The Lords of Rings : Two city war

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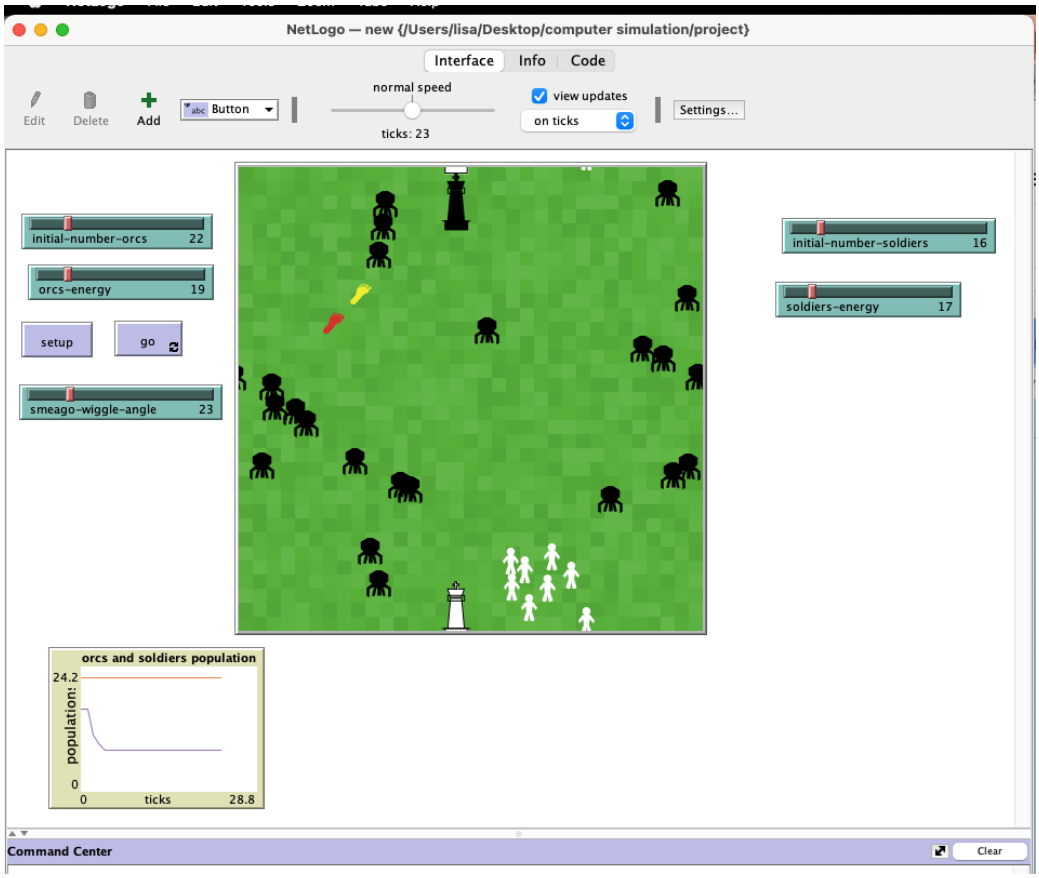
Abstract

The model simulates the war between Mordor and Minas Tirith City. Both cities will send their soldiers to kill each other. This was inspired by Movie “ The Lord of the Rings: The Return of the King. Minas Triith City can’t not be defeated until Fordo(separate group) reaches Mordor and drops the ring into the volcano.



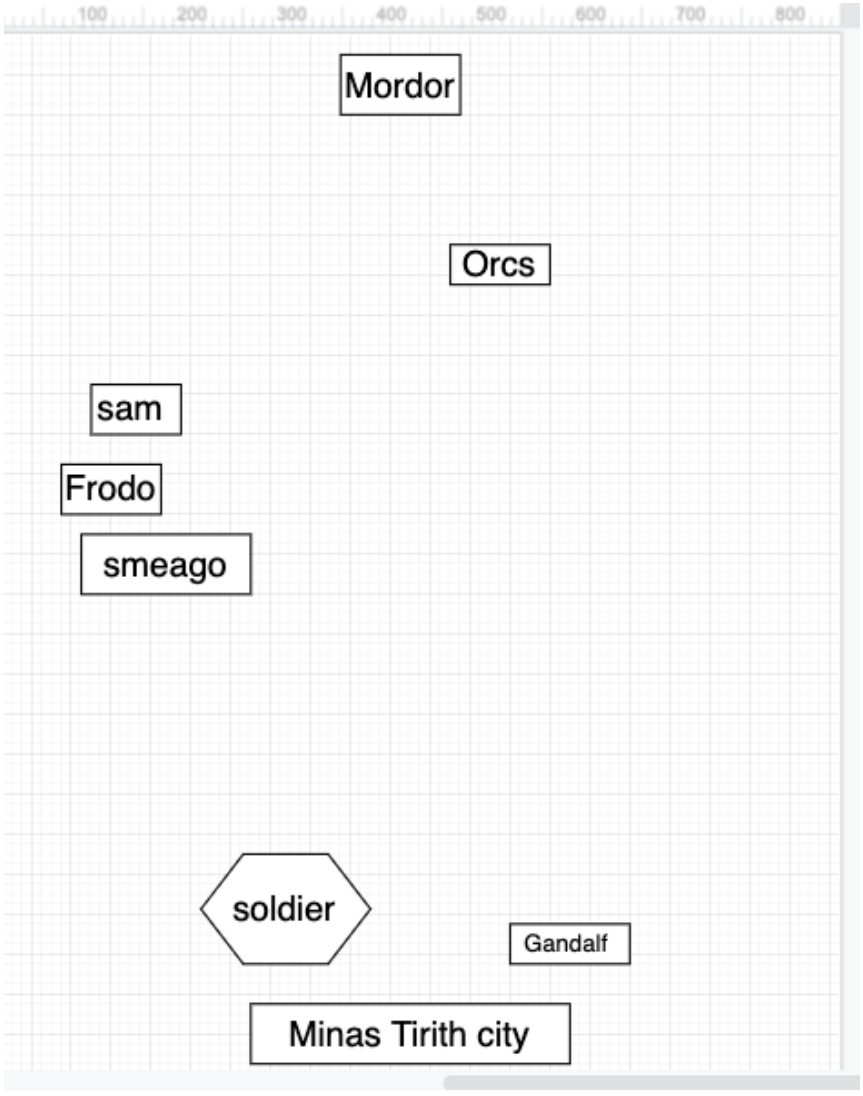
Introduction

There are two cities: Mordor and Minas Tirith City. Mordor wants to destroy Minas city and send its soldiers, orc, to win the war. People(Gandolf,elf,Arogorn, gimli and legolas) from Minas City have to defend the city and kill these orcs.

At the same time, A separate group made of Frodo, Sam, and Seago. Those three people will take a separate road to get to Mordor and drop the ring into Mordor' volcano. Then the soul of Sauron, the owner of Mordor, will be killed.

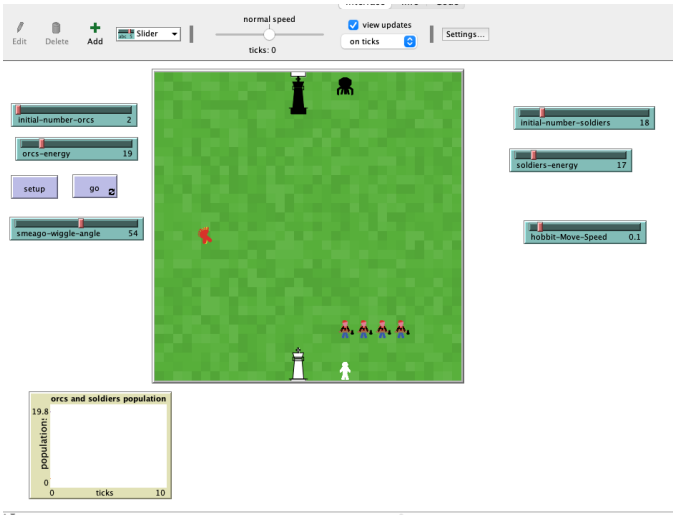
Model that I will use :

I will get some ideas from the Netlogo model library. There are ants models and wolf sheep mode. Ants models can be used to build the direction of orcs to Minas city, and wolf sheep mode can be used to build the killing between orcs and the Gandalf group.



Model setting

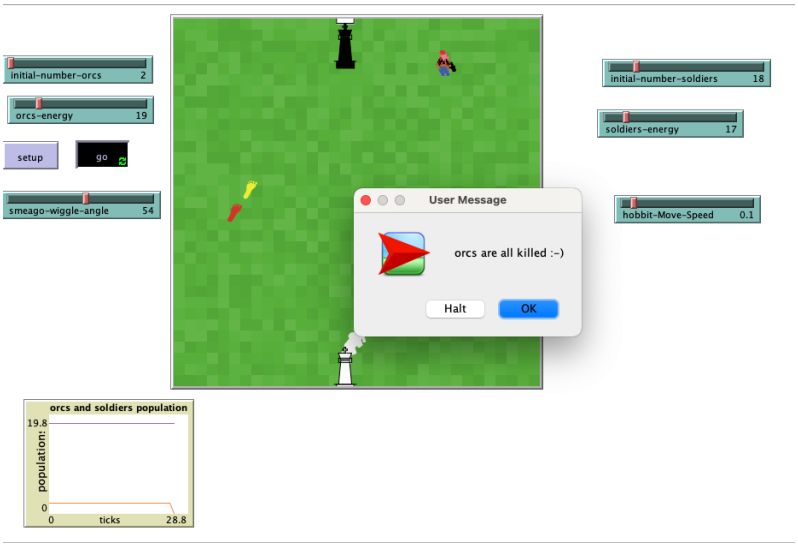
1. **How it works**
   You can click the 'setup' button to initiate the game. The screens will show black and white cities. White person is a soldier and white castle is Minas Tirith city.



Black spiders are orcs and black castle is Mordor.
Left side, there are two footprints. The yellow one is Smeago, and the red one is hobbits.
Right side, there are four people. They are Gandolf, Aragorn, Legolas, and gimlis.

Then you can click “ go” and “initial-number-orcs’ to set the number of orcs.

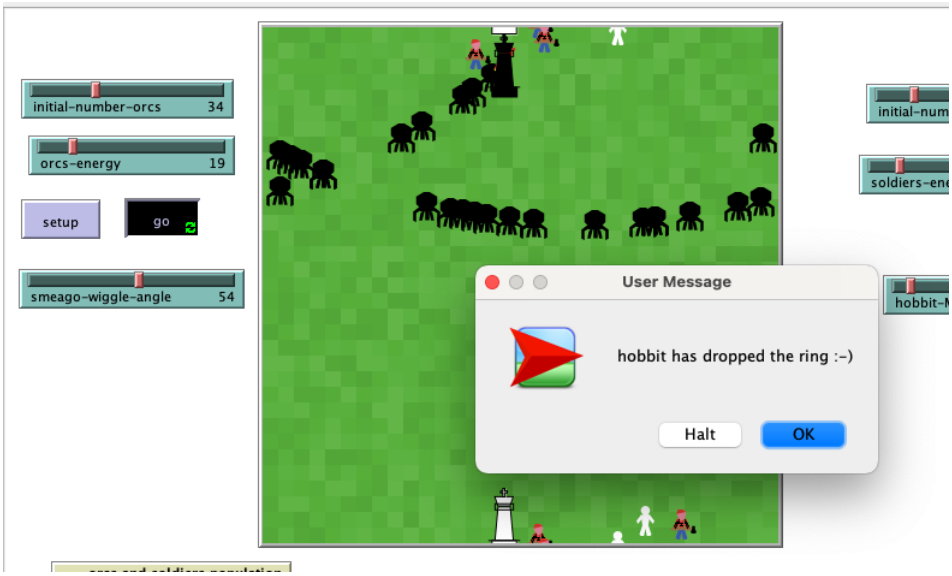
Orcs can kill soldiers and go toward Minas city. If all orcs are skilled, the game will stop.



Soldiers will go toward Mordor but they can ‘t kill anyone.

Gandolf, Aragorn, Legolas and Gimlis will run toward orcs and kill them. They have much faster speed. But you can set the speed by yourself.

Hobbits will follow Smeago to Mordor to drop the ring. Once they reach Mordor, then the game win and stop.



2. **Things to notice**
   The hobbit may drop the ring faster than all orcs are all killed.
3. **Thing to try**
   You can set the number of orcs “2” and “100” to see different game ends.
4. **Related model**
   Frogger model inspired me to write ‘dead? ‘ and stop part, and object moving direction. Ants' lines inspired me to write how to let hobbits follow Smeago moves, and Smeago face toward Mordor city.

   It is a very interesting journey to write this model.

   Code:

```
breed [orcs orc]
breed [soldiers soldier]
breed [smeagos smeago]
breed [hobbits hobbit]
breed [Gandolfs Gandolf]
breed [Aragorns Aragorn]
breed [legolass legolas]
breed [gimlis gimli]

globals [
   city-x city-y ;; location of center of city
   mordor-x mordor-y ;; location of center of mordor
   dropRing?
   orcsAllDead?
]

turtles-own [energy power]

to setup
 clear-all
  ;; set orcs
  set mordor-x min-pxcor + 15
  set dropRing? false
  set mordor-y max-pycor - 1.6
  set-default-shape orcs "monster" ;; plural name
  set orcsAllDead? false

  create-orcs initial-number-orcs [
    set color black
    set heading 120 + random 90
    set size 2
    set energy orcs-energy
    set xcor min-pxcor + 20
    set ycor max-pycor - 1
  ]

  ;; set soldiers
  set-default-shape soldiers "person"
  create-soldiers initial-number-soldiers [
    set heading 280 + random 90
    set color white
    set size 2
    set energy soldiers-energy
    set xcor min-pxcor + 20
    set ycor min-pycor + 0.5
  ]
  set city-x min-pxcor + 15
  set city-y min-pycor + 0.5
```

```
  ;; two castles
   setup-patches

  ;; smeagos
   set-default-shape smeagos "footprint human"
   create-smeagos 1 [
     set heading 0
     set color yellow
     set size 2
     set xcor min-pxcor + 5
     set ycor min-pycor + 15
   ]
  ;; hobbits, following smeagos
   set-default-shape hobbits "footprint human"
   create-hobbits 2 [
     set color red
     set size 2
     set xcor min-pxcor + 5
     set ycor min-pycor + 15
   ]

   setup_Gandolfs
   setup_Aragorns
   setup_legolass
   setup_gimlis

   ;; repeat
   reset-ticks

end

to go
    if orcsAllDead?
       [stop]
    if dropRing?
       [stop]
    orcs-move
    soldiers-move
    smeagos-move
    hobbits-move
    Gandolfs-move
    Aragorns-move
   legolass-move
   gimlis-move

    tick
end
```

```
to orcs-move
   ask orcs [
     ;face  one-of soldiers
     fd 0.2
    ; orcs loose 0.5 units of energy each tick
     set energy energy - 0.5
     kill-soldiers
  ]
end

to Gandolfs-move

   ask Gandolfs [
    ifelse ( count orcs = 0) [
     fd 0.4
  ][
     face one-of orcs
     fd 0.3
    ; orcs loose 0.5 units of energy each tick
     set energy energy - 0.5
      kill-orcs]
  ]
end

to Aragorns-move
   ask Aragorns [
    ifelse ( count orcs = 0) [
     fd 0.4
  ][
     face one-of orcs
     fd 0.3
    ; orcs loose 0.5 units of energy each tick
     set energy energy - 0.5
      kill-orcs]
  ]
end

to legolass-move
   ask legolass [
    ifelse ( count orcs = 0) [
     fd 0.4
  ][
     face one-of orcs
     fd 0.3
    ; orcs loose 0.5 units of energy each tick
     set energy energy - 0.5
      kill-orcs]
  ]
```

```
end

to gimlis-move
   ask gimlis [
    ifelse ( count orcs = 0) [
     fd 0.4
  ][
     face one-of orcs
     fd 0.3
    ; orcs loose 0.5 units of energy each tick
     set energy energy - 0.5
      kill-orcs]
  ]
end

to smeagos-move
  ask smeagos
    [ wiggle smeago-wiggle-angle
      correct-path
      if (xcor > (mordor-x - 10 ))
        [facexy mordor-x mordor-y ]
      if xcor < mordor-x
      [ fd 0.1 ]
  ]
end

to setup_Gandolfs
  set-default-shape Gandolfs "person lumberjack"
  create-Gandolfs 1 [
    set heading -90 + random 180
    set color pink
    set size 2
    set xcor min-pxcor + 20
    set ycor min-pycor + 5
  ]
end

to setup_Aragorns
  set-default-shape Aragorns "person lumberjack"
  create-Aragorns 1 [
    set heading -90 + random 180
    set color pink
    set size 2
    set xcor min-pxcor + 22
    set ycor min-pycor + 5
  ]
end

to setup_legolass
```

```
to setup_legolass
  set-default-shape legolass "person lumberjack"
  create-legolass 1 [
    set heading -90 + random 180
    set color pink
    set size 2
    set xcor min-pxcor + 24
    set ycor min-pycor + 5
  ]
end

to setup_gimlis
  set-default-shape gimlis "person lumberjack"
  create-gimlis 1 [
    set heading -90 + random 180
    set color pink
    set size 2
    set xcor min-pxcor + 26
    set ycor min-pycor + 5
  ]
end

to wiggle [angle]
   rt random-float angle
   lt random-float angle
end

to correct-path
  ifelse heading > 180
    [rt 180]
    [if patch-at 0 -5 = nobody
    [ rt 100 ]
    if patch-at 0 5 = nobody
      [ lt 100 ] ]
end


to kill-soldiers
   let prey one-of soldiers-here
   if prey != nobody [
      ask prey [die]
  ]
end


to kill-orcs
  if ( count orcs = 0) [
    set orcsAllDead? true
  ]
```

```
to kill-orcs
  if ( count orcs = 0) [
    set orcsAllDead? true
  ]
   let prey one-of orcs-here
   if prey != nobody [
      ask prey [die]
  ]
end

to hobbits-move
 ask hobbits
  [ if (xcor >= mordor-x)
      [ user-message "hobbit has dropped the ring :-)"
        set dropRing? true
      ]

    face one-of smeagos
    if time-to-start? and (xcor < mordor-x )
      [ fd hobbit-Move-Speed ]

  ]

end

to-report time-to-start?
  report ([xcor] of (one-of smeagos)) > (min-pxcor + 7)
end

to soldiers-move
  if ( count orcs = 0) [
    set orcsAllDead? true
    user-message "orcs are all killed :-)"
  ]
  ask soldiers [
     ;set heading random 20
     ;facexy mordor-x mordor-y
     fd 0.2
     ;left random 50
    set energy energy - 0.5
  ]
end

to setup-patches
  ask patches
    [ set pcolor green +(random-float 0.8) - 0.4]
  ;; set two castles
  ask patch city-x city-y [  ;;city house
    sprout 1 [
```

```
to setup-patches
  ask patches
    [ set pcolor green +(random-float 0.8) - 0.4]
  ;; set two castles
  ask patch city-x city-y [  ;;city house
    sprout 1 [
      set color white
      set shape "chess king"
      set size 4
  ]]

  ask patch mordor-x mordor-y [ ;; mordor house
    sprout 1 [
      set color black
      set shape "chess king"
      set size 4
  ]]

end
```