extensions [nw table] inks-own [ weight ] setup-turtles turtles-own [ dict;dictionary with shortest path to every node insured? checked?		
turtles-own [ dict,dictionary with shortest path to every node insured? checked? cost-of-link-with-other-turtles;; distance-from-other-turtles ;; distance-from-other-turtles indirpayoffbefore indirpayoffafter degree set infinity 99999 ] ask turtles [ globals[ set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayofffster 0 set insured? true set color green let node-count count turtles links 10 [ set volume in turtles links 10 [ set volume in turtles links 10 [ set volume in turtles links 10 [ set infinity 99999 ask turtles [ set indirpayofffore 0 set indirpayoffore 0 set indirpayofffore 0 set indirpayoffore 0 se	extensions [nw table]	setup-patches
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globals[ donewithinsured? donewithinsured? infinity set indirpayoffafter 0 infinity set payoff 0 newpayoff1 newpayoff2 set insured? true newpayoff2 nolinkpayoff nolinkpayoff2 nolinkpayoff2 let node-count count turtles nr1 let x 0 nr2    compute-inital-payoff   nw:set-snapshot turtles links to setup-shape clear-all setup-patches nw:generate-ring turtles links 10 [ set color red ] nw:set-snapshot turtles links layout set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayofffafter 0 set indirpayoffafter 0 set indirpayoffafter 0 set indirpayoffafter 0 set insured? true set color green let node-count count turtles let x 0  ] nw:set-snapshot turtles links   crt num-nodes layout set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayoffafter 0 set indirpayoffafter 0 set indirpayoffafter 0 set insured? true set checked? false set color green let node-count count turtles let x 0  ] nw:set-snapshot turtles links compute-inital-payoff power nw:set-snapshot turtles links compute-inital-payoff nw:set-snapshot turtles links compute-inital-payoff set label who set label-color black	indirpayoffafter	layout
globals[ donewithinsured? infinity newpayoff1 newpayoff2 newpayoff2 nolinkpayoff nolinkpayoff2 nolinkpayoff2 nolinkpayoff2 nolinkpayoff2 nolinkpayoff2 nolinkpayoff2 nolinkpayoff2 nolinkpayoff2 let node-count count turtles nr1 let x 0 nr2    compute-inital-payoff   nw:set-snapshot turtles links to setup-shape clear-all setup-patches nw:generate-ring turtles links 10 [ set color red ] nw:set-snapshot turtles links layout set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayoffafter 0 set indirpayoffafter 0 set insured? true set checked? false set color green let node-count count turtles links let x 0    nw:set-snapshot turtles links   crt num-nodes   ayout-circle turtles max-pxcor - 20 set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayofffafter 0 set indirpayoffafter 0 set indirpayoffafter 0 set insured? true set checked? false set color green let node-count count turtles let x 0    let x 0   nw:set-snapshot turtles links compute-inital-payoff pw:set-snapshot turtles links px:set-snapshot turtles px:set-snapshot turtl	degree	set infinity 99999
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infinity  newpayoff1  newpayoff2  nolinkpayoff  nolinkpayoff2  nolinkpayoff2  nolinkpayoff2  nolinkpayoff2  nolinkpayoff2  nolinkpayoff2  let node-count count turtles  nr1  let x 0  nr2  ]  compute-inital-payoff  nw:set-snapshot turtles links  to setup-patches  nw:generate-ring turtles links 10 [set color red ]  nw:set-snapshot turtles links  layout  set infinity 99999  ask turtles [  set infinity 99999  ask turtles [  set indirpayoffbefore 0  set indirpayoffafter 0  set indirpayoffafter 0  set insured? true  set color green  let node-count count turtles  let x 0  let x 0  let x 0  let x 0  nw:set-snapshot turtles  set color green  let node-count count turtles  let x 0  let x 0  let x 0  nw:set-snapshot turtles links  set label-color black  set label-color black	globals[	set indirpayoffbefore 0
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newpayoff2 nolinkpayoff nolinkpayoff2 nolinkpayoff2 let node-count count turtles nr1 let x 0 nr2   compute-inital-payoff ] nw:set-snapshot turtles links to setup-patches nw:generate-ring turtles links 10 [ set color red ] set infinity 99999 nw:set-snapshot turtles links layout layout-circle turtles max-pxcor - 20 set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayoffafter 0 set insured? true set checked? false set color green let node-count count turtles let x 0 ] let x 0 ] nw:set-snapshot turtles links lo [ set color red ] set indirpayoffafter 0 set indirpayoffbefore 0 set indirpayoffafter 0 set indirpayoffafter 0 set payoff 0 set insured? true set checked? false set color green let node-count count turtles let x 0 ] ] nw:set-snapshot turtles links compute-inital-payoff ;ask turtles [ set label who set label-color black	newpayoff1	set insured? true
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nr1 nr2   let x 0   compute-inital-payoff   nw:set-snapshot turtles links to setup-shape   clear-all   to setup-turtles     setup-patches   set-default-shape turtles "circle"     nw:set-snapshot turtles links 10 [ set color red ]   set infinity 99999     nw:set-snapshot turtles links   crt num-nodes     layout   layout-circle turtles max-pxcor - 20     set infinity 99999   ask turtles [ set indirpayoffbefore 0     set indirpayoffafter 0   set indirpayoffafter 0     set indirpayoffafter 0   set payoff 0     set insured? true   set checked? false     set checked? false   set color green     let node-count count turtles     let x 0     nw:set-snapshot turtles links     compute-inital-payoff   ;ask turtles [ set label who set label-color black     set color green   set checked? set label set color black     set set color green   set set set set label set label-color black     set set color green   set set set set label set label-color black     set set set set label set label-color black     set set label set set label set label-color black     set set label set label-color black     set set label set l		_
nr2		
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to setup-shape clear-all setup-patches nw:generate-ring turtles links 10 [ set color red ] set infinity 99999 nw:set-snapshot turtles links layout layout set infinity 99999 ask turtles [ set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayoffafter 0 set indirpayoffafter 0 set insured? true set checked? false set color green let node-count count turtles let x 0 ] nw:set-snapshot turtles links set label who set label-color black	1	
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setup-patches nw:generate-ring turtles links 10 [ set color red ] set infinity 99999 nw:set-snapshot turtles links layout layout-circle turtles max-pxcor - 20 set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayofffbefore 0 set indirpayoffafter 0 set indirpayoffafter 0 set insured? true set checked? false set color green let node-count count turtles let x 0 ] nw:set-snapshot turtles links compute-inital-payoff  set color red ] set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayofffafter 0 set checked? false set checked? false set color green let node-count count turtles let x 0 ] nw:set-snapshot turtles links compute-inital-payoff		
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nw:set-snapshot turtles links layout layout-circle turtles max-pxcor - 20 set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayoffafter 0 set payoff 0 set payoff 0 set insured? true set checked? false set color green let node-count count turtles let x 0 ] nw:set-snapshot turtles links compute-inital-payoff set insured? set label-color black		·
layout layout-circle turtles max-pxcor - 20 set infinity 99999 ask turtles [ set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayoffafter 0 set payoff 0 set insured? true set insured? true set checked? false set color green let node-count count turtles let x 0 ] nw:set-snapshot turtles links compute-inital-payoff  layout-circle turtles max-pxcor - 20 ask turtles [ set insured of the set indirpayoffbefore 0 set indirpayofffbefore 0 set indirpayofffbefore 0 set indirpayoffbefore 0 set indirpayofffbefore 0 set indirpayoffbefore 0 set indirpayofffbefore 0 set indirpayofffbefore 0 set indirpayofffbefore 0 set indirpayoff		•
set infinity 99999  ask turtles [  set indirpayoffbefore 0  set indirpayoffafter 0  set indirpayoffafter 0  set payoff 0  set payoff 0  set insured? true  set checked? false  set color green  let node-count count turtles  let x 0  ]  nw:set-snapshot turtles links  compute-inital-payoff  ask turtles [  set indirpayoffbefore 0  set indirpayoffbefore 0  set indirpayoffafter 0  set indirpayoffafter 0  set indirpayoffafter 0  set indirpayoffafter 0  set indirpayoff 0  set indirpayoff 0  set indirpayoff 0  set indirpayoff set indirpayoff 0  set indirpayoff set indirpayoff of set ind	·	
ask turtles [ set indirpayoffbefore 0 set indirpayoffbefore 0 set indirpayoffafter 0 set indirpayoffafter 0 set payoff 0 set payoff 0 set insured? true set insured? true set checked? false set checked? false set color green let node-count count turtles let node-count count turtles let x 0 ]  ] nw:set-snapshot turtles links compute-inital-payoff ;ask turtles [ set label who set label-color black]		
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set payoff 0 set insured? true set insured? true set checked? false set checked? false set color green let node-count count turtles let node-count count turtles let x 0  let x 0  ] nw:set-snapshot turtles links compute-inital-payoff ;ask turtles [ set label who set label-color black		
set insured? true set checked? false set checked? false set color green let node-count count turtles let node-count count turtles let x 0  ]  ] nw:set-snapshot turtles links compute-inital-payoff ;ask turtles [ set label who set label-color black		
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set color green let node-count count turtles let x 0 let x 0 ]  let x 0 ]  nw:set-snapshot turtles links compute-inital-payoff ;ask turtles [ set label who set label-color black		
let node-count count turtles let x 0  let x 0  ]  nw:set-snapshot turtles links  compute-inital-payoff ;ask turtles [ set label who set label-color black		
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] nw:set-snapshot turtles links compute-inital-payoff ;ask turtles [ set label who set label-color black	let node-count count turtles	let x 0
compute-inital-payoff ;ask turtles [ set label who set label-color black	let x 0	]
	]	nw:set-snapshot turtles links
nw:set-snapshot turtles links end	compute-inital-payoff	;ask turtles [ set label who set label-color black
	nw:set-snapshot turtles links	end
reset-ticks	reset-ticks	
end to compute-inital-payoff	end	to compute-inital-payoff
to setup-star find-path-lengths	to setup-star	find-path-lengths
clear-all ask turtles [	clear-all	ask turtles [
setup-patches set degree count link-neighbors	setup-patches	set degree count link-neighbors
setup-turtles-star let nr who		
reset-ticks let i 0	•	
end let j 1		
to setup set payoff 0		-
clear-all foreach distance-from-other-turtles [	•	

```
if(?<999)[
                                                                let node2 one-of turtles with [not link-neighbor?
     if(?!=0)[
                                                              node1 and (self != node1) and not checked?]
      set payoff (payoff +( (beta / 100) ^?))
                                                                ifelse node2 = nobody
     ]
     if(?=1)[
                                                                  set checked? true
       set payoff (payoff - ((insurancelink / 100 ) /
                                                                1
(j)))
       set j j + 1
                                                                  ask node2 [set nr2 who
  ]
                                                                   set nolinkpayoff2 payoff
  ]
 ]
                                                                  set link? true
                                                                ]
 ]
end
                                                               if( link?)[
to setup-patches
                                                               create-and-check-path nr1 nr2
ask patches [
                                                               check-delete nr1
 set pcolor white
                                                               check-delete nr2
 ]
                                                               1
end
                                                              end
to go
                                                              to setup-indivudal-map
  add-edge-simpler
                                                               let j 0
  delete
                                                               let c count turtles
  layout
                                                               while [j < c][
  tick
                                                               ask turtle j[
end
                                                               let i 0
to delete
                                                               set dict table:make
 let i 0
                                                               while [i <= c - 1][
 while [i < count turtles]
                                                               if j != i[
                                                                table:put dict i nw:path-to turtle i
  check-delete i
                                                                ]
  set i i + 1
                                                               set i i + 1
  ]
                                                               end while
end
                                                               1
to add-edge-simpler
                                                               ;end ask
 set newpayoff1 -1
 set newpayoff2 -1
                                                               set j j + 1
                                                               end while;
 set nolinkpayoff 0
 set nolinkpayoff2 0
                                                               1
 compute-inital-payoff
 let node1 one-of turtles
                                                              end
 if( node1 = nobody)[
                                                              to check-delete[a]
  display
  user-message "ferdig"
                                                               let i 0
  stop
                                                               let opay -1
 ]
                                                               let dist []
 set nr1 0
                                                               ask turtle a[
 set nr2 0
                                                               set opay payoff
 let link? false
                                                               set dist distance-from-other-turtles
 ask node1[
                                                               ]
  set nolinkpayoff payoff
                                                                foreach dist
  set nr1 who
                                                                 if(? = 1)[
```

```
;neighbors
                                                                  ask turtle a [ create-link-with oldneighbor [ set
   ;i is the turtle nr
                                                               weight 2.0 ] ]
   ask link a i[
                                                                   nw:set-snapshot turtles links
    die
                                                                 1
   nw:set-snapshot turtles links
                                                                find-path-lengths
   find-path-lengths
                                                                compute-inital-payoff
   compute-inital-payoff
                                                                setup-indivudal-map
   ask turtle af
    if(payoff < opay)
                                                               end
    [
     ;do not delete link
                                                               to layout
     create-link-with turtle i [ set weight 2.0 ] ]
                                                                repeat 10 [
    nw:set-snapshot turtles links
                                                                 layout-spring (turtles with [any? link-neighbors])
                                                               links 0.4 6 1
    find-path-lengths
                                                                 display ;; so we get smooth animation
    compute-inital-payoff
                                                                ]
                                                               end
    set i i + 1
                                                               to find-path-lengths
   1
                                                                ;; reset the distance list
end
                                                                ask turtles
                                                                ſ
to create-and-check-path[a b]
                                                                 set distance-from-other-turtles []
 let temp []
 let nextloop? true
 ;create temporary table of pathes from 0 to 2.
                                                                let i 0
 ask turtle a [set temp nw:path-to turtle b]
                                                                let j 0
                                                                let k 0
 let len length temp
                                                                let node1 one-of turtles
 ask turtle a [ create-link-with turtle b [ set weight
                                                                let node2 one-of turtles
                                                                let node-count count turtles
2.0]]
 let nlink link a b
                                                                ;; initialize the distance lists
 nw:set-snapshot turtles links
                                                                while [i < node-count]
 setup-indivudal-map
                                                                [
 find-path-lengths
                                                                 set j 0
                                                                 while [j < node-count]
 let t []
 let i 0
                                                                  set node1 turtle i
 let oldneighbor -1
                                                                  set node2 turtle j
                                                                  ;; zero from a node to itself
 nw:set-snapshot turtles links
                                                                   ifelse i = j
 find-path-lengths
                                                                   ſ
 compute-inital-payoff
                                                                    ask node1 [
 if (([payoff] of turtle a) < nolinkpayoff or
                                                                     set distance-from-other-turtles lput 0
([payoff] of turtle b ) < nolinkpayoff2 )[
                                                               distance-from-other-turtles
                                                                   ]
  ;remove new link, and recreate the old.
  ask link a b[
                                                                  ]
   die
   nw:set-snapshot turtles links
                                                                    ;; 1 from a node to it's neighbor
                                                                    ifelse [link-neighbor? node1] of node2
  if(oldneighbor != -1)[
                                                                     ask node1 [
```

```
set distance-from-other-turtles lput 1
distance-from-other-turtles
     ]
    ]
    [
     ask node1 [
      set distance-from-other-turtles lput infinity
distance-from-other-turtles
     1
    ]
   ]
   set jj + 1
  set i i + 1
 1
 set i 0
 set j 0
 let dummy 0
 while [k < node-count]
  set i 0
  while [i < node-count]
   set j 0
   while [j < node-count]
    set dummy ( (item k [distance-from-other-
turtles] of turtle i) +
           (item j [distance-from-other-turtles] of
turtle k))
    if dummy < (item j [distance-from-other-
turtles] of turtle i)
    [
     ask turtle i [
       set distance-from-other-turtles replace-item
j distance-from-other-turtles dummy
     ]
    ]
    set j j + 1
   set i i + 1
  ]
  set k k + 1
 ]
end
```