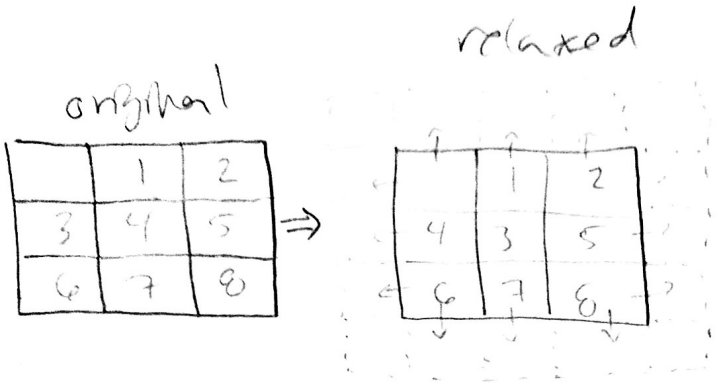
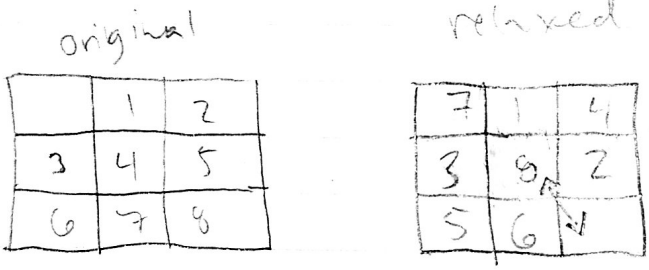
(6)

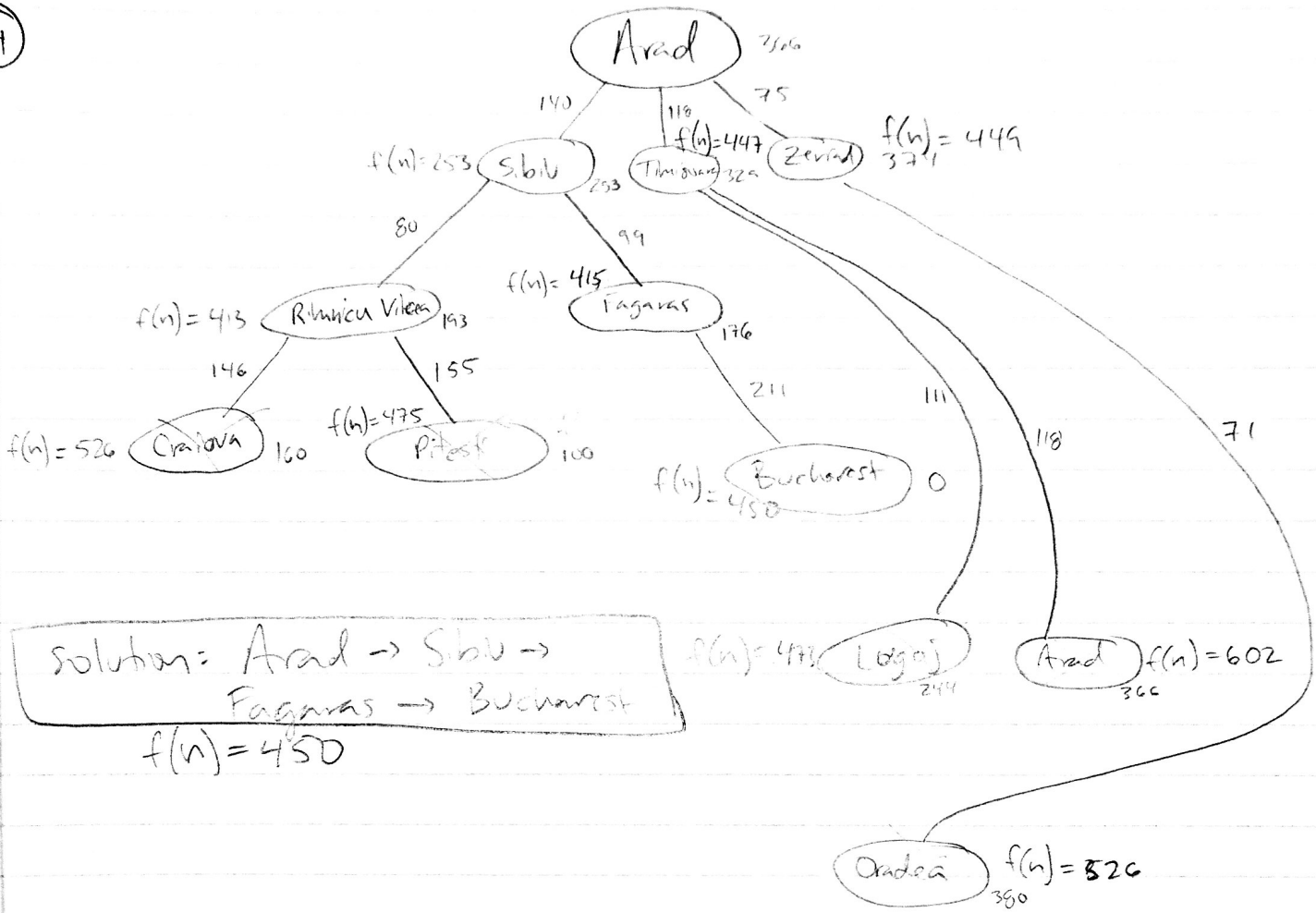


h_3 : assume any border tile can move off of the board — essentially cache itself — while the other tiles are manipulated and reinserted whenever desired to complete the puzzle. The cost of an optimal solution in this case is a heuristic because this solution involves relaxing the original rules.



h_4 : assume that the middle tile can at any time be swapped with the blank square, If it is the case that the middle tile is the blank tile, only the moves valid in the original problem are options. The cost of an optimal solution in this case is a heuristic because the solution involves "relaxing" the rules, ie adding the ability to make moves that weren't previously allowed.

(4)

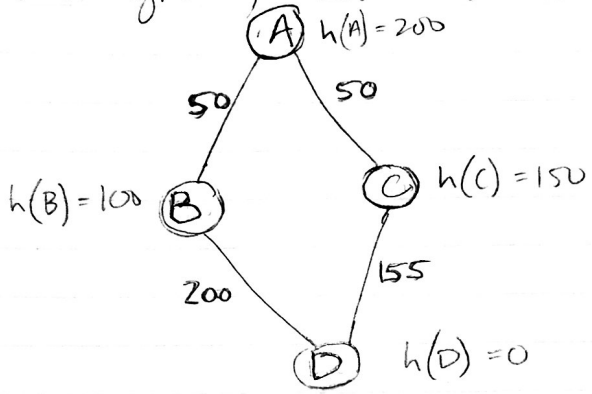


Solution: Arad → Sibu → Fagaras → Bucharest

$f(n) = 450$

Adam Nuack

⑤ Prove that greedy best-first is non-optimal:



$h(A) < 205 < 250$
$h(B) < 200$
$h(C) < 155$
$h(D) = 0$

*showing heuristics are va

1) Assume A is the starting point and D is the objective.
2) Assume Greedy Best First search is optimal ⟹ the solution found by this algorithm will be the best possible.
3) Perform search: (using the graph above)
   ① Start at A
   ② Load successor nodes onto queue in order of increasing heuristic value.
   ③ B is selected from queue and expanded because its heuristic value is lower than C's.
   ④ D is successor of C. D is the goal node and therefore the solution. A → B → C is returned.
   ⑤ Notice that $(A \to C \to D = 205) < (A \to B \to D = 2$
   ∴ A → B → D is non optimal.
   ⑥ Therefore, GBFS is non optimal.