```
1  (init (cell 1 1 wp)) (init (cell 2 1 blank))
2    (init (cell 3 1 wp)) (init (cell 4 1 blank)) ...
3
4  (init (cell 1 2 blank)) (init (cell 2 2 wp))
5    (init (cell 3 2 blank)) (init (cell 4 2 wp)) ...
6
7  (init (cell 1 3 wp)) (init (cell 2 3 blank)) ...
8  (init (cell 1 4 blank)) (init (cell 2 4 blank)) ...
9  (init (cell 1 5 blank)) (init (cell 2 5 blank)) ...
10 (init (cell 1 6 blank)) (init (cell 2 6 bp)) ...
11 (init (cell 1 7 bp)) (init (cell 2 7 blank)) ...
12 (init (cell 1 8 blank)) (init (cell 2 8 bp)) ...
```

```
1 (playerpiece white wp)
2 (playerpiece black bp)
3
4 (<= (legal ?player (move ?xfrom ?yfrom ?xto ?yto))
5   (true (control ?player))
6   (playerpiece ?player ?piece)
7   (true (cell ?xfrom ?yfrom ?piece))
8   (movement ?player ?xfrom ?yfrom ?xto ?yto)
9   (true (cell ?xto ?yto blank)))
```

```
(nextcoord 1 2) (nextcoord 2 3) ... (nextcoord 7 8)

(<= (movement white ?xfrom ?yfrom ?xto ?yto)
  (nextcoord ?xfrom ?xto) (nextcoord ?yfrom ?yto))

(<= (movement white ?xfrom ?yfrom ?xto ?yto)
  (nextcoord ?xto ?xfrom) (nextcoord ?yfrom ?yto))

(<= (movement black ?xfrom ?yfrom ?xto ?yto)
  (nextcoord ?xfrom ?xto) (nextcoord ?yto ?yfrom))

(<= (movement black ?xfrom ?yfrom ?xto ?yto)
  (nextcoord ?xto ?xfrom) (nextcoord ?yto ?yfrom))
```

```
1 (<= (next (cell ?x ?y blank))
2     (moved_from ?x ?y))
3
4 (<= (moved_from ?x ?y)
5     (does ?player (move ?x ?y ?xto ?yto)))
6
7 (<= (next (cell ?x ?y ?piece))
8     (does ?player (move ?xfrom ?yfrom ?x ?y))
9     (true (cell ?xfrom ?yfrom ?piece)))
```

```
1 (<= (next (cell ?x ?y ?c))
2     (true (cell ?x ?y ?c))
3     (not (moved_from ?x ?y))
4     (not (moved_to ?x ?y)))
5
6 (<= (moved_to ?x ?y)
7     (does ?player (move ?xfrom ?yfrom ?x ?y)))
```

```
1 (succ 0 1) (succ 1 2) (succ 2 3) ...
2 (succ 10 11) (succ 11 12)
3
4 (<= (smaller ?x ?y)
5   (succ ?x ?y))
6 (<= (smaller ?x ?y)
7   (succ ?y1 ?y)
8   (smaller ?x ?y1))
```

```
1  (<= (pieces ?w ?b)
2    (countpieces 1 1 0 0 ?w ?b))
3
4  (<= (countpieces 8 8 ?w1 ?b1 ?w ?b)
5    (countpiece 8 8 ?w1 ?b1 ?w ?b))
6  (<= (countpieces 8 ?y ?w1 ?b1 ?w ?b)
7    (countpiece 8 ?y ?w1 ?b1 ?w2 ?b2)
8    (nextcoord ?y ?y1)
9    (countpieces 1 ?y1 ?w2 ?b2 ?w ?b))
10 (<= (countpieces ?x ?y ?w1 ?b1 ?w ?b)
11   (countpiece ?x ?y ?w1 ?b1 ?w2 ?b2)
12   (nextcoord ?x ?x1)
13   (countpieces ?x1 ?y ?w2 ?b2 ?w ?b))
```

```
1  (<= (countpiece ?x ?y ?w1 ?b ?w ?b)
2    (true (cell ?x ?y wp))
3    (succ ?w1 ?w) (number ?b))
4
5  (<= (countpiece ?x ?y ?w ?b1 ?w ?b)
6    (true (cell ?x ?y bp))
7    (succ ?b1 ?b) (number ?w))
8
9  (<= (countpiece ?x ?y ?w ?b ?w ?b)
10   (true (cell ?x ?y blank))
11   (number ?w) (number ?b))
12
13 (<= (number ?x) (succ ?x ?y))
14 (<= (number ?x) (succ ?y ?x))
```

```
1  (<= terminal (pieces 0 ?b))
2  (<= terminal (pieces ?w 0))
3  (<= terminal (true (step 60)))
4
5  (init (step 0))
6
7  (<= (next (step ?y))
8    (true (step ?x))
9    (succ ?x ?y))
10
11 (succ 12 13) ... (succ 59 60)
```

```
1  (<= (goal white 100)
2      (pieces ?w ?b) (smaller ?b ?w))
3  (<= (goal black 0)
4      (pieces ?w ?b) (smaller ?b ?w))
5
6  (<= (goal black 100)
7      (pieces ?w ?b) (smaller ?w ?b))
8  (<= (goal white 0)
9      (pieces ?w ?b) (smaller ?w ?b))
10
11 (<= (goal ?player 50)
12     (pieces ?w ?w)
13     (role ?player))
```