Inteligência Artificial - Lista 1
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Aluno: Mauro Roberto Machado Trevisan

Ex 8)

Pelo algoritmo A*:

Fila: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0, 3)]

Fechados: []

     Melhor escolha: [[1, 2, 3], ['b', 6, 4], [8, 7, 5]] Heurística: 3

          [['b', 2, 3], [1, 6, 4], [8, 7, 5]] adicionado à fila, heurística: 5
          [[1, 2, 3], [8, 6, 4], ['b', 7, 5]] adicionado à fila, heurística: 3
          [[1, 2, 3], [6, 'b', 4], [8, 7, 5]] adicionado à fila, heurística: 4

Fila: [([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1, 3), ([[1, 2, 3], [6, 'b', 4],
[8, 7, 5]], 1, 4), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1, 5)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0, 3)]

     Melhor escolha: [[1, 2, 3], [8, 6, 4], ['b', 7, 5]] Heurística: 3

          [[1, 2, 3], [8, 6, 4], [7, 'b', 5]] adicionado à fila, heurística: 3

Fila: [([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2, 3), ([[1, 2, 3], [6, 'b', 4],
[8, 7, 5]], 1, 4), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1, 5)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0, 3), ([[1, 2, 3], [8, 6, 4],
['b', 7, 5]], 1, 3)]

     Melhor escolha: [[1, 2, 3], [8, 6, 4], [7, 'b', 5]] Heurística: 3

          [[1, 2, 3], [8, 'b', 4], [7, 6, 5]] adicionado à fila, heurística: 3
          [[1, 2, 3], [8, 6, 4], [7, 5, 'b']] adicionado à fila, heurística: 5

Fila: [([[1, 2, 3], [8, 'b', 4], [7, 6, 5]], 3, 3), ([[1, 2, 3], [6, 'b', 4],
[8, 7, 5]], 1, 4), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1, 5), ([[1, 2, 3], [8,
6, 4], [7, 5, 'b']], 3, 5)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0, 3), ([[1, 2, 3], [8, 6, 4],
['b', 7, 5]], 1, 3), ([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2, 3)]

     Melhor escolha: [[1, 2, 3], [8, 'b', 4], [7, 6, 5]] Heurística: 3

Solução encontrada:
[1, 2, 3]
[8, 'b', 4]
[7, 6, 5]

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Pelo algoritmo Melhor Escolha:

Fila: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0)]

Fechados: []

     Melhor escolha: [[1, 2, 3], ['b', 6, 4], [8, 7, 5]] Custo: 0

          [['b', 2, 3], [1, 6, 4], [8, 7, 5]] adicionado à fila

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                    [[1, 2, 3], [8, 6, 4], ['b', 7, 5]] adicionado à fila
                    [[1, 2, 3], [6, 'b', 4], [8, 7, 5]] adicionado à fila

Fila:  [([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b',
7, 5]], 1), ([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 1)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0)]

      Melhor escolha:  [['b', 2, 3], [1, 6, 4], [8, 7, 5]]  Custo:  1

            [[2, 'b', 3], [1, 6, 4], [8, 7, 5]] adicionado à fila

Fila:  [([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b', 4], [8,
7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4],
[8, 7, 5]], 1)]

      Melhor escolha:  [[1, 2, 3], [8, 6, 4], ['b', 7, 5]]  Custo:  1

            [[1, 2, 3], [8, 6, 4], [7, 'b', 5]] adicionado à fila

Fila:  [([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8,
7, 5]], 2), ([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4],
[8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1)]

      Melhor escolha:  [[1, 2, 3], [6, 'b', 4], [8, 7, 5]]  Custo:  1

            [[1, 'b', 3], [6, 2, 4], [8, 7, 5]] adicionado à fila
            [[1, 2, 3], [6, 7, 4], [8, 'b', 5]] adicionado à fila
            [[1, 2, 3], [6, 4, 'b'], [8, 7, 5]] adicionado à fila

Fila:  [([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2), ([[1, 2, 3], [8, 6, 4], [7,
'b', 5]], 2), ([[1, 'b', 3], [6, 2, 4], [8, 7, 5]], 2), ([[1, 2, 3], [6, 7, 4],
[8, 'b', 5]], 2), ([[1, 2, 3], [6, 4, 'b'], [8, 7, 5]], 2)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4],
[8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b',
4], [8, 7, 5]], 1)]

      Melhor escolha:  [[2, 'b', 3], [1, 6, 4], [8, 7, 5]]  Custo:  2

            [[2, 6, 3], [1, 'b', 4], [8, 7, 5]] adicionado à fila
            [[2, 3, 'b'], [1, 6, 4], [8, 7, 5]] adicionado à fila

Fila:  [([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2), ([[1, 'b', 3], [6, 2, 4], [8,
7, 5]], 2), ([[1, 2, 3], [6, 7, 4], [8, 'b', 5]], 2), ([[1, 2, 3], [6, 4, 'b'],
[8, 7, 5]], 2), ([[2, 6, 3], [1, 'b', 4], [8, 7, 5]], 3), ([[2, 3, 'b'], [1, 6,
4], [8, 7, 5]], 3)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4],
[8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b',
4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2)]

      Melhor escolha:  [[1, 2, 3], [8, 6, 4], [7, 'b', 5]]  Custo:  2

            [[1, 2, 3], [8, 'b', 4], [7, 6, 5]] adicionado à fila
            [[1, 2, 3], [8, 6, 4], [7, 5, 'b']] adicionado à fila

Fila:  [([[1, 'b', 3], [6, 2, 4], [8, 7, 5]], 2), ([[1, 2, 3], [6, 7, 4], [8,
'b', 5]], 2), ([[1, 2, 3], [6, 4, 'b'], [8, 7, 5]], 2), ([[2, 6, 3], [1, 'b',
4], [8, 7, 5]], 3), ([[2, 3, 'b'], [1, 6, 4], [8, 7, 5]], 3), ([[1, 2, 3], [8,
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'b', 4], [7, 6, 5]], 3), ([[1, 2, 3], [8, 6, 4], [7, 5, 'b']], 3)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2), ([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2)]

    Melhor escolha: [[1, 'b', 3], [6, 2, 4], [8, 7, 5]] Custo: 2

        [['b', 1, 3], [6, 2, 4], [8, 7, 5]] adicionado à fila
        [[1, 3, 'b'], [6, 2, 4], [8, 7, 5]] adicionado à fila

Fila: [([[1, 2, 3], [6, 7, 4], [8, 'b', 5]], 2), ([[1, 2, 3], [6, 4, 'b'], [8, 7, 5]], 2), ([[2, 6, 3], [1, 'b', 4], [8, 7, 5]], 3), ([[2, 3, 'b'], [1, 6, 4], [8, 7, 5]], 3), ([[1, 2, 3], [8, 'b', 4], [7, 6, 5]], 3), ([[1, 2, 3], [8, 6, 4], [7, 5, 'b']], 3), ([['b', 1, 3], [6, 2, 4], [8, 7, 5]], 3), ([[1, 3, 'b'], [6, 2, 4], [8, 7, 5]], 3)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2), ([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2), ([[1, 'b', 3], [6, 2, 4], [8, 7, 5]], 2)]

    Melhor escolha: [[1, 2, 3], [6, 7, 4], [8, 'b', 5]] Custo: 2

        [[1, 2, 3], [6, 7, 4], ['b', 8, 5]] adicionado à fila
        [[1, 2, 3], [6, 7, 4], [8, 5, 'b']] adicionado à fila

Fila: [([[1, 2, 3], [6, 4, 'b'], [8, 7, 5]], 2), ([[2, 6, 3], [1, 'b', 4], [8, 7, 5]], 3), ([[2, 3, 'b'], [1, 6, 4], [8, 7, 5]], 3), ([[1, 2, 3], [8, 'b', 4], [7, 6, 5]], 3), ([[1, 2, 3], [8, 6, 4], [7, 5, 'b']], 3), ([['b', 1, 3], [6, 2, 4], [8, 7, 5]], 3), ([[1, 3, 'b'], [6, 2, 4], [8, 7, 5]], 3), ([[1, 2, 3], [6, 7, 4], ['b', 8, 5]], 3), ([[1, 2, 3], [6, 7, 4], [8, 5, 'b']], 3)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2), ([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2), ([[1, 'b', 3], [6, 2, 4], [8, 7, 5]], 2), ([[1, 2, 3], [6, 7, 4], [8, 'b', 5]], 2)]

    Melhor escolha: [[1, 2, 3], [6, 4, 'b'], [8, 7, 5]] Custo: 2

        [[1, 2, 'b'], [6, 4, 3], [8, 7, 5]] adicionado à fila
        [[1, 2, 3], [6, 4, 5], [8, 7, 'b']] adicionado à fila

Fila: [([[2, 6, 3], [1, 'b', 4], [8, 7, 5]], 3), ([[2, 3, 'b'], [1, 6, 4], [8, 7, 5]], 3), ([[1, 2, 3], [8, 'b', 4], [7, 6, 5]], 3), ([[1, 2, 3], [8, 6, 4], [7, 5, 'b']], 3), ([['b', 1, 3], [6, 2, 4], [8, 7, 5]], 3), ([[1, 3, 'b'], [6, 2, 4], [8, 7, 5]], 3), ([[1, 2, 3], [6, 7, 4], ['b', 8, 5]], 3), ([[1, 2, 3], [6, 7, 4], [8, 5, 'b']], 3), ([[1, 2, 'b'], [6, 4, 3], [8, 7, 5]], 3), ([[1, 2, 3], [6, 4, 5], [8, 7, 'b']], 3)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2), ([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 2), ([[1, 'b', 3], [6, 2, 4], [8, 7, 5]], 2), ([[1, 2, 3], [6, 7, 4], [8, 'b', 5]], 2), ([[1, 2, 3], [6, 4, 'b'], [8, 7, 5]], 2)]

    Melhor escolha: [[2, 6, 3], [1, 'b', 4], [8, 7, 5]] Custo: 3

        [[2, 6, 3], [1, 7, 4], [8, 'b', 5]] adicionado à fila
        [[2, 6, 3], ['b', 1, 4], [8, 7, 5]] adicionado à fila
        [[2, 6, 3], [1, 4, 'b'], [8, 7, 5]] adicionado à fila

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Fila:  [([[2, 3, 'b'], [1, 6, 4], [8, 7, 5]], 3), ([[1, 2, 3], [8, 'b', 4], [7,
6, 5]], 3), ([[1, 2, 3], [8, 6, 4], [7, 5, 'b']], 3), ([['b', 1, 3], [6, 2, 4],
[8, 7, 5]], 3), ([[1, 3, 'b'], [6, 2, 4], [8, 7, 5]], 3), ([[1, 2, 3], [6, 7,
4], ['b', 8, 5]], 3), ([[1, 2, 3], [6, 7, 4], [8, 5, 'b']], 3), ([[1, 2, 'b'],
[6, 4, 3], [8, 7, 5]], 3), ([[1, 2, 3], [6, 4, 5], [8, 7, 'b']], 3), ([[2, 6,
3], [1, 7, 4], [8, 'b', 5]], 4), ([[2, 6, 3], ['b', 1, 4], [8, 7, 5]], 4), ([[2,
6, 3], [1, 4, 'b'], [8, 7, 5]], 4)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4],
[8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b',
4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2), ([[1, 2, 3], [8,
6, 4], [7, 'b', 5]], 2), ([[1, 'b', 3], [6, 2, 4], [8, 7, 5]], 2), ([[1, 2, 3],
[6, 7, 4], [8, 'b', 5]], 2), ([[1, 2, 3], [6, 4, 'b'], [8, 7, 5]], 2), ([[2, 6,
3], [1, 'b', 4], [8, 7, 5]], 3)]

        Melhor escolha:  [[2, 3, 'b'], [1, 6, 4], [8, 7, 5]]  Custo:  3

             [[2, 3, 4], [1, 6, 'b'], [8, 7, 5]] adicionado à fila

Fila:  [([[1, 2, 3], [8, 'b', 4], [7, 6, 5]], 3), ([[1, 2, 3], [8, 6, 4], [7, 5,
'b']], 3), ([['b', 1, 3], [6, 2, 4], [8, 7, 5]], 3), ([[1, 3, 'b'], [6, 2, 4],
[8, 7, 5]], 3), ([[1, 2, 3], [6, 7, 4], ['b', 8, 5]], 3), ([[1, 2, 3], [6, 7,
4], [8, 5, 'b']], 3), ([[1, 2, 'b'], [6, 4, 3], [8, 7, 5]], 3), ([[1, 2, 3], [6,
4, 5], [8, 7, 'b']], 3), ([[2, 6, 3], [1, 7, 4], [8, 'b', 5]], 4), ([[2, 6, 3],
['b', 1, 4], [8, 7, 5]], 4), ([[2, 6, 3], [1, 4, 'b'], [8, 7, 5]], 4), ([[2, 3,
4], [1, 6, 'b'], [8, 7, 5]], 4)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 0), ([['b', 2, 3], [1, 6, 4],
[8, 7, 5]], 1), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 1), ([[1, 2, 3], [6, 'b',
4], [8, 7, 5]], 1), ([[2, 'b', 3], [1, 6, 4], [8, 7, 5]], 2), ([[1, 2, 3], [8,
6, 4], [7, 'b', 5]], 2), ([[1, 'b', 3], [6, 2, 4], [8, 7, 5]], 2), ([[1, 2, 3],
[6, 7, 4], [8, 'b', 5]], 2), ([[1, 2, 3], [6, 4, 'b'], [8, 7, 5]], 2), ([[2, 6,
3], [1, 'b', 4], [8, 7, 5]], 3), ([[2, 3, 'b'], [1, 6, 4], [8, 7, 5]], 3)]

        Melhor escolha:  [[1, 2, 3], [8, 'b', 4], [7, 6, 5]]  Custo:  3

Solução encontrada:
[1, 2, 3]
[8, 'b', 4]
[7, 6, 5]

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Pelo algoritmo Melhor Escolha com heurística:

Fila:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 3)]

Fechados:  []

        Melhor escolha:  [[1, 2, 3], ['b', 6, 4], [8, 7, 5]]  Heurística:  3

                [['b', 2, 3], [1, 6, 4], [8, 7, 5]] adicionado à fila, heurística: 4
                [[1, 2, 3], [8, 6, 4], ['b', 7, 5]] adicionado à fila, heurística: 2
                [[1, 2, 3], [6, 'b', 4], [8, 7, 5]] adicionado à fila, heurística: 3

Fila:  [([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 2), ([[1, 2, 3], [6, 'b', 4], [8,
7, 5]], 3), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 4)]

Fechados:  [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 3)]

        Melhor escolha:  [[1, 2, 3], [8, 6, 4], ['b', 7, 5]]  Heurística:  2

                [[1, 2, 3], [8, 6, 4], [7, 'b', 5]] adicionado à fila, heurística: 1
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Fila: [([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 1), ([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 3), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 4)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 3), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 2)]

     Melhor escolha: [[1, 2, 3], [8, 6, 4], [7, 'b', 5]] Heurística: 1

            [[1, 2, 3], [8, 'b', 4], [7, 6, 5]] adicionado à fila, heurística: 0
            [[1, 2, 3], [8, 6, 4], [7, 5, 'b']] adicionado à fila, heurística: 2

Fila: [([[1, 2, 3], [8, 'b', 4], [7, 6, 5]], 0), ([[1, 2, 3], [8, 6, 4], [7, 5, 'b']], 2), ([[1, 2, 3], [6, 'b', 4], [8, 7, 5]], 3), ([['b', 2, 3], [1, 6, 4], [8, 7, 5]], 4)]

Fechados: [([[1, 2, 3], ['b', 6, 4], [8, 7, 5]], 3), ([[1, 2, 3], [8, 6, 4], ['b', 7, 5]], 2), ([[1, 2, 3], [8, 6, 4], [7, 'b', 5]], 1)]

     Melhor escolha: [[1, 2, 3], [8, 'b', 4], [7, 6, 5]] Heurística: 0

Solução encontrada:
[1, 2, 3]
[8, 'b', 4]
[7, 6, 5]