P8.py

8 puzzle in python

- Look at a simple implementation of the eight puzzle in python
- [p8.py](p8.py)
- Solve using A*
- Three heuristics: NIL, OOP, MHD

What must we model?

- A state

- Goal test

- Successor function

What must we model?

- A state
  - Represent a state as a string of nine characters
  - E.g.: "1234*5678"
- Goal test
- Successor function

What must we model?

- A state
- Goal test
  - String equality
- Successor function

What must we model?

- A state

- Goal test

- Successor function

```
def successor8(S):
    """Returns a list of successors of state S"""
    # index of the blank
    blank = S.index('*')
    succs = []
    # UP: if blank not on top row, swap it with tile above it
    if blank > 2:
        swap = blank - 3
        new = S[0:swap]+'*'+S[swap+1:blank]+S[swap]+S[blank+1:]
        succs.append(('U', new))
    …
```

Example

python> python p8.py 10

Problems using 10 random steps from goal

Using No Heuristic (NIL) from *32415678 to *12345678
  72 states, 27 successors, 40 goal tests, 0.002507 sec
  Solution of length 5

Using Out of Place Heuristic (OOP) from *32415678 to *12345678
  32 states, 11 successors, 17 goal tests, 0.001228 sec
  Solution of length 5

Using Manhattan Distance Heuristic (MHD) from *32415678 to *12345678
  48 states, 16 successors, 24 goal tests, 0.002736 sec
  Solution of length 5