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Modelling Players - Heuristic Machine Development

Full code: https://github.com/hscells/CSC466/blob/master/ttt4.lisp

demo-heuristic-human

I was able to fix the mistakes in the previous assignment to make it work multiple times. It is still kind of buggy and won't always display the moves.

Losing Against Heuristic

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[1]> (demo-heuristic-human 10)
HEURISTIC MACHINE PLAYER ...
name = HM
number of rules = 10
rules ...
IF (PREFIX OF (C W SW NW S E SE N NE) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (C W SW NW S E SE N NE))
IF (PREFIX OF (C S SE SW NW W NE E N) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (C S SE SW NW W NE E N))
IF (PREFIX OF (S C SW N SE W NW NE E) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (S C SW N SE W NW NE E))
IF (PREFIX OF (C SW E SE W N S NE NW) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (C SW E SE W N S NE NW))
IF (PREFIX OF (N E C NW SW NE SE W S) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (N E C NW SW NE SE W S))
IF (PREFIX OF (SE C NE S N W SW NW E) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (SE C NE S N W SW NW E))
IF (PREFIX OF (N NE S SW W SE C E NW) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (N NE S SW W SE C E NW))
IF (PREFIX OF (N S E C NE SW SE W NW) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (N S E C NE SW SE W NW))
IF (PREFIX OF (NW E NE W C SW N S SE) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (NW E NE W C SW N S SE))
IF (PREFIX OF (NW SE W N S C NE E SW) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (NW SE W N S C NE E SW))

HUMAN PLAYER ...
name = HU

 --  --  --
 --  --  --
 --  --  --
BEGIN HEURISTIC PLAYER MOVE ...
play so far = NIL
making move C by applying the rule ...
IF (PREFIX OF (C W SW NW S E SE N NE) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (C W SW NW S E SE N NE))
end heuristic player move
 --  --  --
 --  --  --
 --  --  --
BEGIN HUMAN PLAYER MOVE ...
Please select a move from (NW N NE W E SW S SE)
n
END HUMAN PLAYER MOVE
 --  O2  --
 --  --  --
 --  --  --
BEGIN HEURISTIC PLAYER MOVE ...
making a random move NE since no rule is applicable.
end heuristic player move
 --  O2  X3
```

```
 --  --  --
 --  --  --
BEGIN HUMAN PLAYER MOVE ...
Please select a move from (NW W E SW S SE)
s
END HUMAN PLAYER MOVE
 --  O2  X3
 --  X1  --
 --  --  --
BEGIN HEURISTIC PLAYER MOVE ...
making a random move NW since no rule is applicable.
end heuristic player move
 X5  O2  X3
 --  X1  --
 --  --  --
BEGIN HUMAN PLAYER MOVE ...
Please select a move from (W E SW SE)
w
END HUMAN PLAYER MOVE
 X5  O2  X3
 O6  X1  --
 --  --  --
BEGIN HEURISTIC PLAYER MOVE ...
making a random move SE since no rule is applicable.
end heuristic player move
Game Summary
Play of the game = (C N NE S NW W SE)
 X5  O2  X3
 O6  X1  --
 --  O4  --
W
heuristic use summary
random move count = 3 and heuristic move count = 1
random move wins = 1 and heuristic move wins = 0
NIL
```

Winning Against Heuristic

```
[2]> (demo-heuristic-human 10)
HEURISTIC MACHINE PLAYER ...
name = HM
number of rules = 10
rules ...
IF (PREFIX OF (SW NW E C SE N S NE W) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (SW NW E C SE N S NE W))
IF (PREFIX OF (NE SE SW NW W N C E S) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (NE SE SW NW W N C E S))
IF (PREFIX OF (C S E SW NW W NE N SE) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (C S E SW NW W NE N SE))
IF (PREFIX OF (C NE SE N W S E NW SW) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (C NE SE N W S E NW SW))
IF (PREFIX OF (S C NW N SE E SW W NE) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (S C NW N SE E SW W NE))
IF (PREFIX OF (NW E C N W SW SE S NE) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (NW E C N W SW SE S NE))
IF (PREFIX OF (NE SW E SE N C NW S W) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (NE SW E SE N C NW S W))
IF (PREFIX OF (NW E SW C N S SE NE W) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (NW E SW C N S SE NE W))
IF (PREFIX OF (SW NE E W C N SE S NW) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (SW NE E W C N SE S NW))
```

```
IF (PREFIX OF (E SE SW NE N NW S W C) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (E SE SW NE N NW S W C))


HUMAN PLAYER ...
name = HU


 --  --  --
 --  --  --
 --  --  --
BEGIN HEURISTIC PLAYER MOVE ...
play so far = NIL
making move SW by applying the rule ...
IF (PREFIX OF (SW NW E C SE N S NE W) MATCHES THE PLAY SO FAR)
THEN (SELECT MOVE FROM (SW NW E C SE N S NE W))
end heuristic player move
 --  --  --
 --  --  --
 --  --  --
BEGIN HUMAN PLAYER MOVE ...
Please select a move from (NW N NE W C E S SE)
n
END HUMAN PLAYER MOVE
 --  O2  --
 --  --  --
 --  --  --
BEGIN HEURISTIC PLAYER MOVE ...
making a random move C since no rule is applicable.
end heuristic player move
 --  O2  --
 --  --  --
 --  --  --
BEGIN HUMAN PLAYER MOVE ...
Please select a move from (NW NE W E S SE)
nw
END HUMAN PLAYER MOVE
 O4  O2  --
 --  X3  --
 --  --  --
BEGIN HEURISTIC PLAYER MOVE ...
making a random move E since no rule is applicable.
end heuristic player move
 O4  O2  --
 --  X3  X5
 --  --  --
BEGIN HUMAN PLAYER MOVE ...
Please select a move from (NE W S SE)
ne
END HUMAN PLAYER MOVE
Game Summary
Play of the game = (SW N C NW E NE)
 O4  O2  O6
 --  X3  X5
 X1  --  --
L
heuristic use summary
random move count = 2 and heuristic move count = 1
random move wins = 0 and heuristic move wins = 0
```