Univerza *v Ljubljani*
Fakulteta *za računalništvo*
in informatiko

>>> AI SNAKE GAME PLAYER

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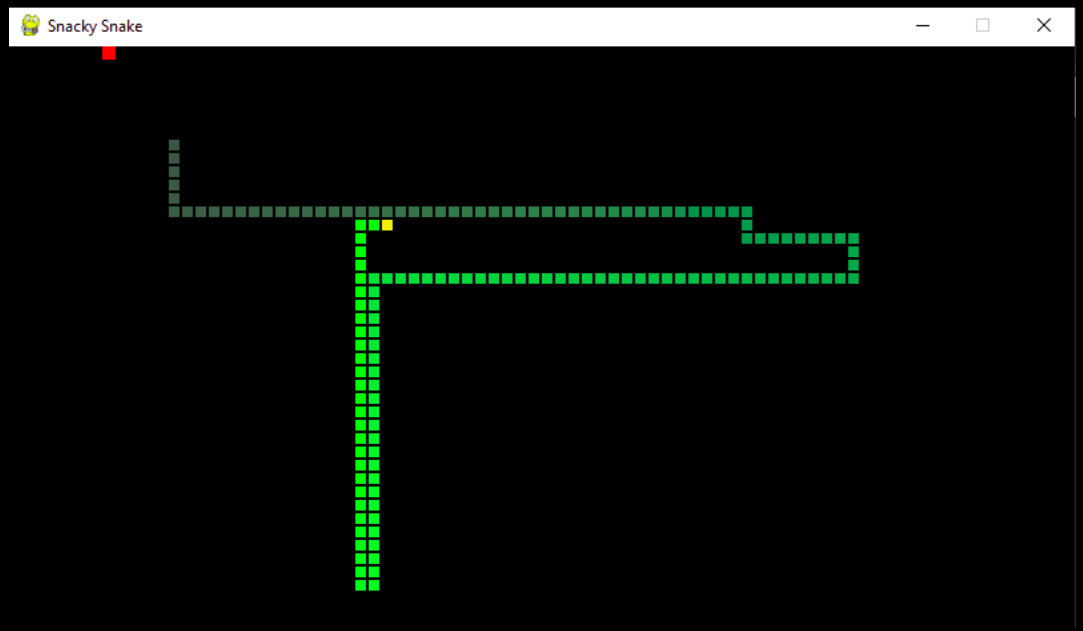
>>> Introduction

* Implemented snake game and AI player
* basic algorithm, Hamiltonian cycle and A*
* compared performances of each algorithm

>>> Snacky snek

* Snake game made with PyGame library
* simple rules, possible moves are left, right and forward, game ends when snake crashes into itself or a wall[1]
* game can be launched using one of the 3 algorithms



[1] no snakes were harmed in making of this game

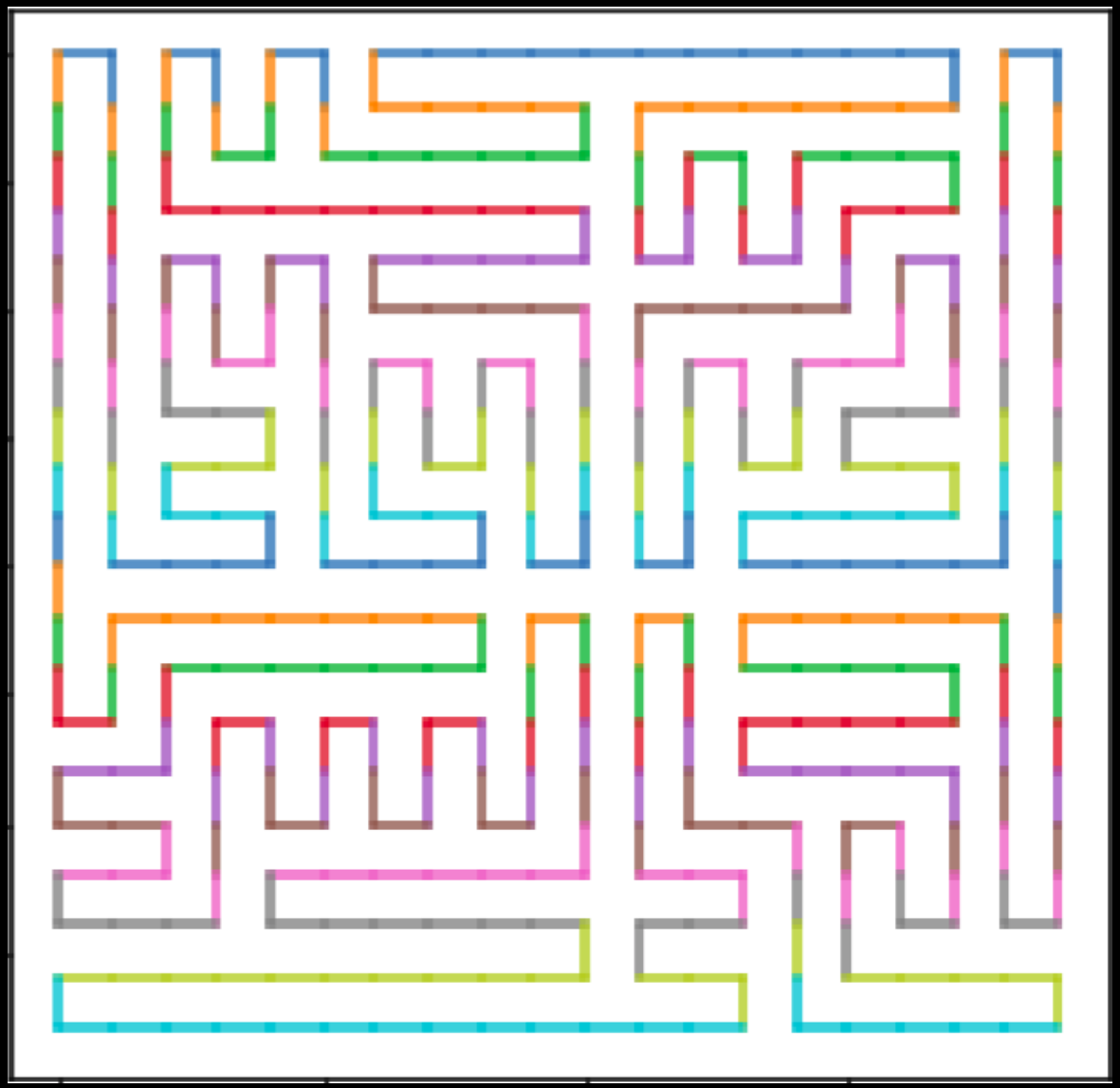
>>> Algorithms

* Basic
  - bunch of if-statements
  - from valid moves picks the shortest path
  - Manhattan distance from snake's head to the apple
* A*
  - uses Manhattan distance to the goal as heuristics
  - modification for dead-end loops
* Hamiltonian cycle
  - cutting corners improves speed
  - only when safe and possible - less as game progresses
  - requires even-numbered grid size

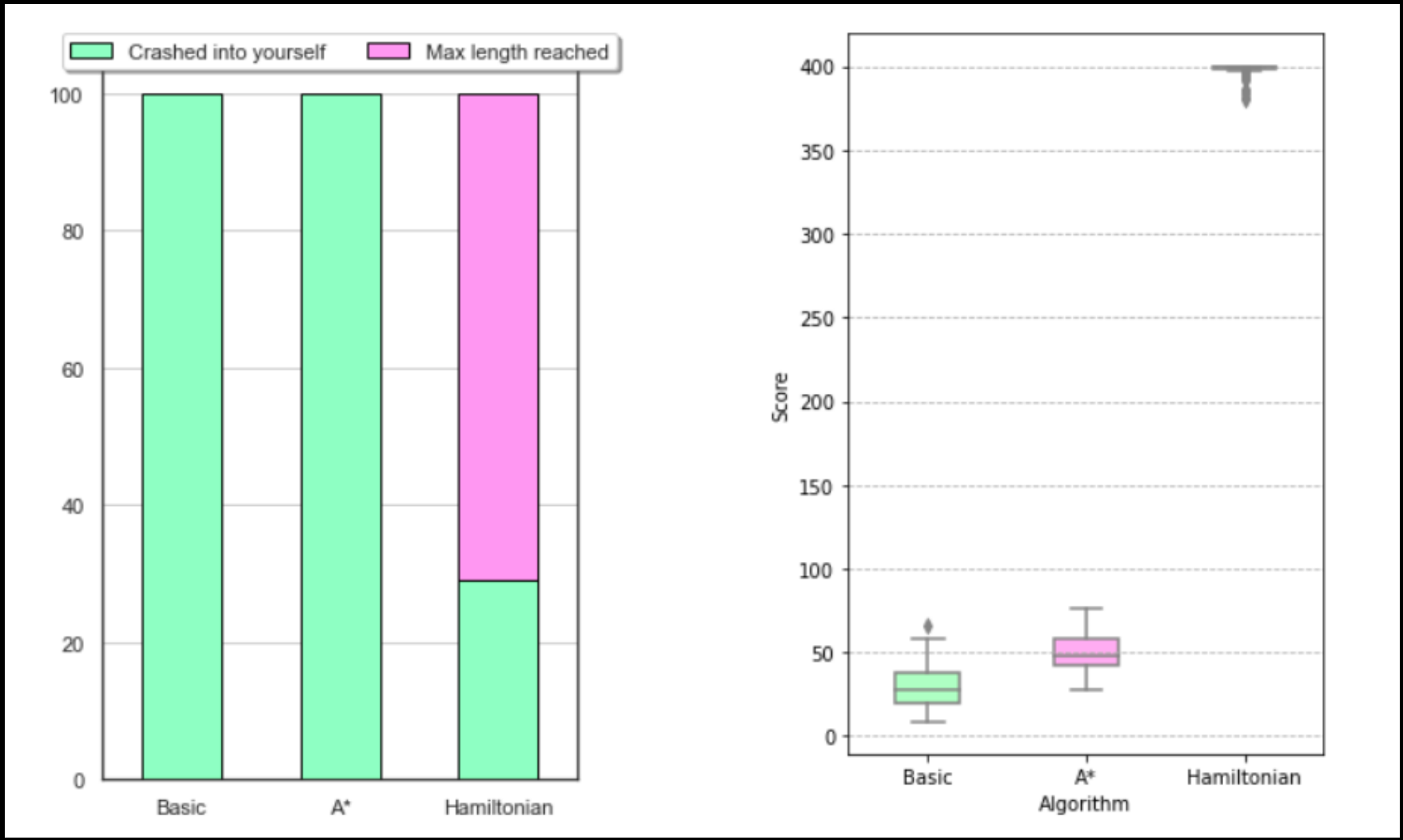
>>> Algorithms in action

▸ video

>>> Algorithms in action



>>> Algorithms in action



>>> Conclusions

* Each algorithm has flaws
* basic and A* can play, but never win
* Hamiltonian cycle could have better win-lose ratio with no corner-cutting but would take much longer and would look *unnatural*
* A* algorithm might be improved if used in combination with H. cycle for when snake gets caught in a loop
* Hamiltonian cycle performed best

>>> GAME OVER