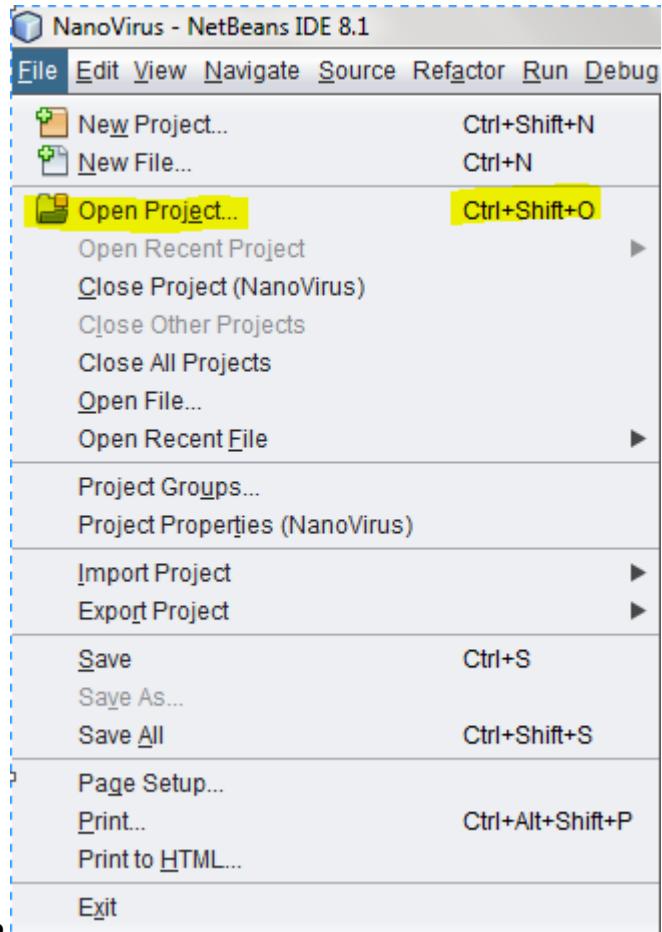
In Netbeans Locate File and open file

Find the NanoVirus Java File and open.

Once the NanoVirus File has opened : locate the MainGameFrame. java File and double click

```
▼ ☕ NanoVirus
   ▼ 📁 Source Packages
      ▼ 🔳 <default package>
            📄 GameStateSave.java
            📄 JavaIcon.png
            📄 MainGameFrame.java
            📄 NextMove.java
            📄 TumorMove.java
            📄 close.png
            📄 down.png
            📄 half.png
            📄 hel.png
            📄 help.java
            📄 left.png
            📄 logout2.png
            📄 nano.png
            📄 nanos.gif
            📄 play.png
            📄 red.png
            📄 replicate.png
            📄 right.png
            📄 righta.png
            📄 tumor.png
            📄 type.png
            📄 type2.png
            📄 up.png
            📄 white.png
```

The source code will open in Netbeans:

```
1
2   /*
3    * FILE : NanoVirusSimulation.java
4    *
5    * DATE: 24/09/2018
6    *
7    * AUTHOR: @author Angela
8    *
9    * PURPOSE: Simulation of a Nano Virus that kills all tumorus cells.
10   *
11   * VERSION : V1.0
12   */
13
14   // Java Imports
15   import java.awt.event.ActionEvent;// Abstract Window Toolkit import for use of Action Event Listener
16   import java.awt.event.ActionListener;// Abstract Window Toolkit import for use of Action Listener
17   import java.io.File;// Java import for input output file writes
18   import java.io.Serializable;// Import to input output object writes
19   import java.util.ArrayList; // Util import for use of Array list
20   import java.util.Collections;// Util Collections import in order to shuffle list of array
21   import java.util.Random; // Util Random import for use of Randomizer of numbers
22   import javax.swing.ImageIcon;// Swing import for use of Image Icons
23   import javax.swing.JButton;// Swing import for use of JButtons
24   import javax.swing.JFrame;
25   import javax.swing.JLabel;// Swing JLable import for use of JLables
26   import javax.swing.JOptionPane;// Swing JOptionPane import for use of JOptionPanes
27   // class MainGameFrame
```

Right click and Run:

Navigate	▶
Show Javadoc	Alt+F1
Find Usages	Alt+F7
Call Hierarchy	
Insert Code...	Alt+Insert
Fix Imports	Ctrl+Shift+I
Refactor	▶
Format	Alt+Shift+F
Run File	Shift+F6
Debug File	Ctrl+Shift+F5
Test File	Ctrl+F6
Debug Test File	Ctrl+Shift+F6
Run Focused Test Method	
Debug Focused Test Method	
Run Into Method	
New Watch...	Ctrl+Shift+F7
Toggle Line Breakpoint	Ctrl+F8
Profile	▶
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Code Folds	▶
Select in Projects	

The Begin Simulation will appear: Click OK OK
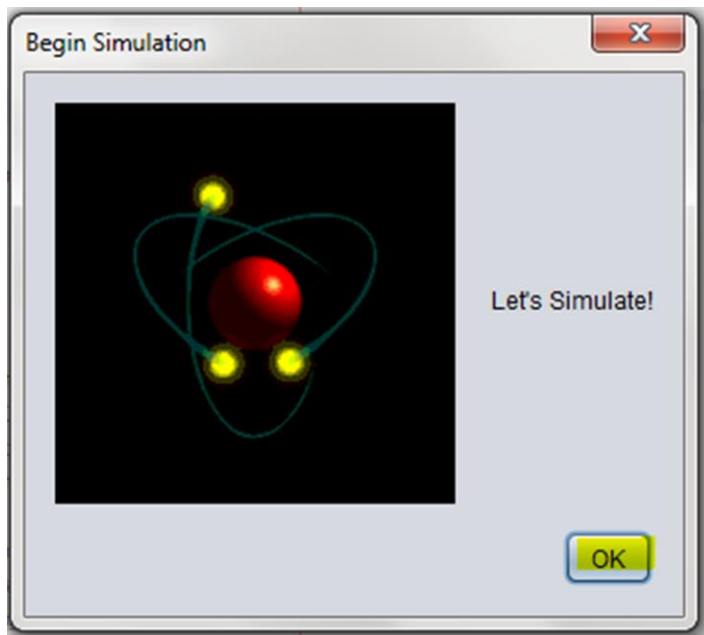
The JOptionPane : Let's Simulate will appear – Click OK
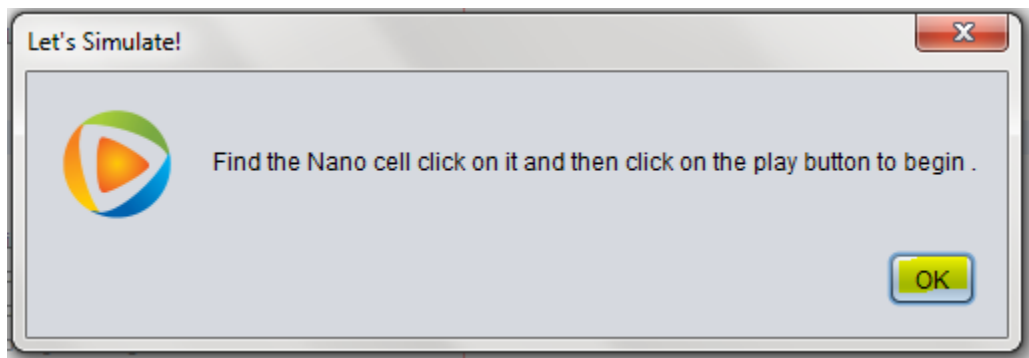
The MainGameFrame will appear:
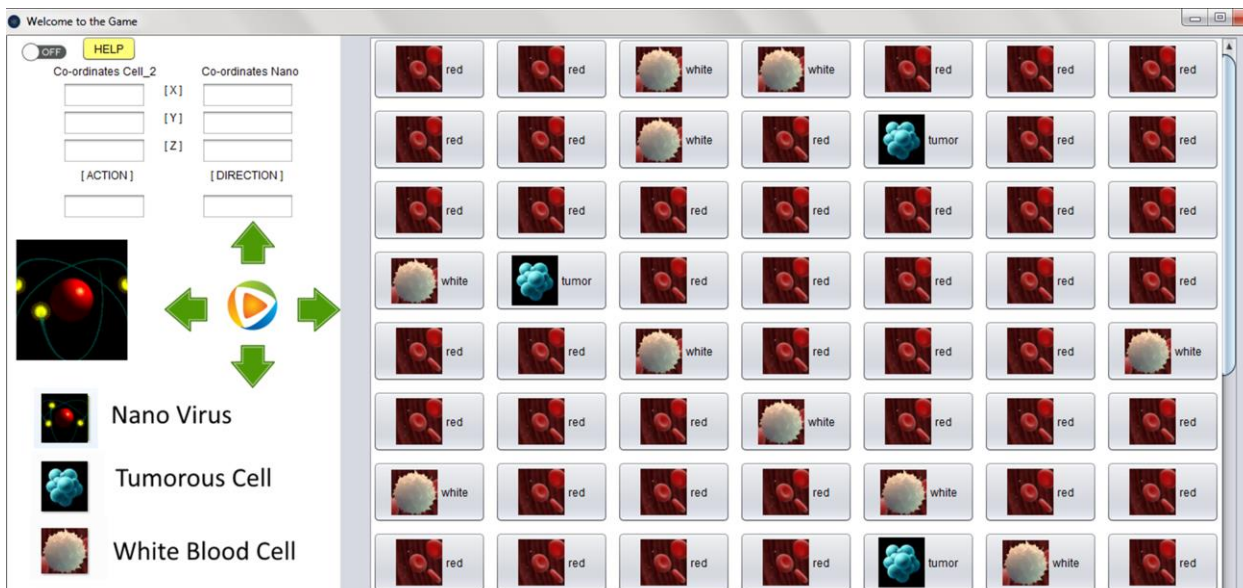
The MainGameFrame interface:
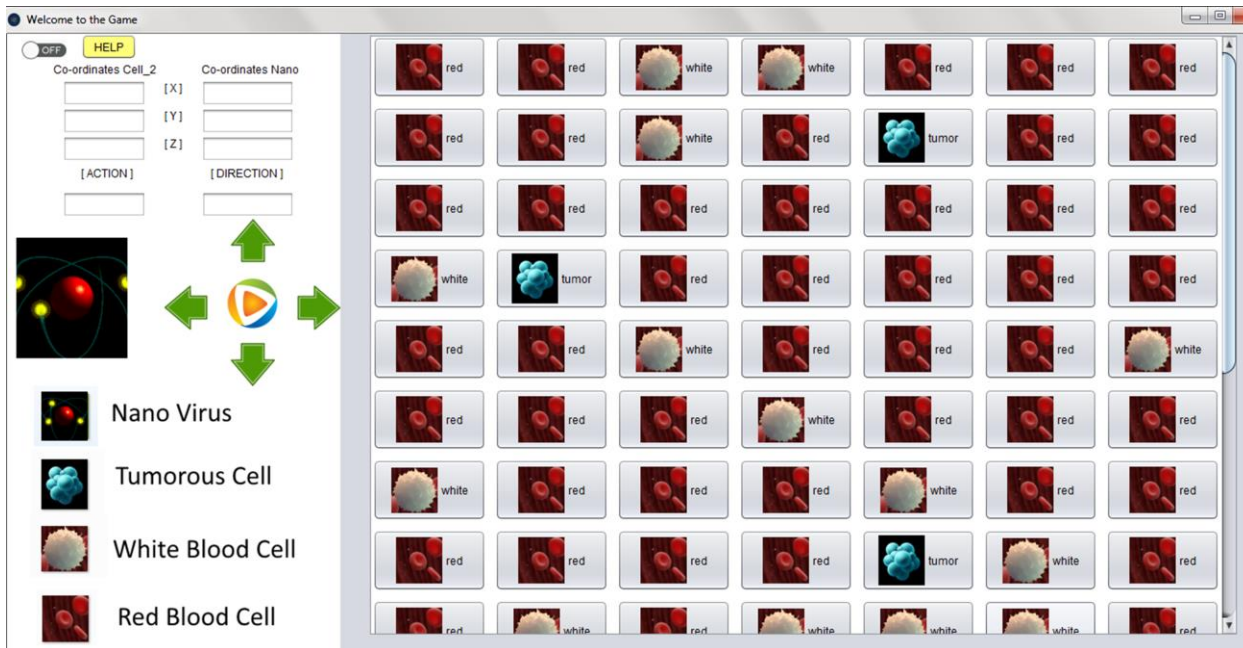
The off button can be used to close the simulation:

The HELP button can be used for help purposes:
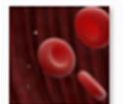
Cell types are indicated by icons:
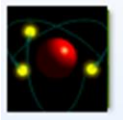
Nano Virus
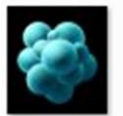
Tumorous Cell

White Blood Cell

Red Blood Cell

X, Y and Z coordinates are indicated in text fields:

The action text field determines the action of the simulation , the direction text fields determines the

direction of the move :

The scroll panes can be used to scroll to the farthest end of the game panel:
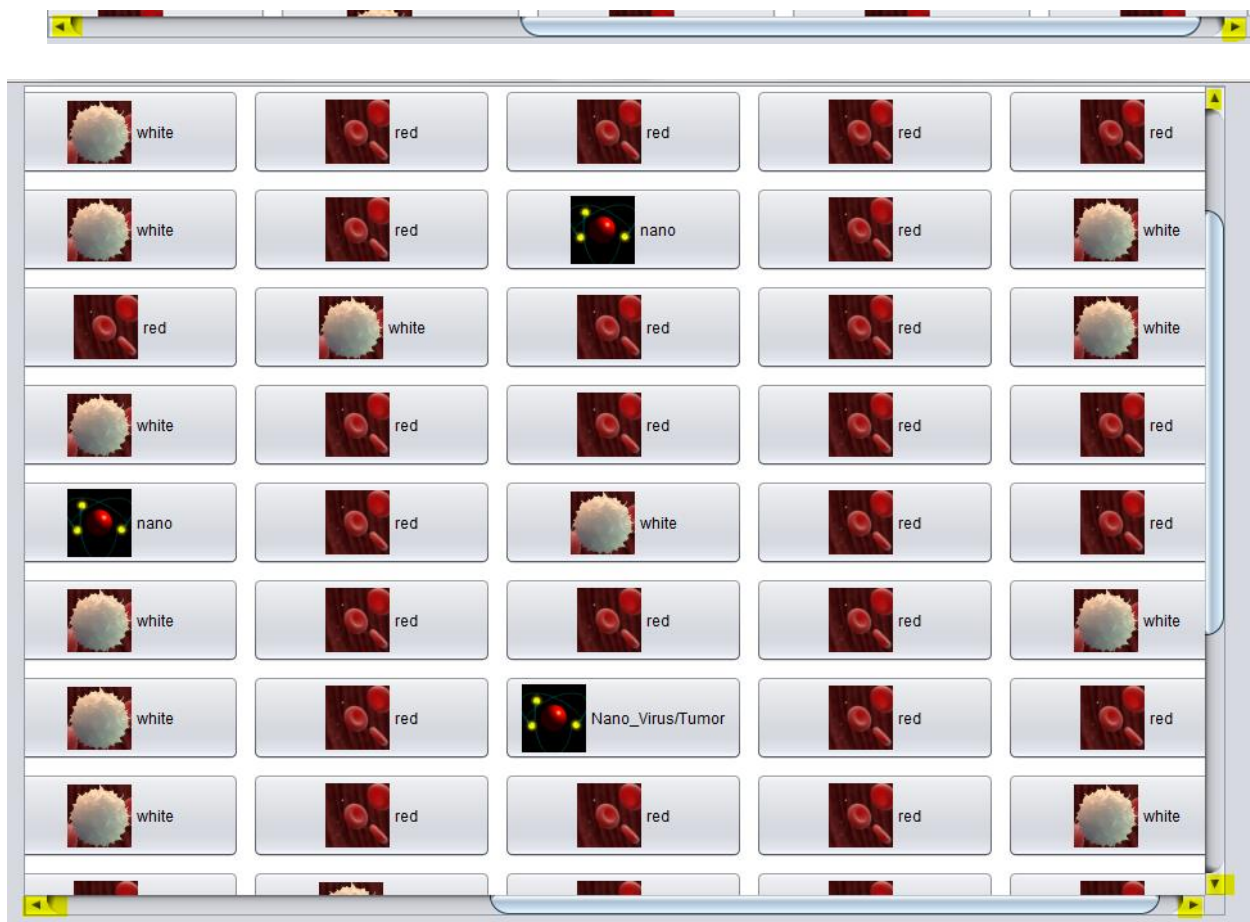
Begin the simulation:

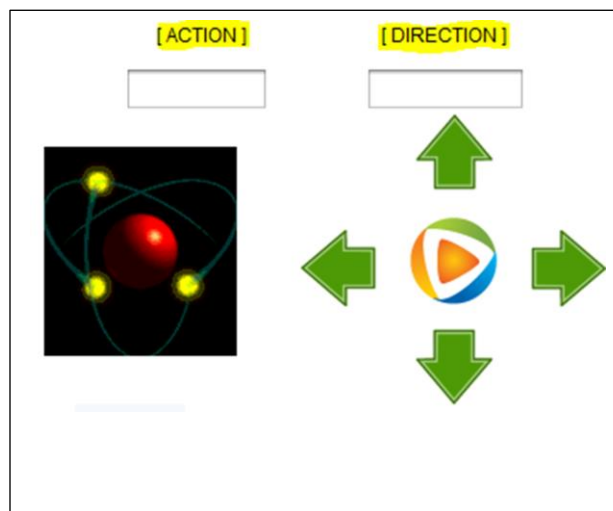Find the Nano Virus cell on the game panel and click on it:

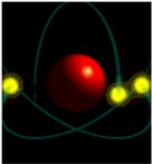|						
red	red	red	red	white	red	red
red	red	red	red	white	red	red
red	white	red	red	red	red	red
red	red	nano	white	red	red	red
white	white	red	red	red	red	red
red	red	red	red	red	red	red
red	white	red	red	red	red	tumor
red	red	red	red	red	red	red
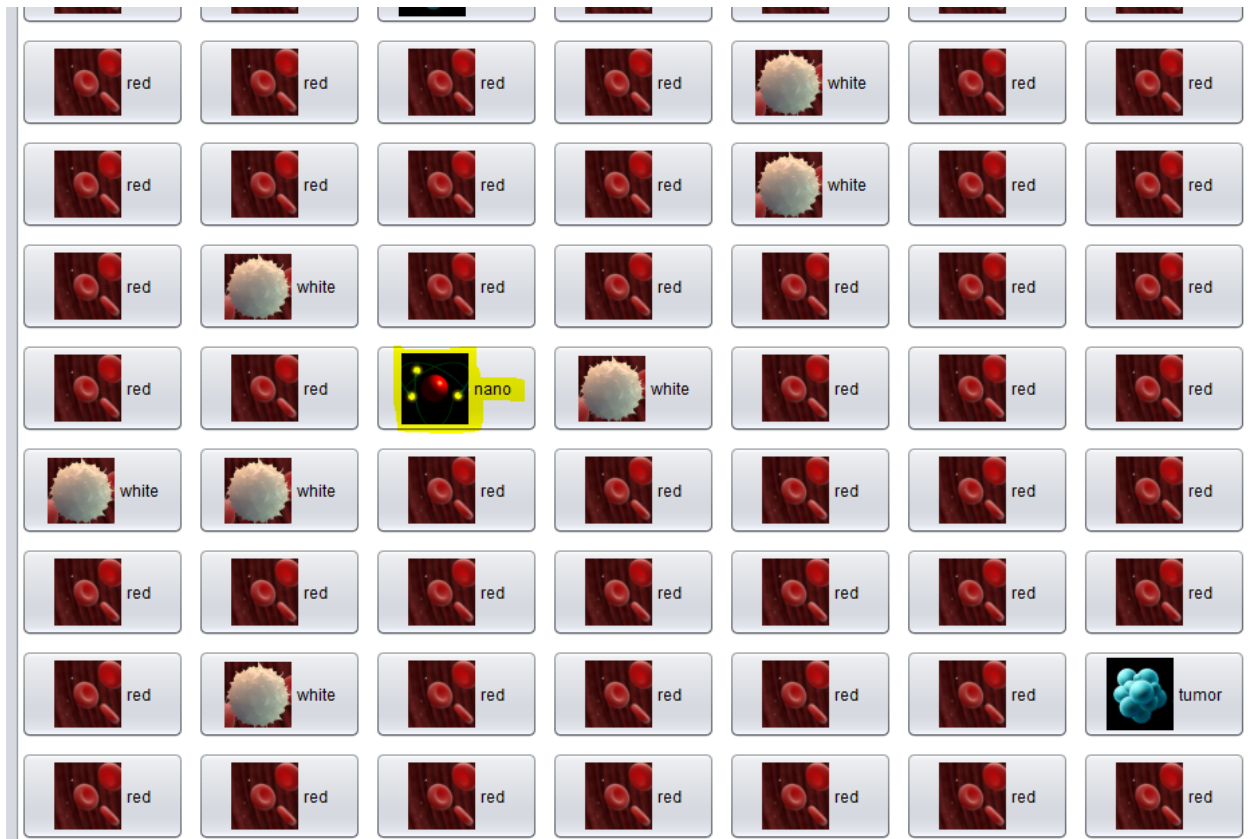
Click on the play button:

Before click:

Action and Direction fields are

*Blank. Green arrows are visible.*

[ACTION]

[DIRECTION]

After play button click:

Co-ordinates Cell_2		Co-ordinates Nano
1774	[X]	3464
1169	[Y]	452
3645	[Z]	468
[ACTION]		[DIRECTION]
PLAY!		3669

Nano Virus

red   red   red

red   red   red

red   white   red

red

white

Message

First Move!

OK
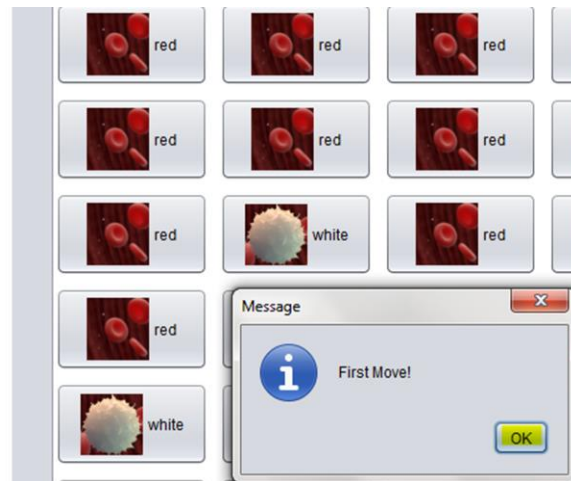
Coordinates are filled in text fields. Action field is filled. Direction field is filled. Green arrows have disappeared. View display message and click OK OK *.*

View display message choose units and click ok OK *.*

Input

How many units do you want to move ? 250 or 1800 or 2000
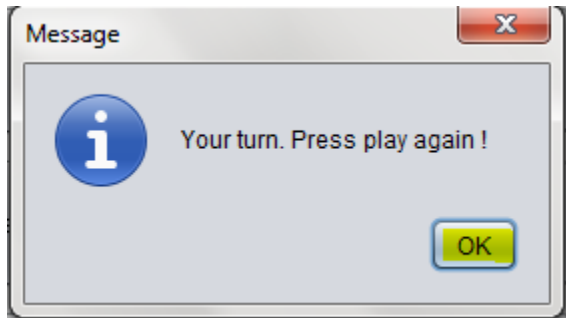
250

OK   Cancel

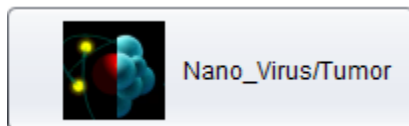View display message for first round and click ok. OK
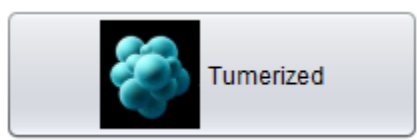
Message

Wait till next round to KILL

OK

View display message for tumor move and click ok

View game panel and find one Nano_Virus Tumor icon. Nano virus is not able to kill the tumor in the first round:

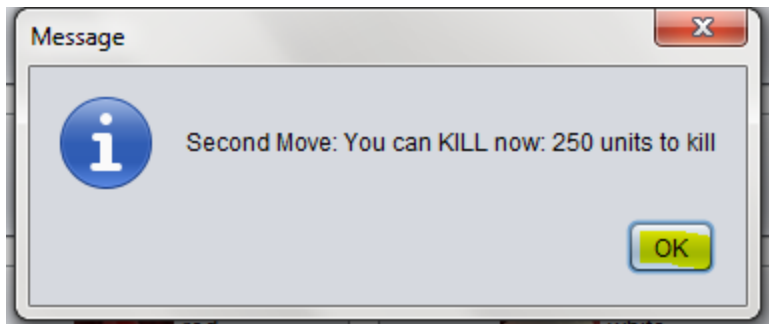View the game panel and find one Tumorized icon:

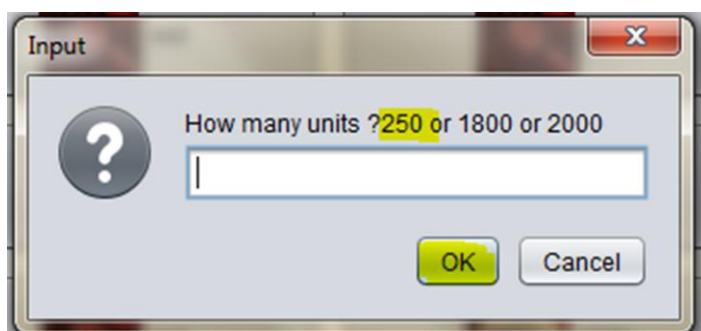The Tumor cell has taken over one red blood cell.
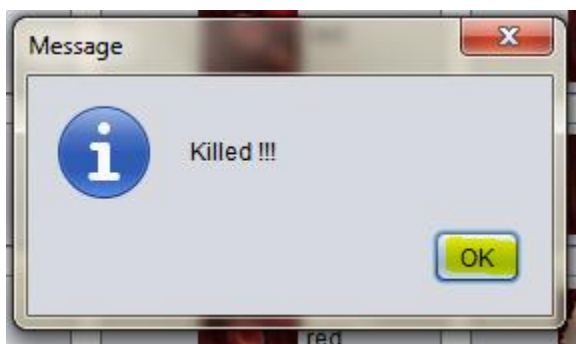

Click on the play button again
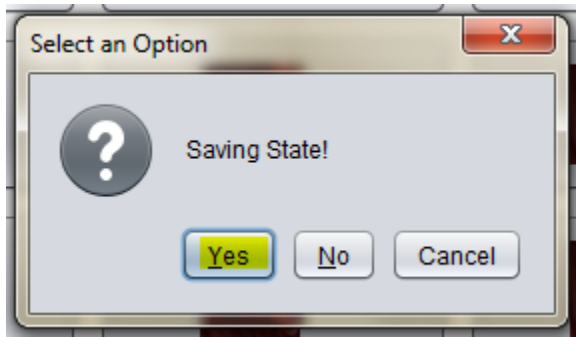
Nano Virus cell move: view display message and click ok

Message

Second Move: You can KILL now: 250 units to kill

OK

View display message and choose units click ok. OK

Input

How many units ?250 or 1800 or 2000

OK   Cancel

View display message and click ok. OK
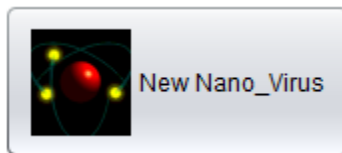

Message

Killed !!!

OK

red

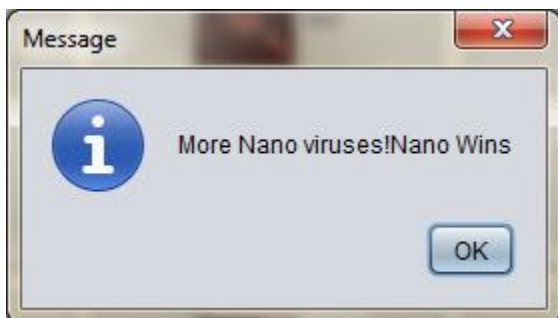View display message and click yes to save the state of the game:

View the game panel and find the New Nano Virus cell which has killed a tumor cell:

Other unit choices can lead to replicated Nano Virus cells:
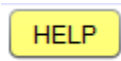

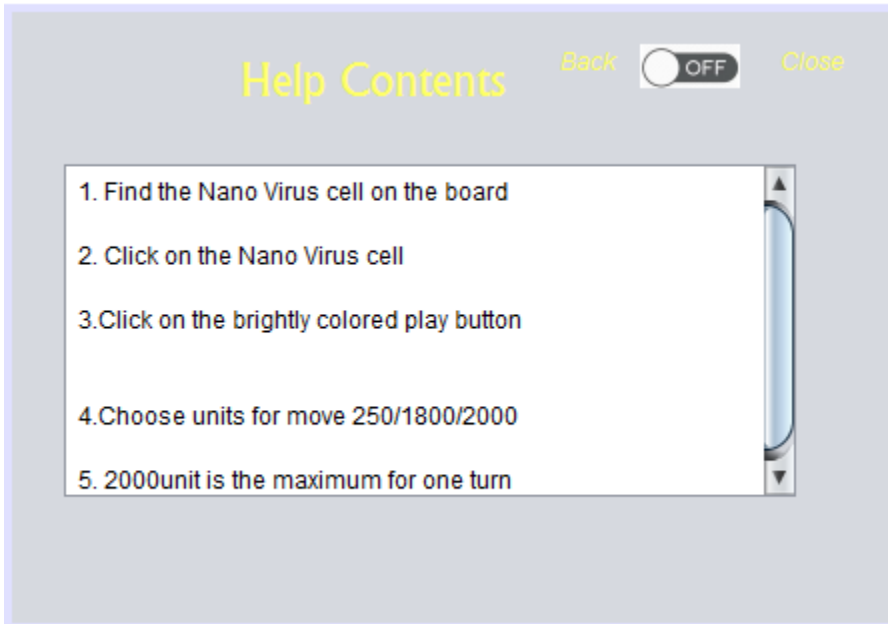If there are more Nano Virus cells than tumor cells a message will be displayed:

If there are more Tumor cells than Nano Viruses a message will be displayed.

The help button:

Click on the help button if help is required.

HELP

A help screen will appear.

Help Contents   Back   OFF   Close

1. Find the Nano Virus cell on the board

2. Click on the Nano Virus cell

3. Click on the brightly colored play button

4. Choose units for move 250/1800/2000

5. 2000unit is the maximum for one turn

Use the back button to return to the game   Back

Use the log off button to exit   OFF

Or use the close button to exit   Close

Tips and Tricks

1. If the program is run for the first time and a Nano Virus cell does not appear.

    Clean and build the project again *until the Nano Virus is visible.*
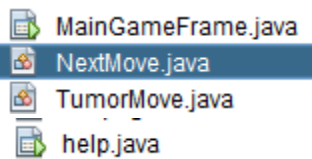   *No Nano Virus cell means no simulation play.*

2. Design and source view.
    Switch between design and source code on the GUI build project to see different views of
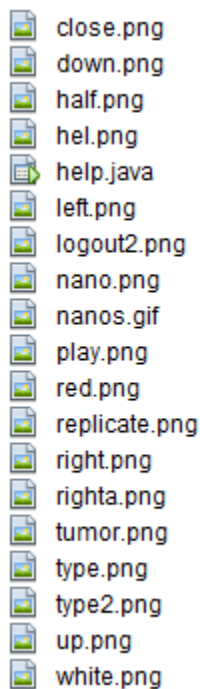   *the project.*

3. Classes :
    There are four classes in the project including:

    MainGameFrame.java
    NextMove.java
    TumorMove.java
    help.java

4. Icons :
    There are many icons within the project including:

    close.png
    down.png
    half.png
    hel.png
    help.java
    left.png
    logout2.png
    nano.png
    nanos.gif
    play.png
    red.png
    replicate.png
    right.png
    righta.png
    tumor.png
    type.png
    type2.png
    up.png
    white.png

5. Comments :
   Comments are
   Available within
   Each class for clarity of
   code.

```java
// Java imports for the NextMove class
import java.io.File;
import javax.swing.ImageIcon;// swing import for the Image Icon use
import javax.swing.JButton; // swing import for teh JButton use
import javax.swing.JOptionPane; // swing import for the JOptionPane use.
```