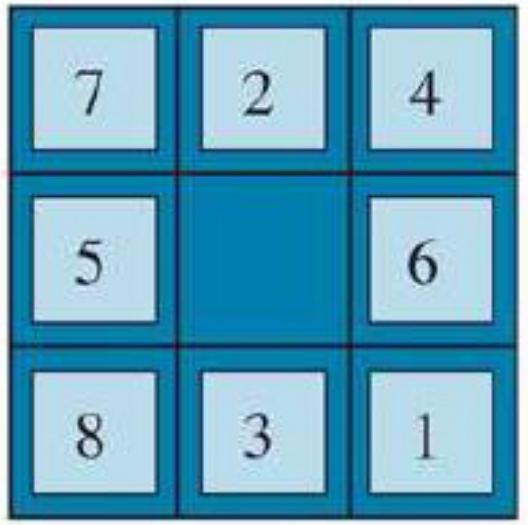
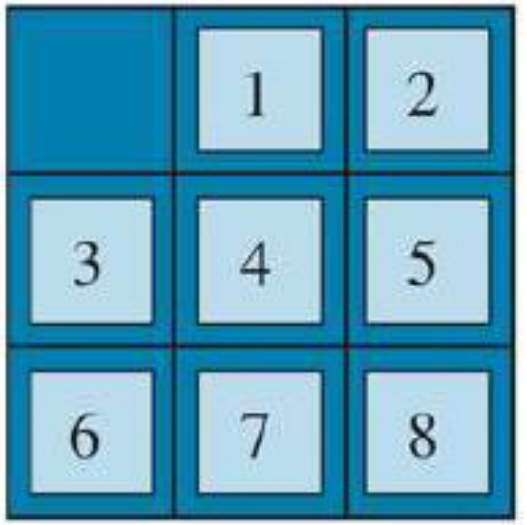
Your Task: 8-Puzzle

- From a **random start state**
- Check for solvability
- Generate **goal state**
- Using at least **2 different heuristic functions**
- Provide estimate of **algorithms complexity**
- Implementation in Python or Java
- Measure memory effort (number of nodes expanded) and run time for each of 100 random states and each heuristics
- Provide mean and standard deviation of memory usage and execution time for each heuristics



Start State



Goal State

8-Puzzle Exercise Components

1. Check for **Solvability**
2. Implement **two Heuristics**: Hamming (misplaced tiles) and Manhattan
3. **Compare** two Heuristics (using 100 random searches each):
   - Memory Usage (number of expanded nodes in the search tree)
   - Computation Time
4. Comment Code, provide for each submodule at least:
   - What are Inputs and Outputs
   - What is the Function of the submodule
5. **Don’t just copy/paste code from Internet**
   - Provide you own structure
   - Comment the code (see above)
   - Measure space (memory) and time complexity of each heuristics

8-Puzzle Task Documentation

Content

1. Short task description
2. Software architecture diagram
3. Short descriptions of modules and interfaces
4. Explain design decisions
5. Discussion and conclusions
   - Describe you experience
   - Provide a table with complexity comparisons of different heuristics
   - Possible improvements in future

Remember: Professional software developer work for others and an amateur for herself/himself.

Tasks and Schedule

- Provide **Design**:
  - Architecture: Modules and Interfaces (Functions, Inputs/Outputs)
  - **Define Heuristics you are going to use**
  - How would you test your code?

- Provide **Code**
- **Deadline: 02.12.2024**