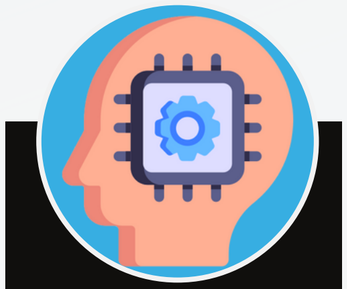
PRIMEIRO TRABALHO

SCC0230 - Inteligência Artificial

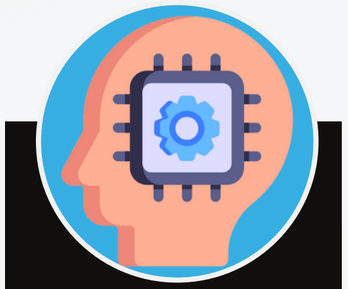
Solange Oliveira Rezende



Bernardo Maia Coelho

Vice-Líder

Nº USP 12542481



João Gabriel Sasseron

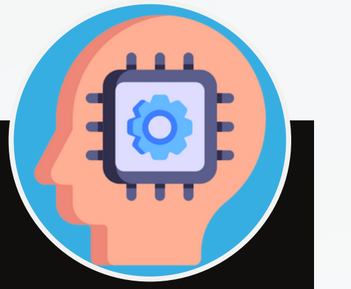
Membro

Nº USP 12542564

João Pedro Buzzo Silva

Membro

Nº USP 10425191



Marcos Patrício Nogueira Filho

Membro

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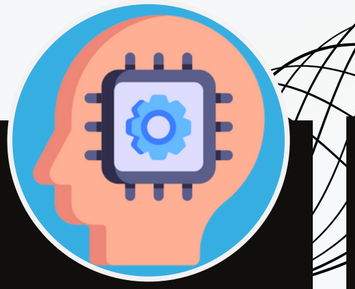
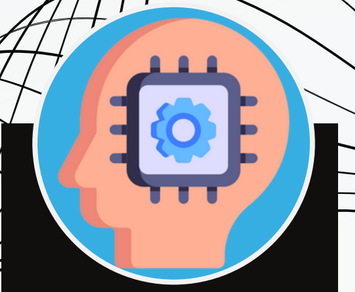


Pedro Guilherme dos Reis Teixeira

Membro

Nº USP 12542477



Rogério Lopes Lübe

Líder

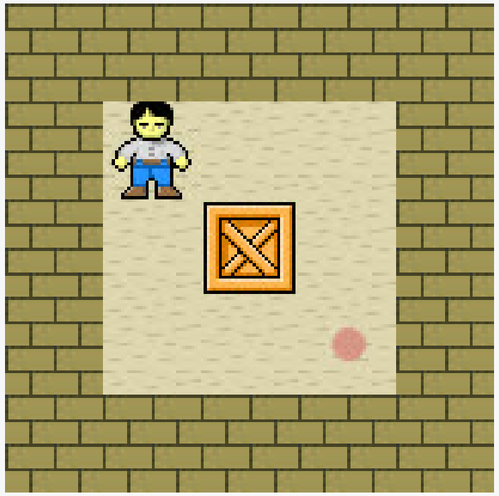
Nº USP 10770113

SUMÁRIO

TEMA E JUSTIFICATIVA

TEMA

- O trabalho visa criar algoritmos de **busca**, tanto **informada** quanto **não informada**, para solucionar desafios do jogo **Sokoban**.

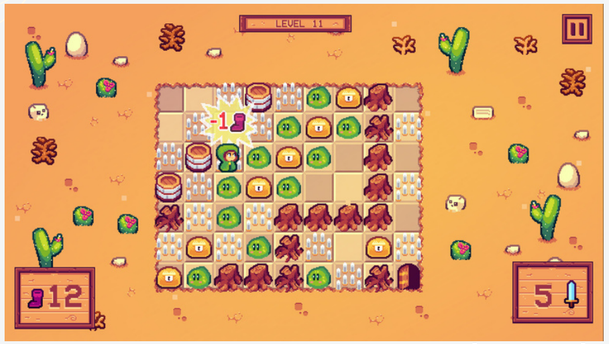


JUSTIFICATIVA

- A solução de um tabuleiro de **Sokoban** é um problema **P-SPACE** completo.
- É bem mais difícil do que parece!
- Desafios:
  - As possibilidades são muito grandes.
  - O jogador pode precisar passar por células já visitadas.
  - A árvore de possibilidades cresce rapidamente (alto branching factor).
- É um jogo divertido :)

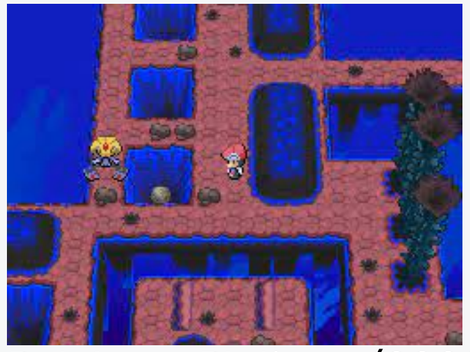
JUSTIFICATIVA

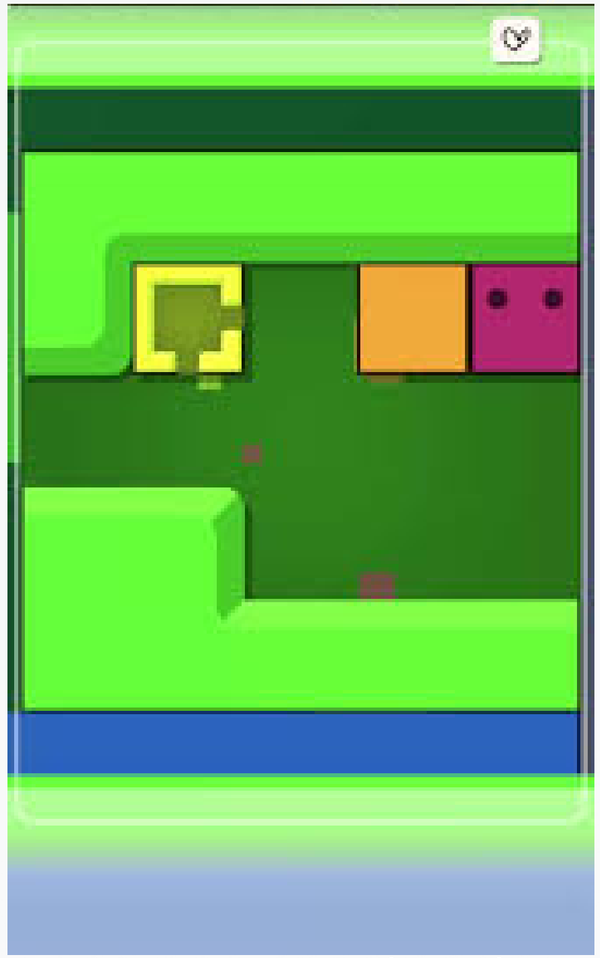
- Vários jogos clássicos e modernos são inspirados em sokoban ou têm partes inspiradas em sokoban.

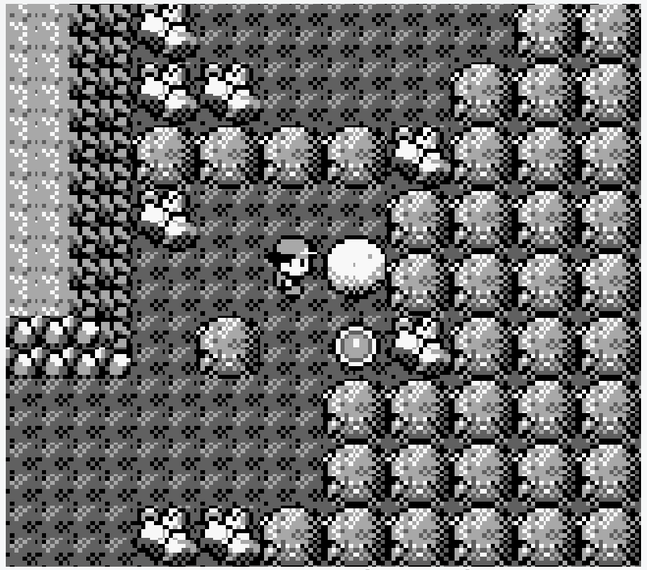


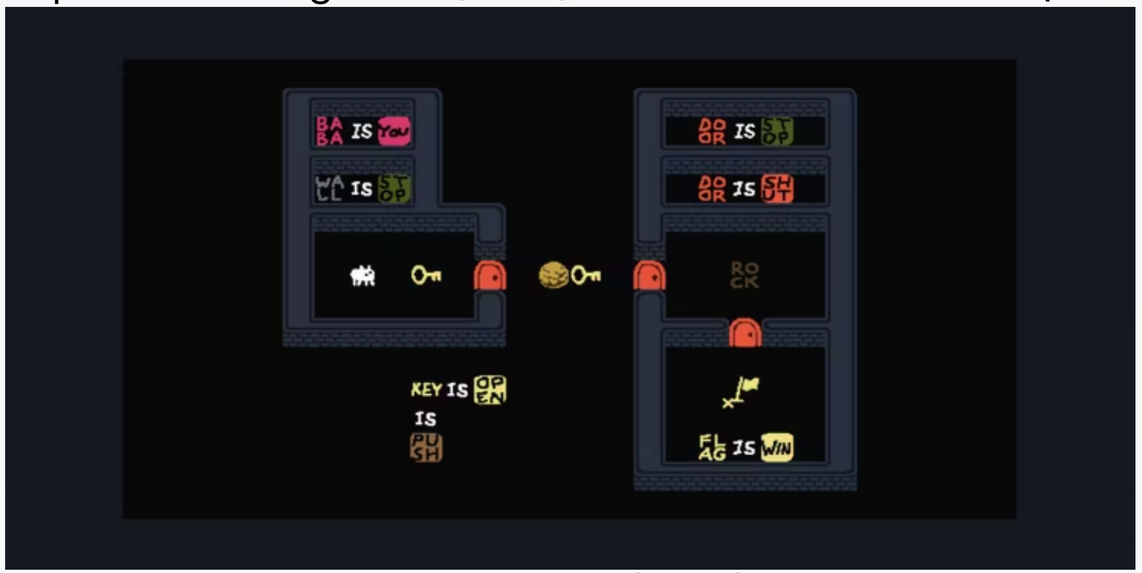
Slime Warrior Sokoban (2023)


Stephen's Sausage Roll (2016)


Pokémon Platinum (2008)


Patrick's Parabox (2022)

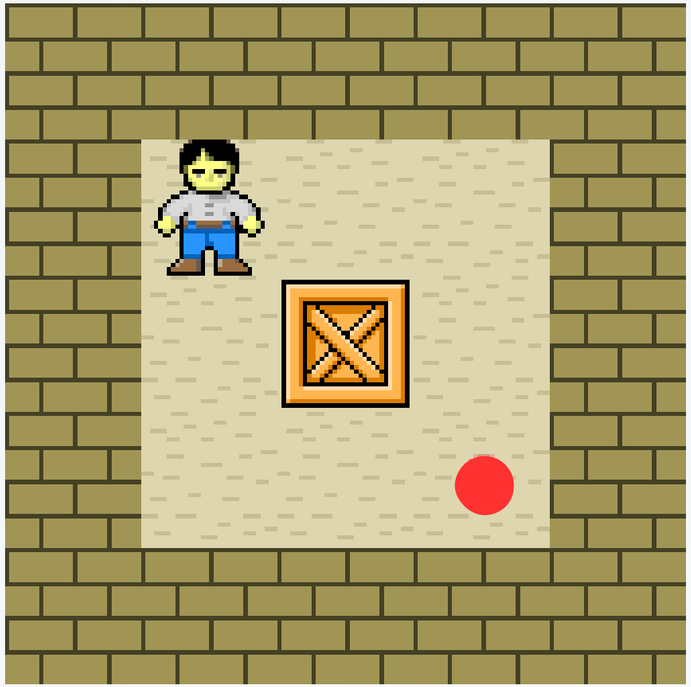

Pokémon Blue (1996)



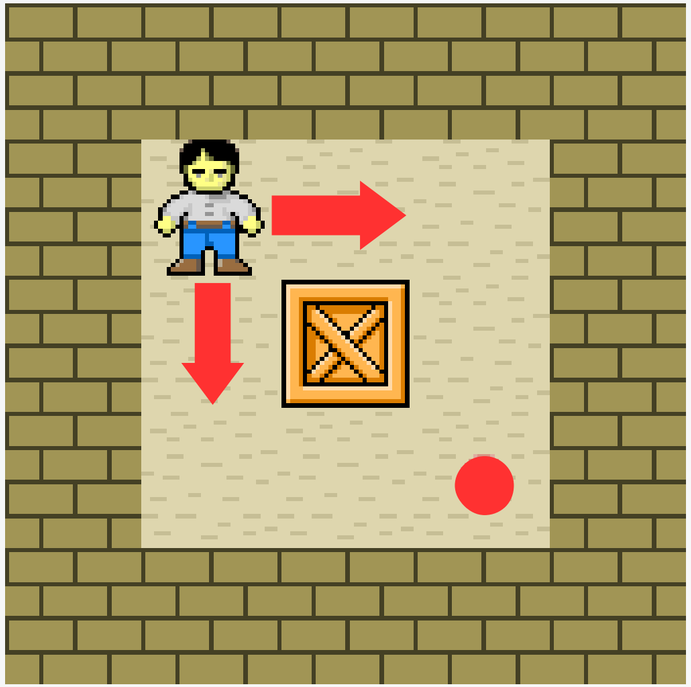
Baba is You (2019)

O QUE É O SOKOBAN?

SOKOBAN



SOKOBAN



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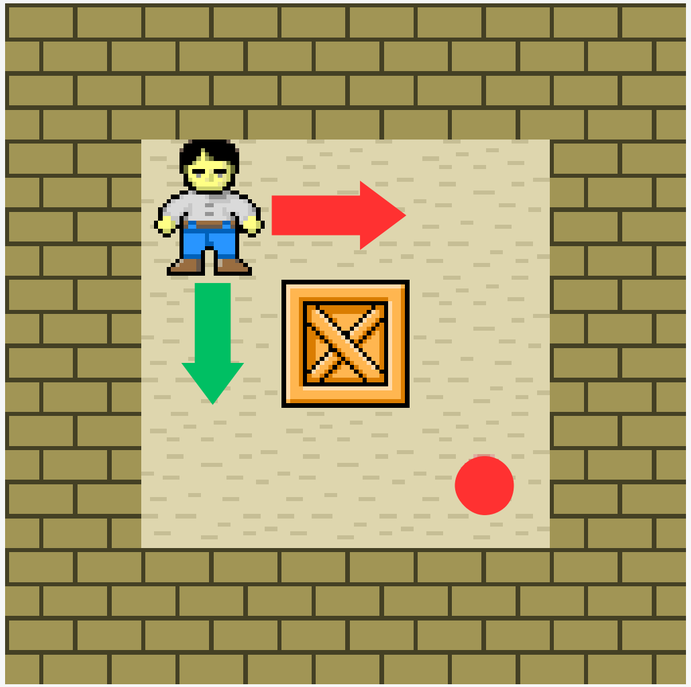

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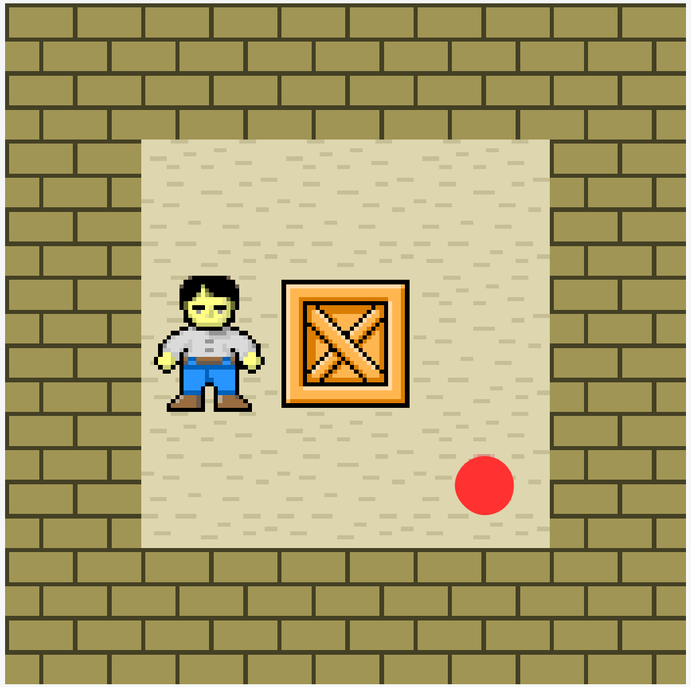

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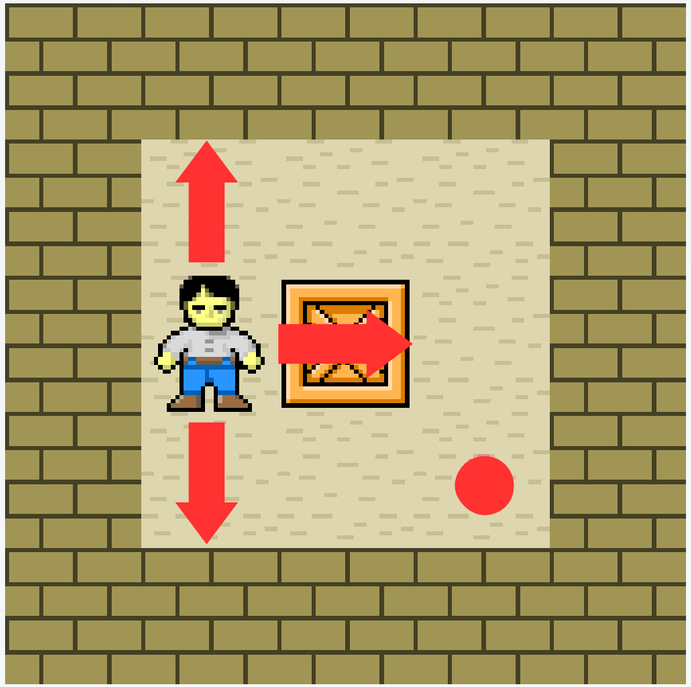

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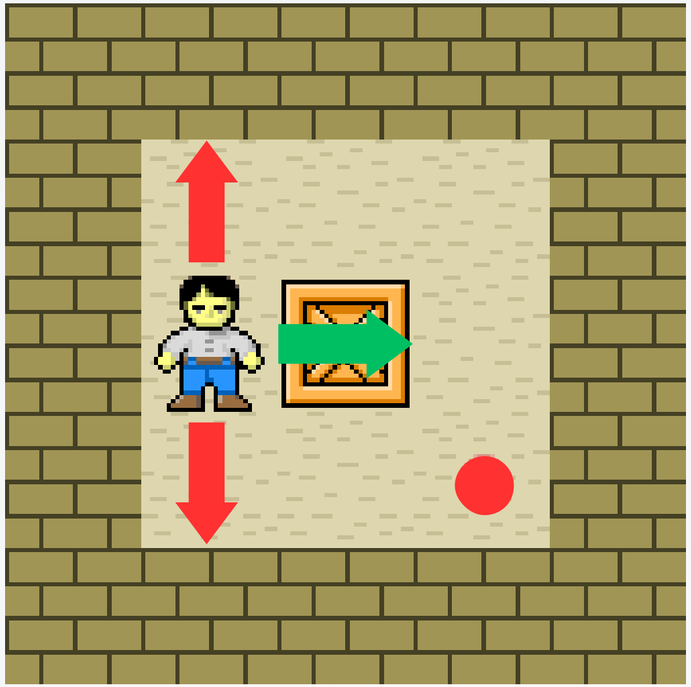

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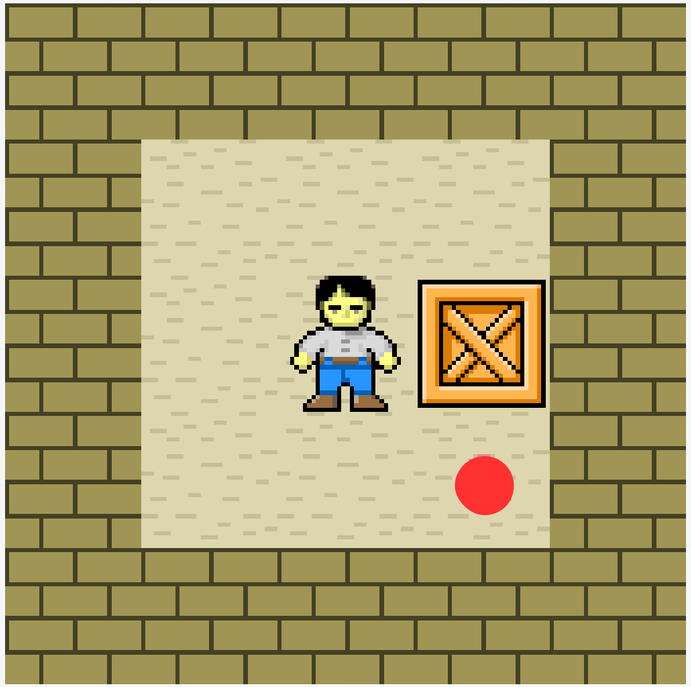

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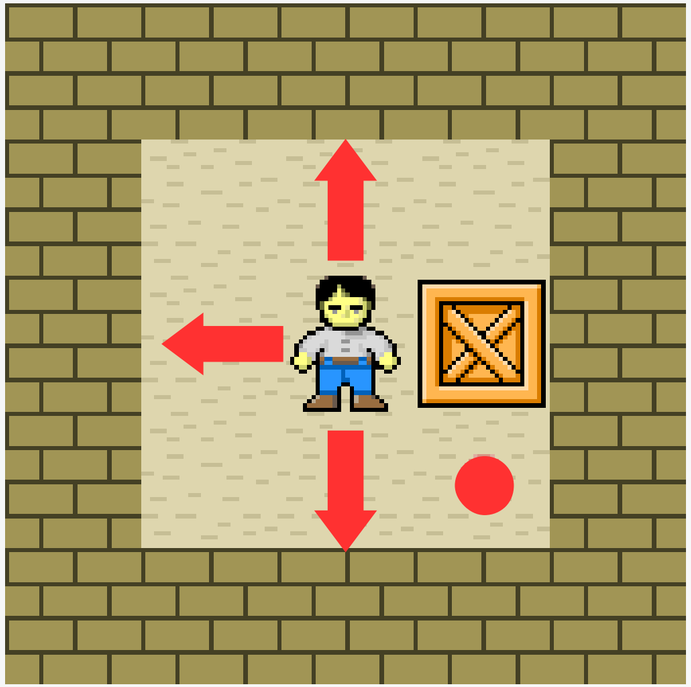

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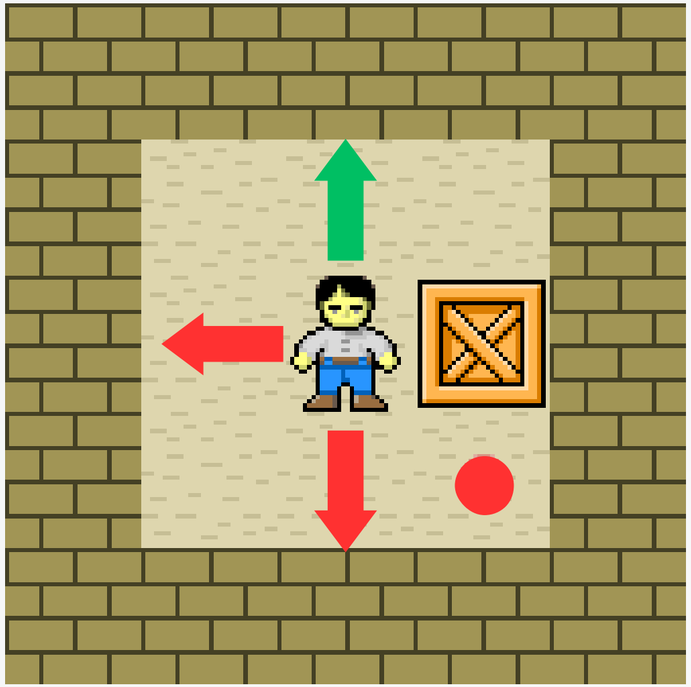

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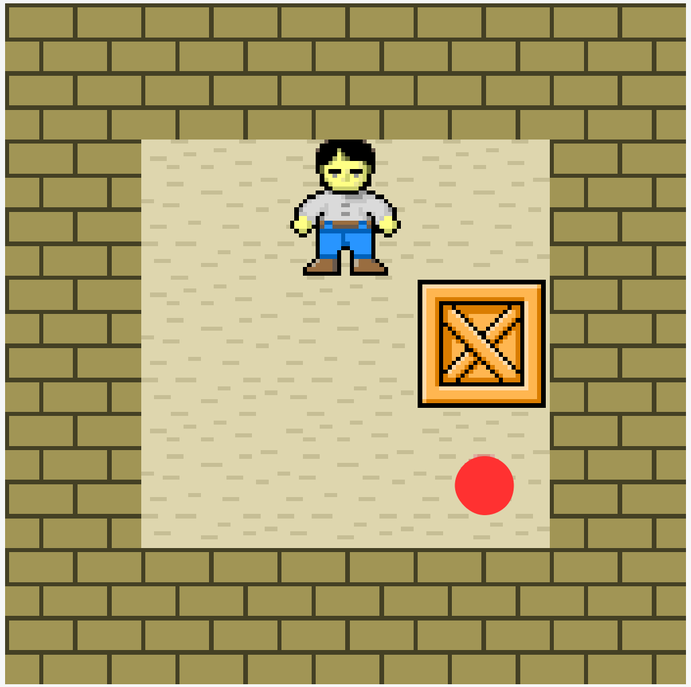

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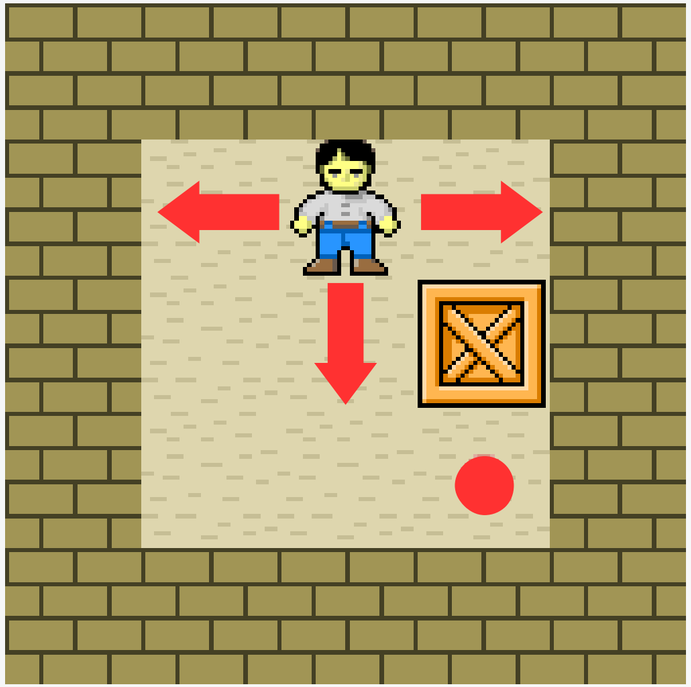

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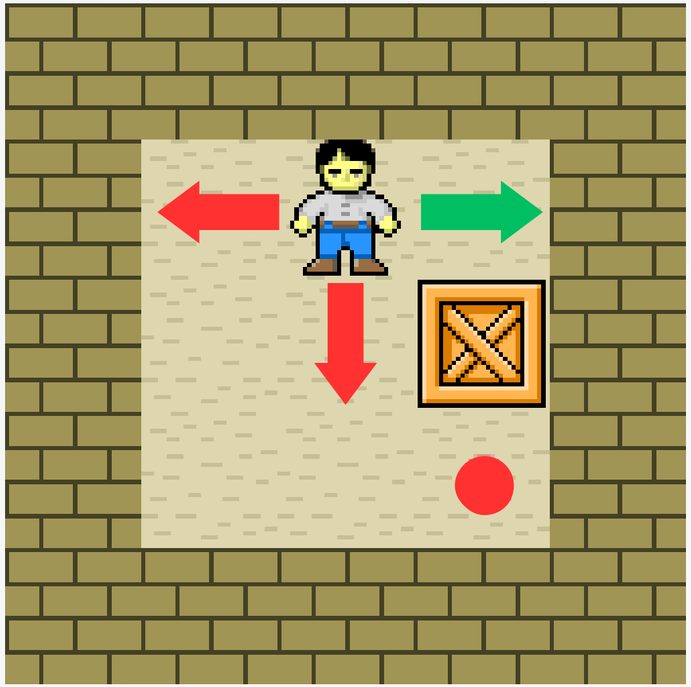

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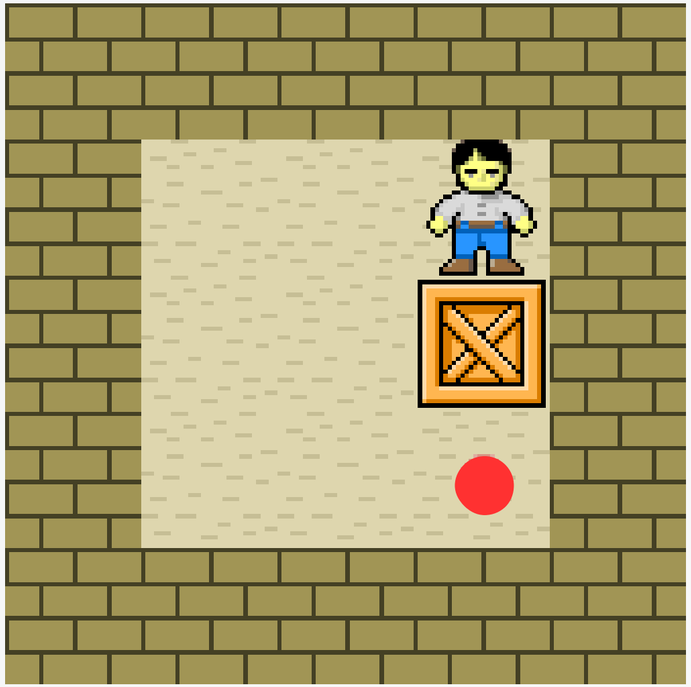

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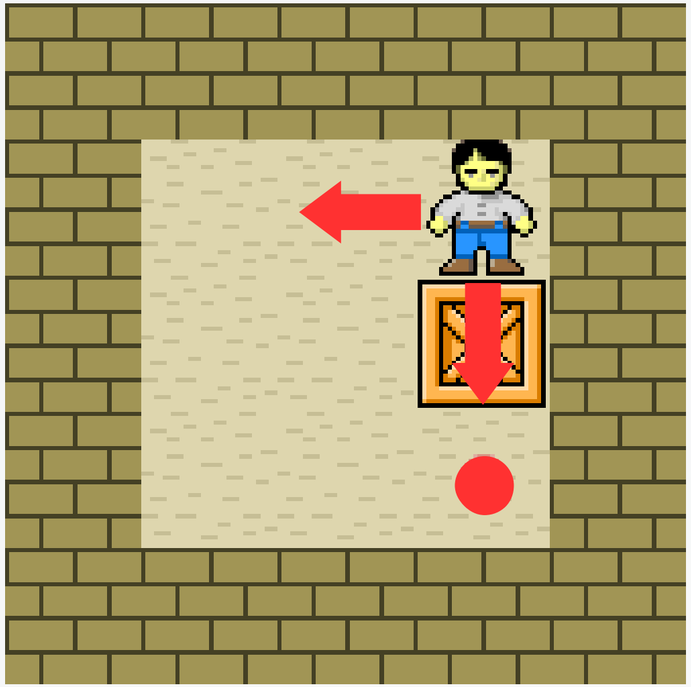

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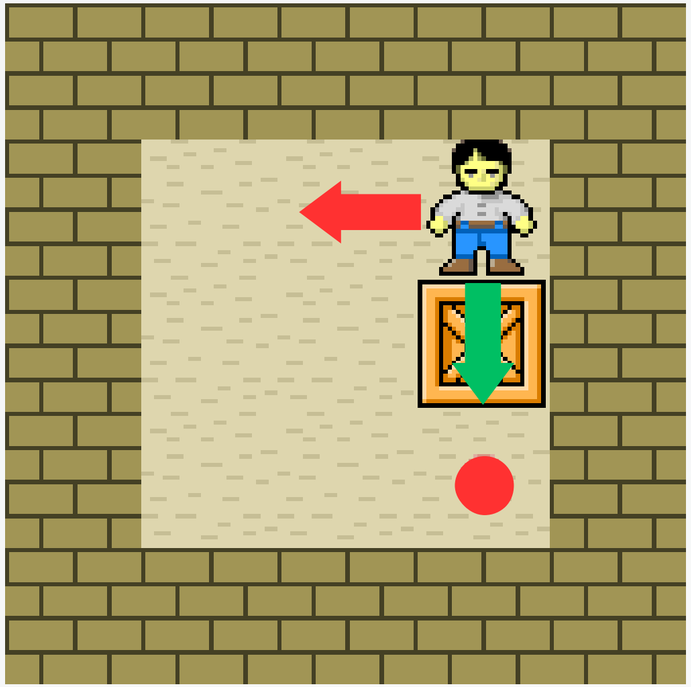

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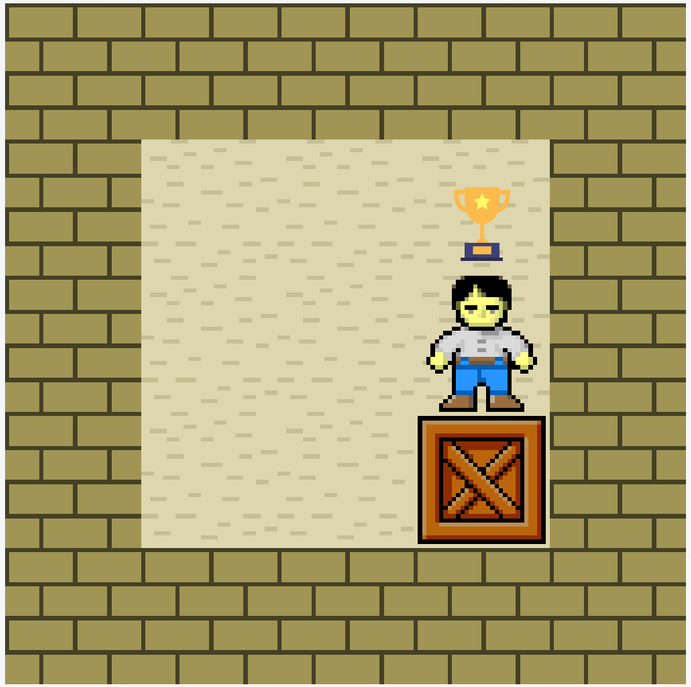
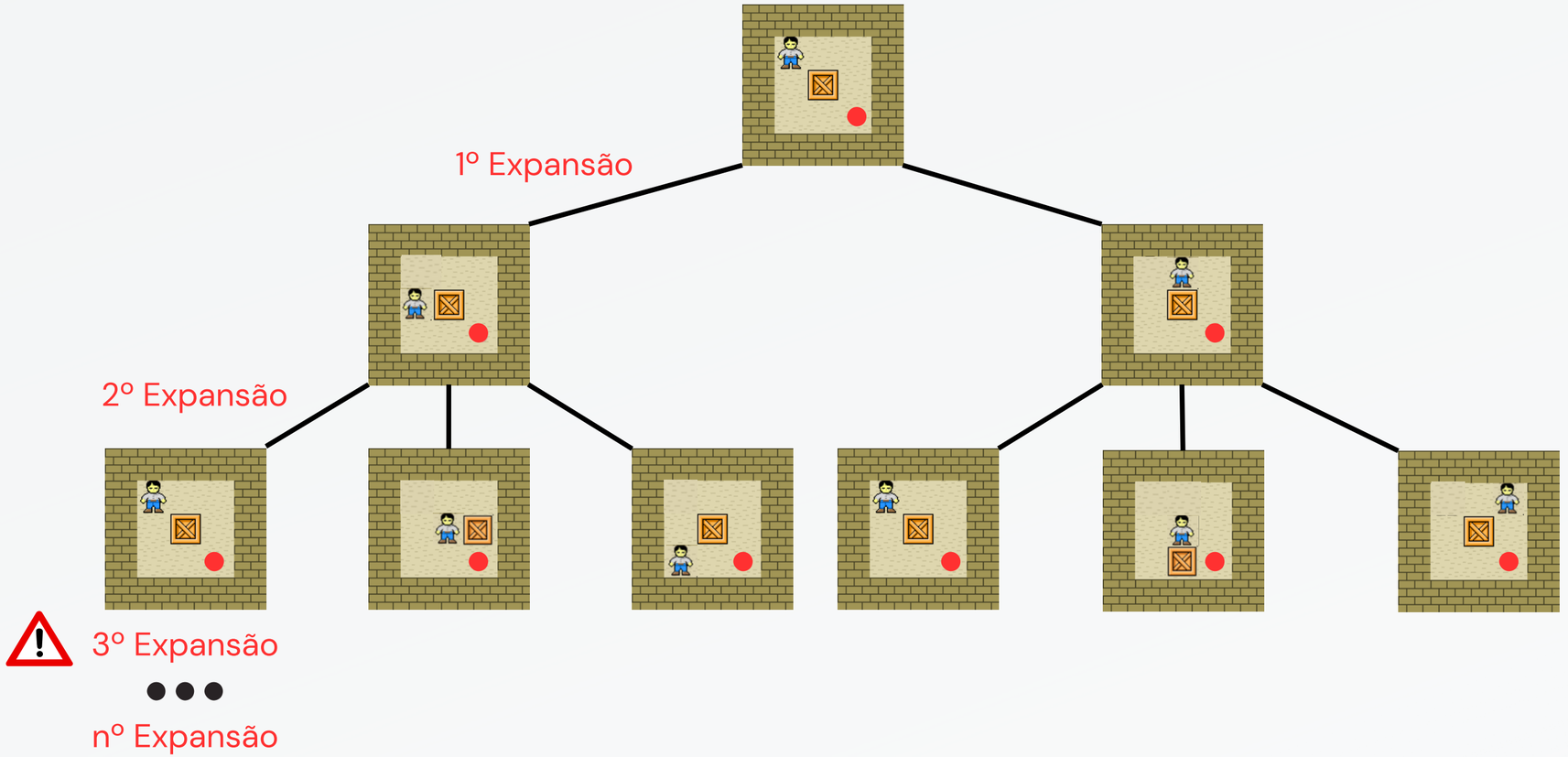


BUSCA NÃO INFORMADA

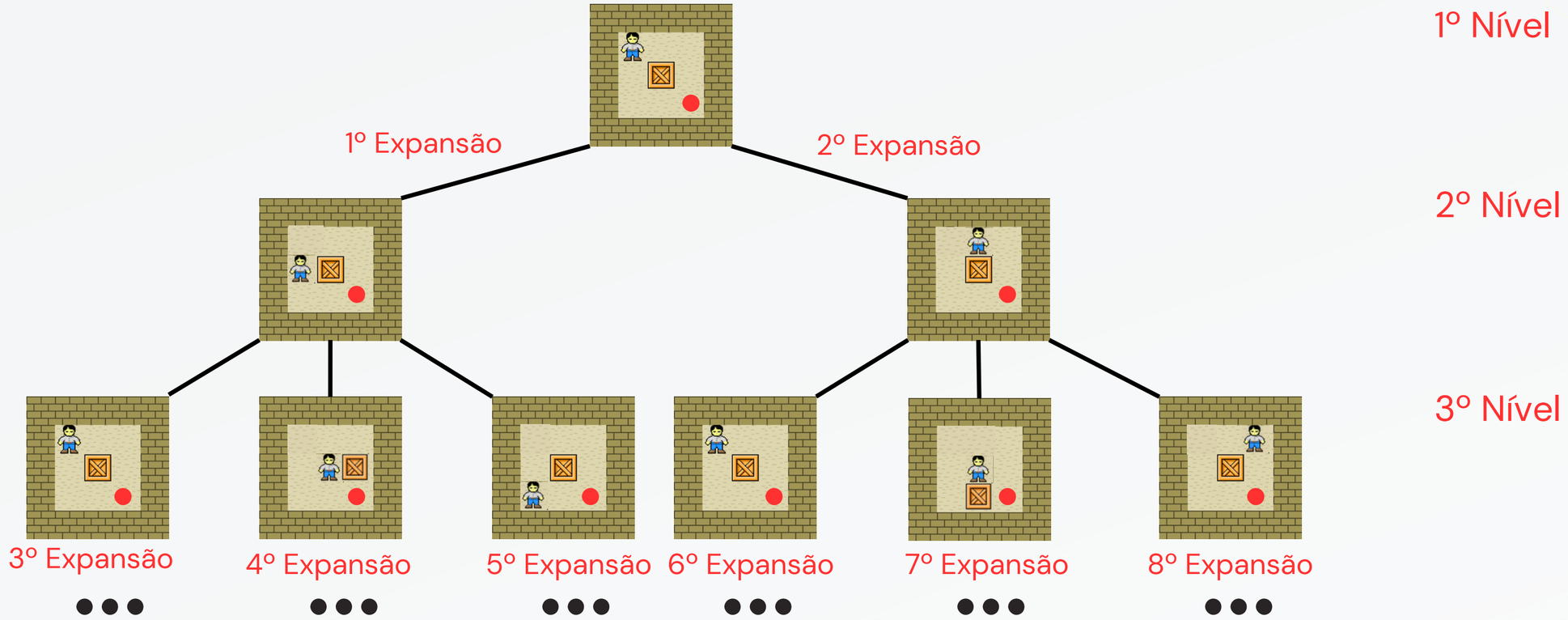
BUSCA EM PROFUNDIDADE

- A busca em profundidade explora tão profundamente quanto possível antes de retroceder.



BUSCA EM LARGURA

- A busca em largura examina minuciosamente todos os nós no mesmo nível antes de prosseguir para o próximo.

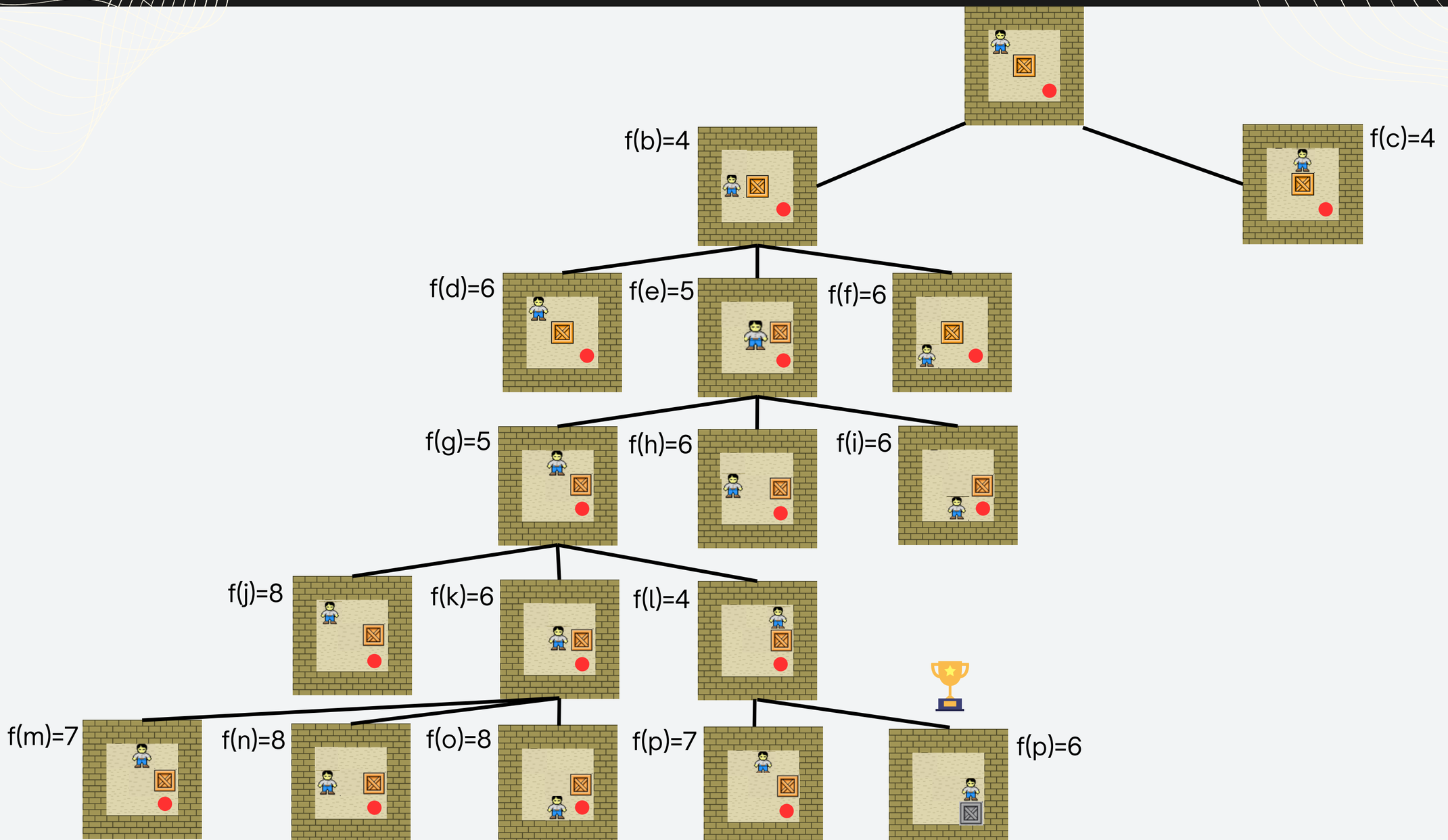


BUSCA INFORMADA

A*

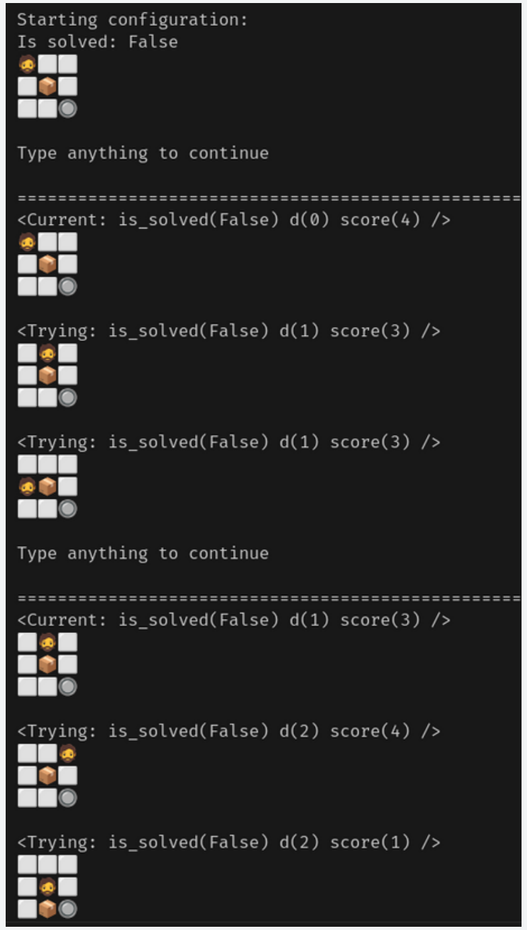
- **Função Heurística** $f(n) = h_1(n) + h_2(n) + h_3(n) + g(n)$**:**
  - $h_1(n)$ é a FA da distância do **botão até a caixa**;
  - $h_2(n)$ é a FA da distância do **jogador até a caixa mais próxima**.
  - $h_3(n)$ é uma função que concede um bônus para casos em que o jogador, a caixa e o botão estão alinhados horizontal ou verticalmente ou casos adjacentes a esses.
  - $h_1(n) + h_2(n) + h_3(n)$ é equivalente a **função de avaliação**.
  - $g(n)$ é a FC com 1 de **custo para cada movimento**.
- Além disso, no cálculo das distâncias, utilizamos como base a métrica de **distância de Manhattan**.
- Em caso de empate, o caminho escolhido é referente a ordem alfabética.

A*



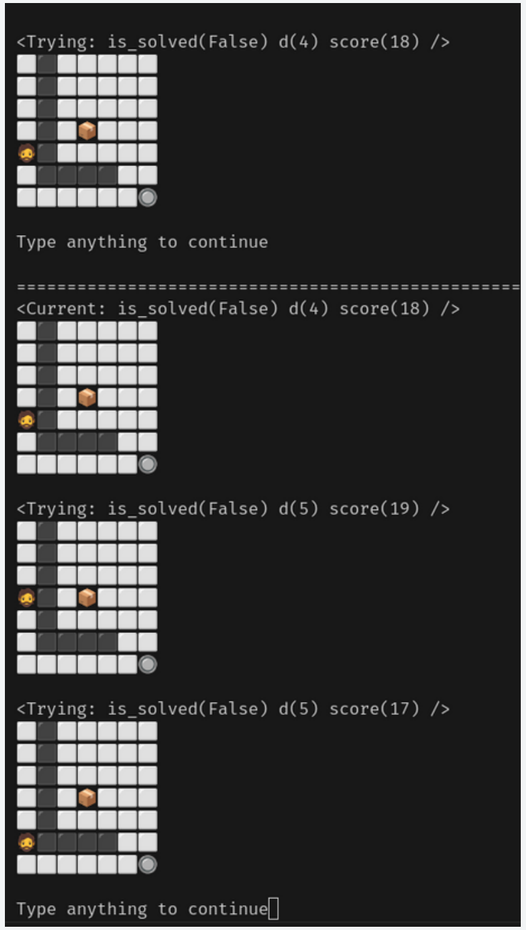
A*

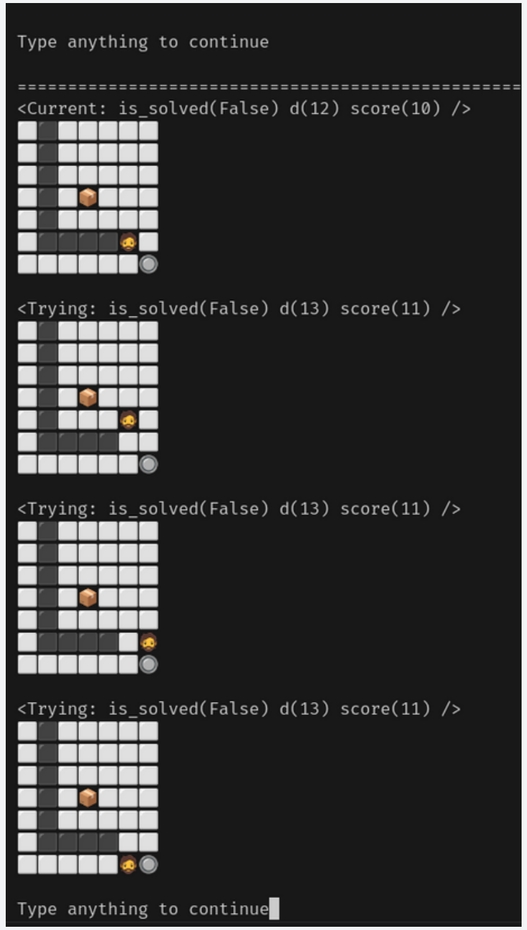
- Execução do código em python para solução de um tabuleiro.

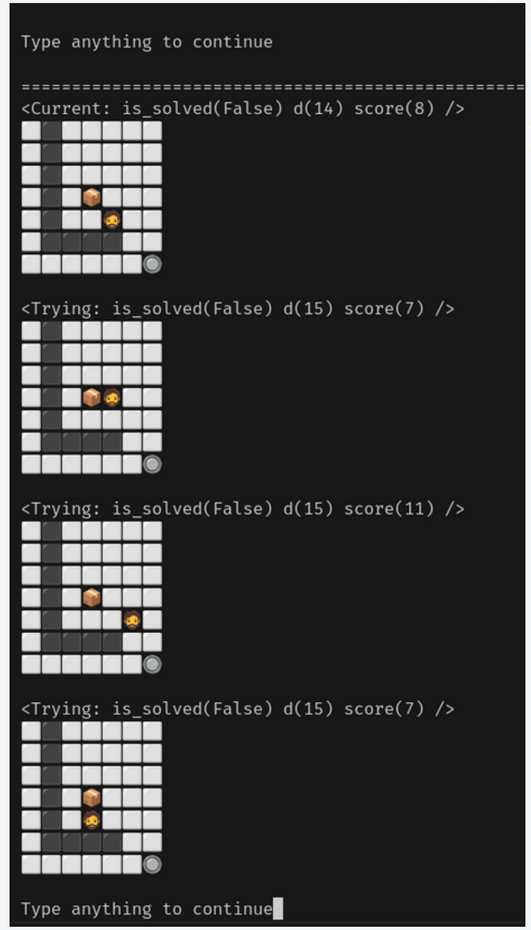


A*

- Extra: com paredes







OBRIGADO!