Advent of Code 2022 Day 14

Selected Fun Problems of the ACM Programming Contest

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University of Tübingen

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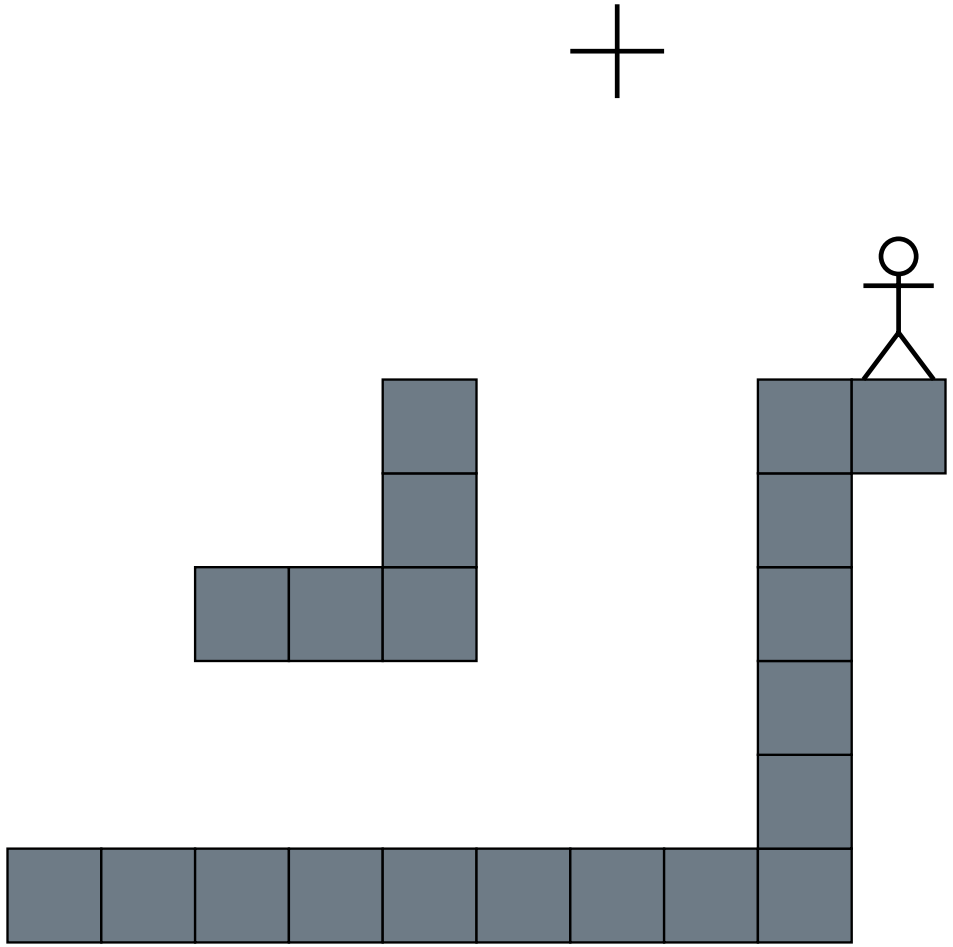
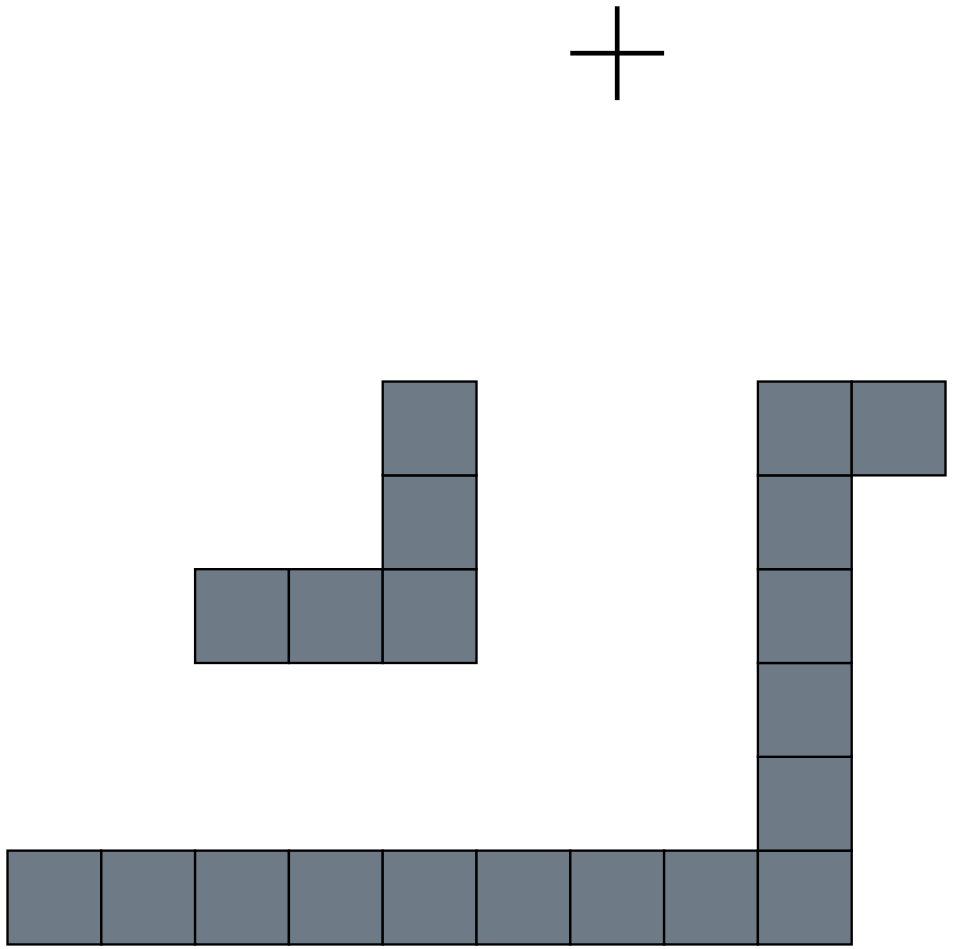
Motivation

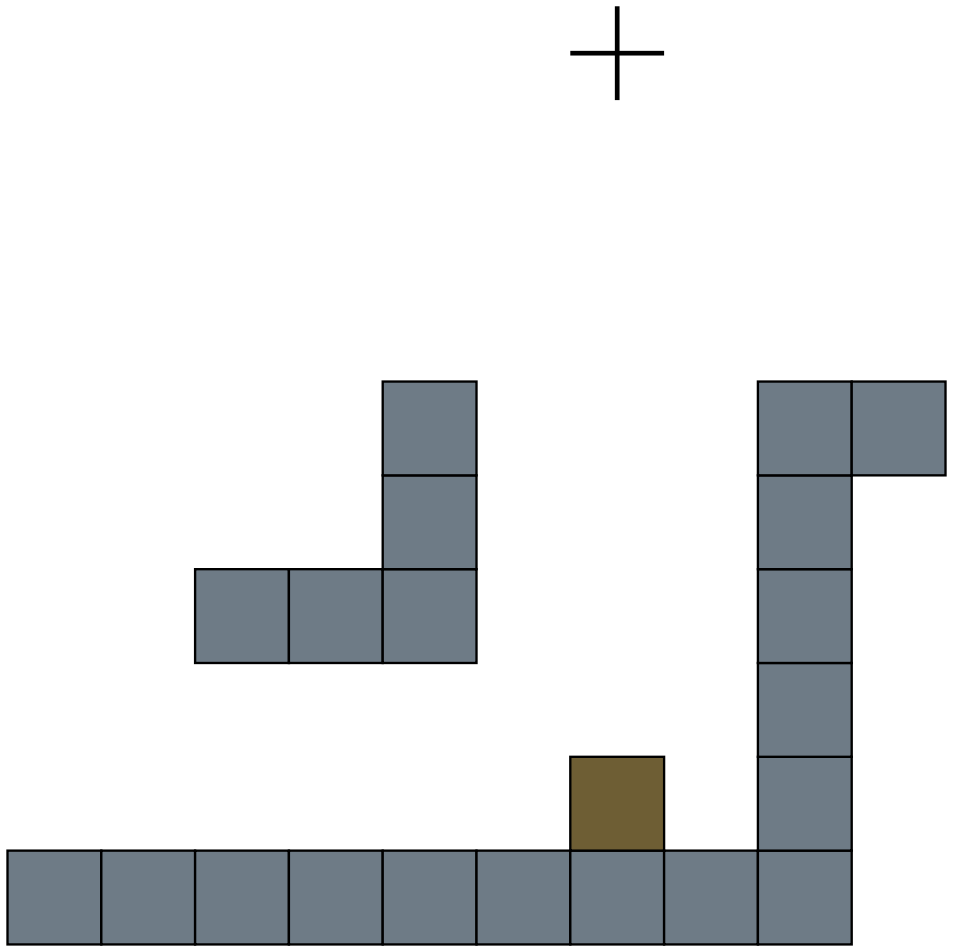
How much sand is needed to fill the cave and its surroundings?



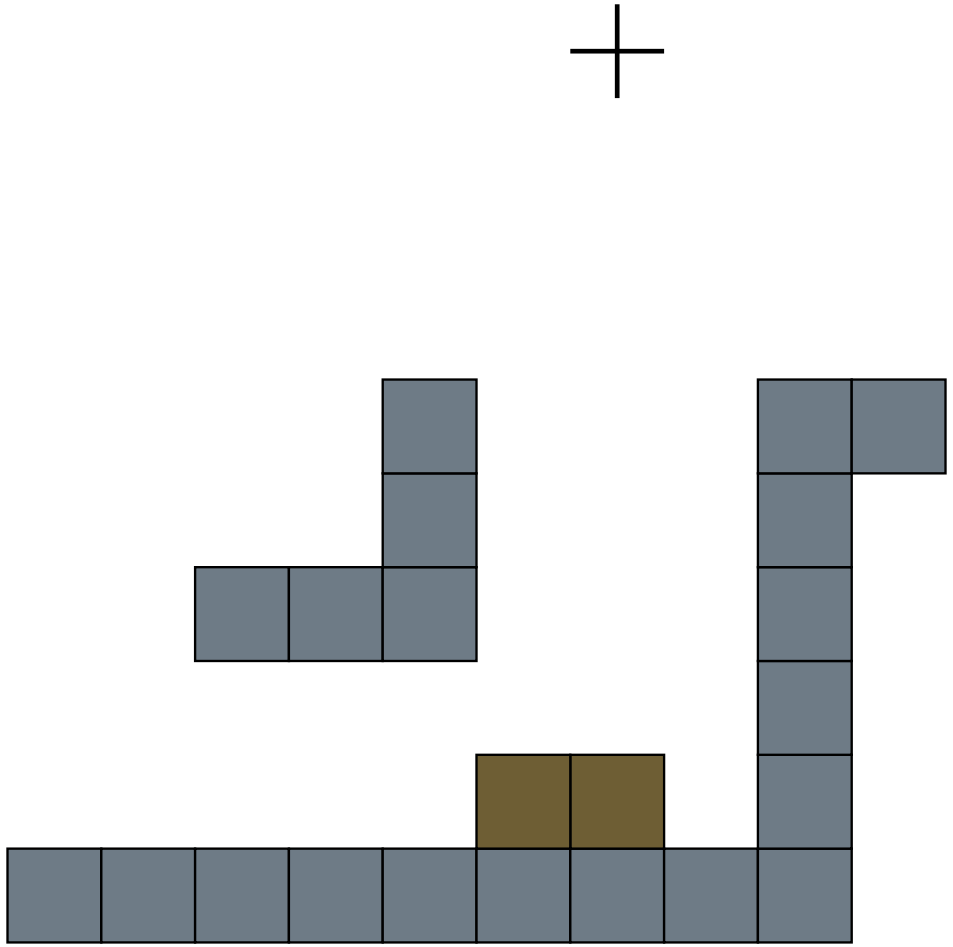
Problem Example



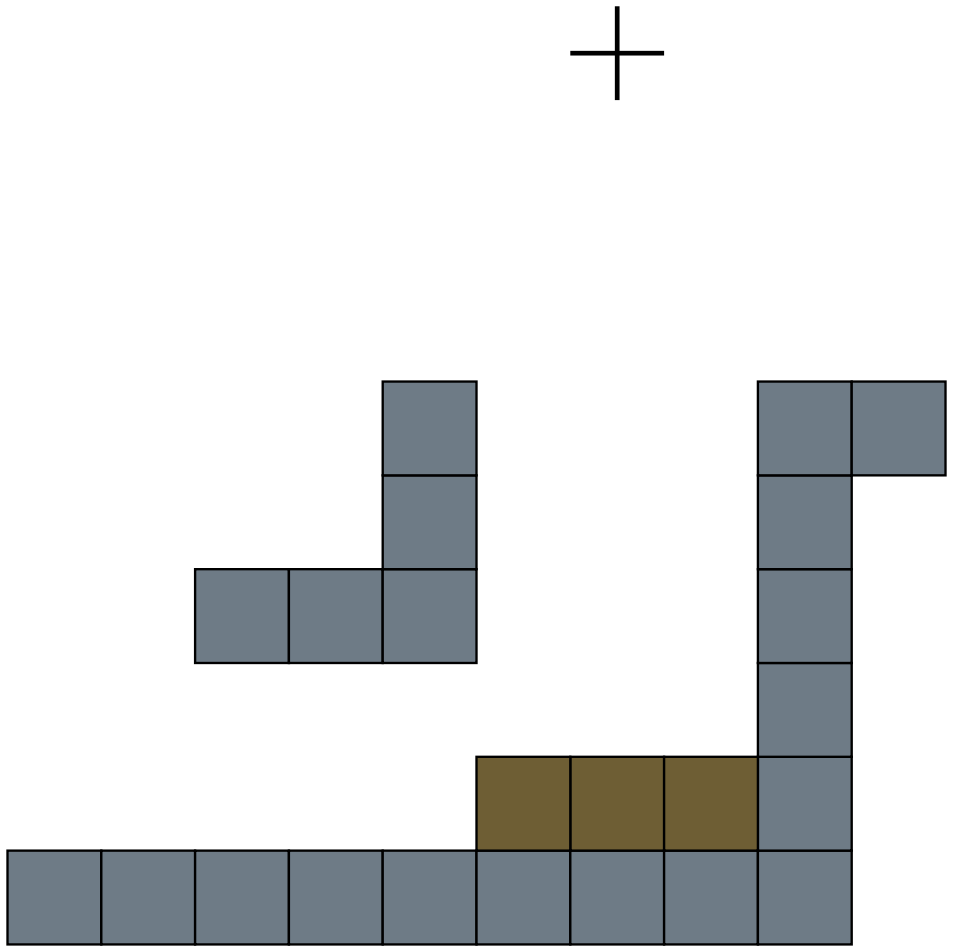
Problem Example



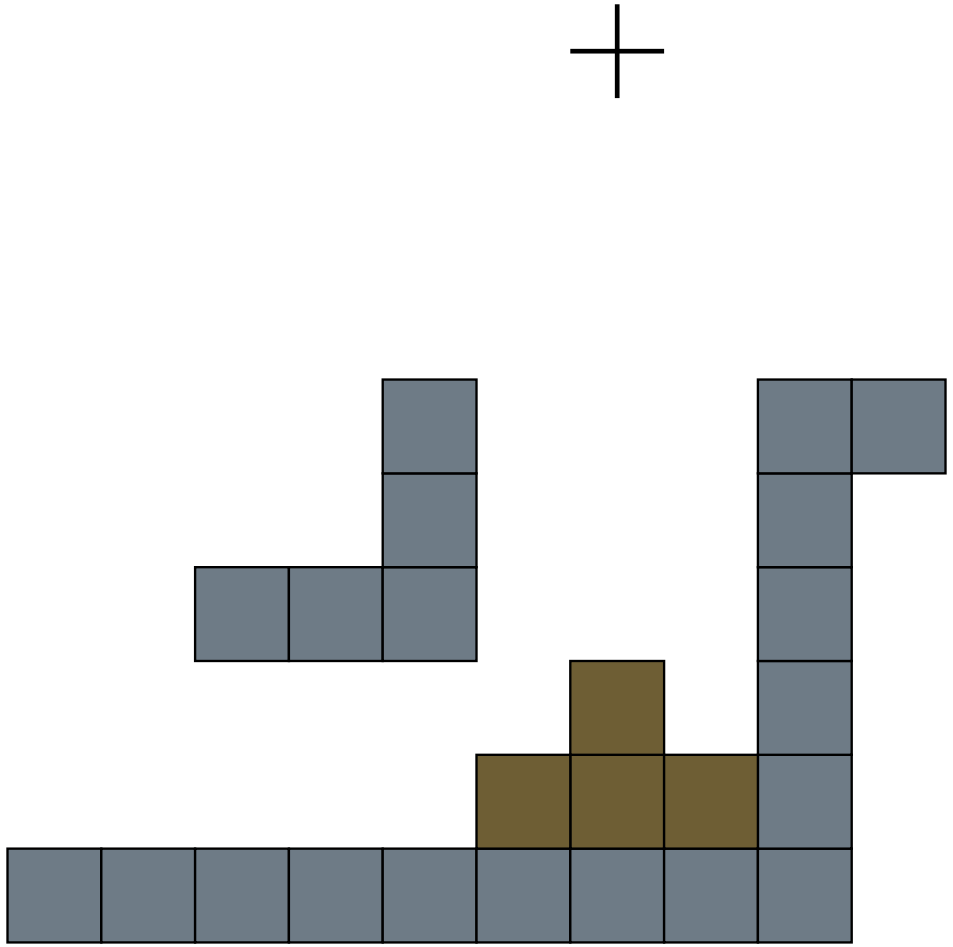
Problem Example



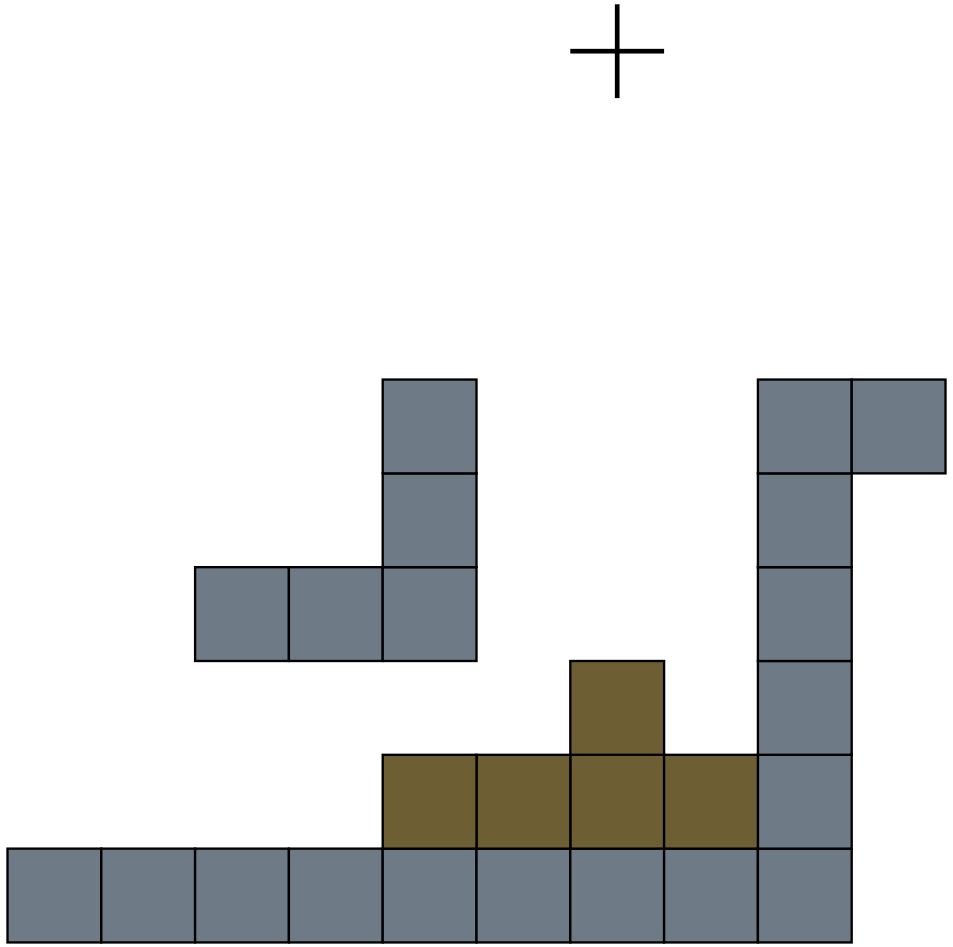
Problem Example



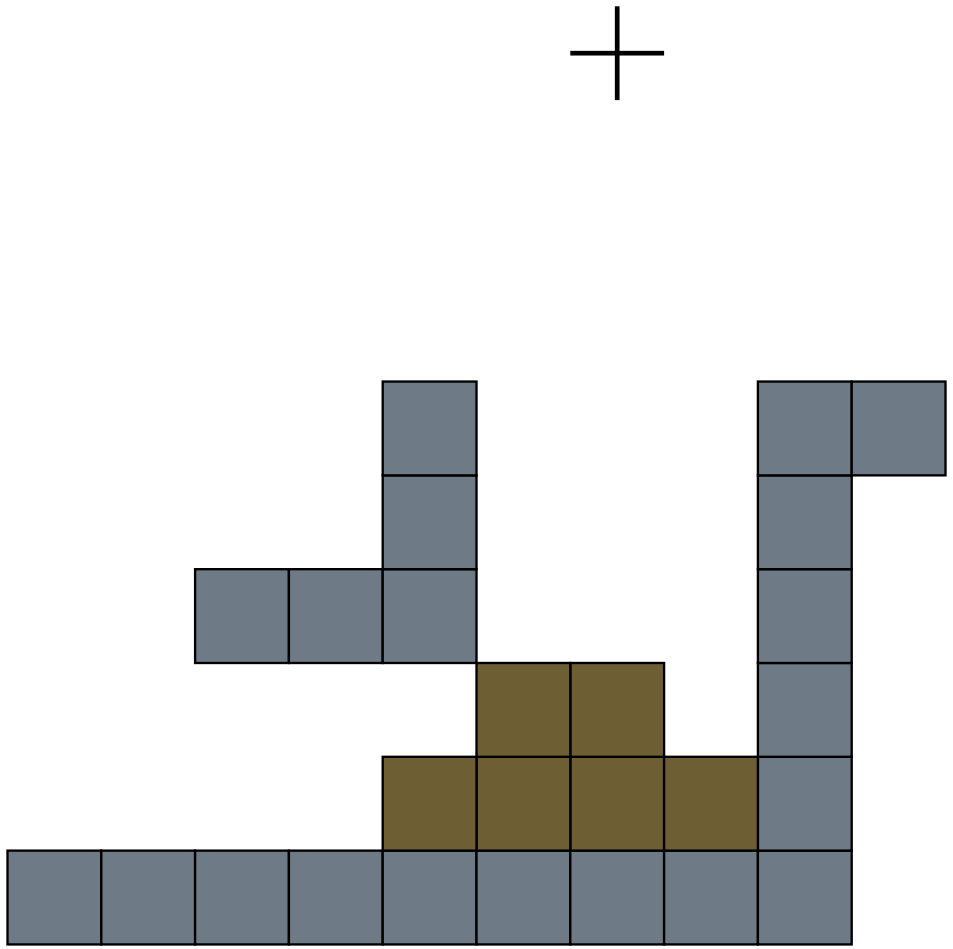
Problem Example



Problem Example



Problem Example



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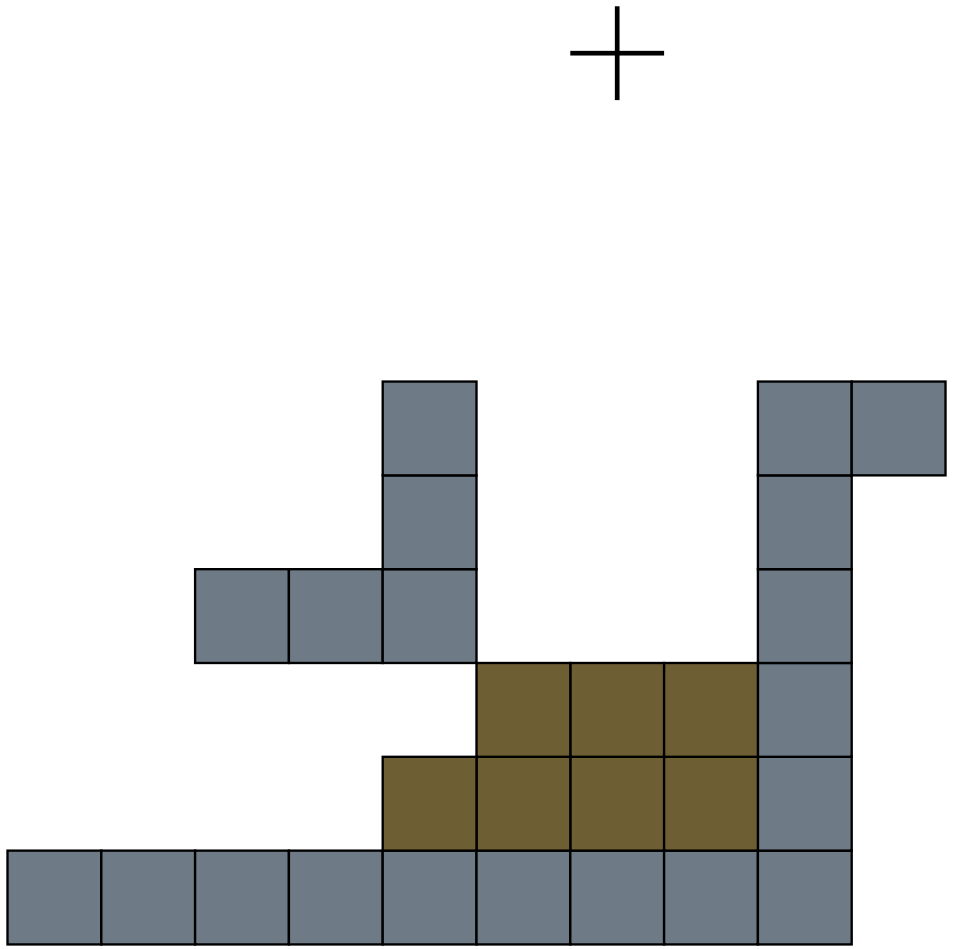
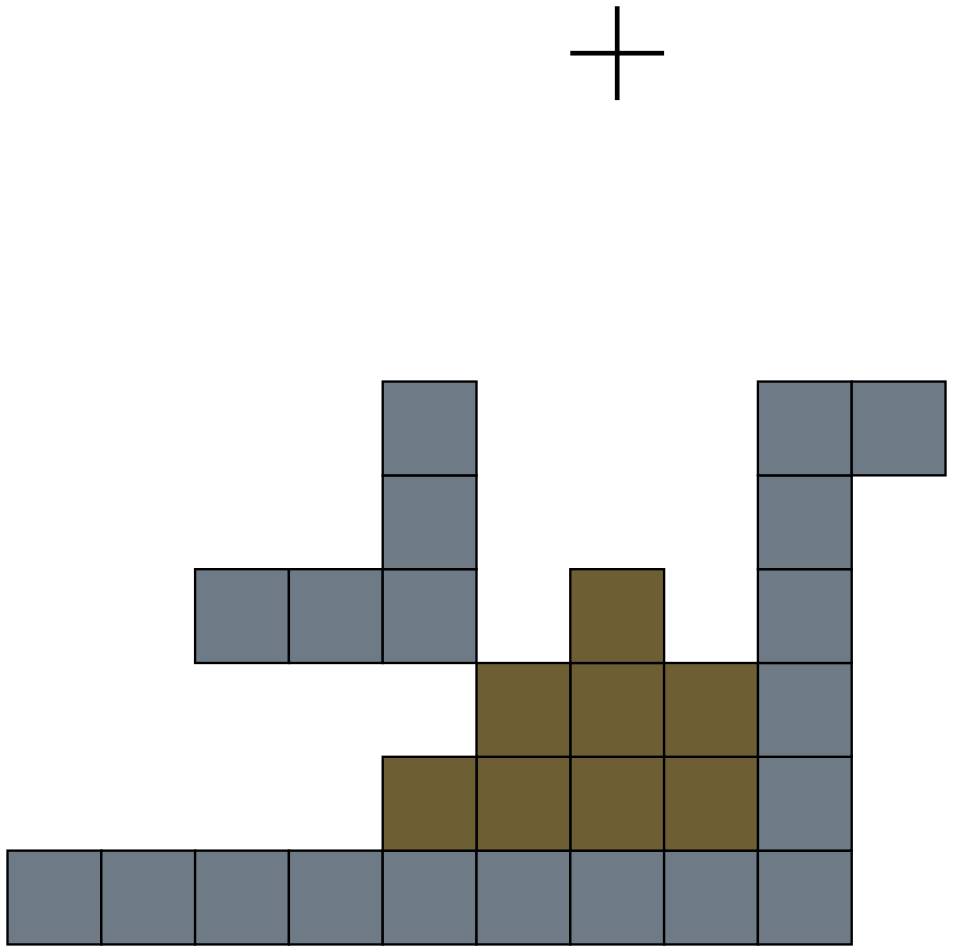


Problem Example



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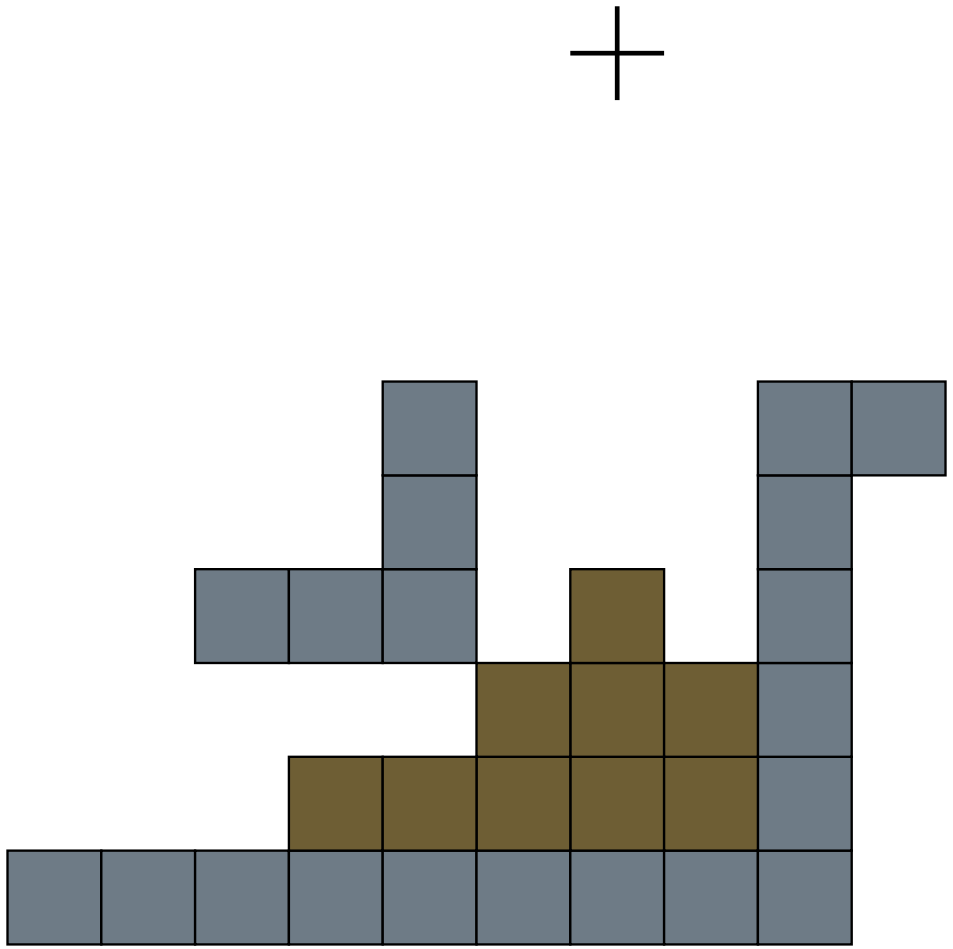

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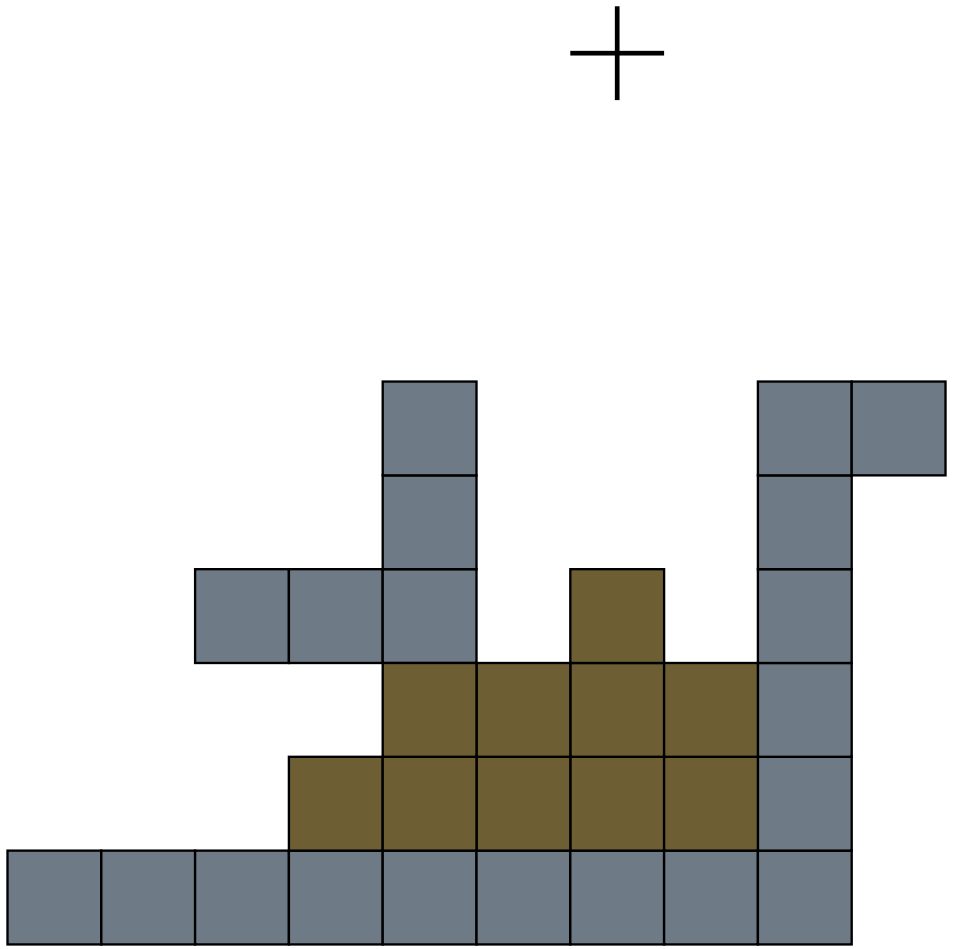

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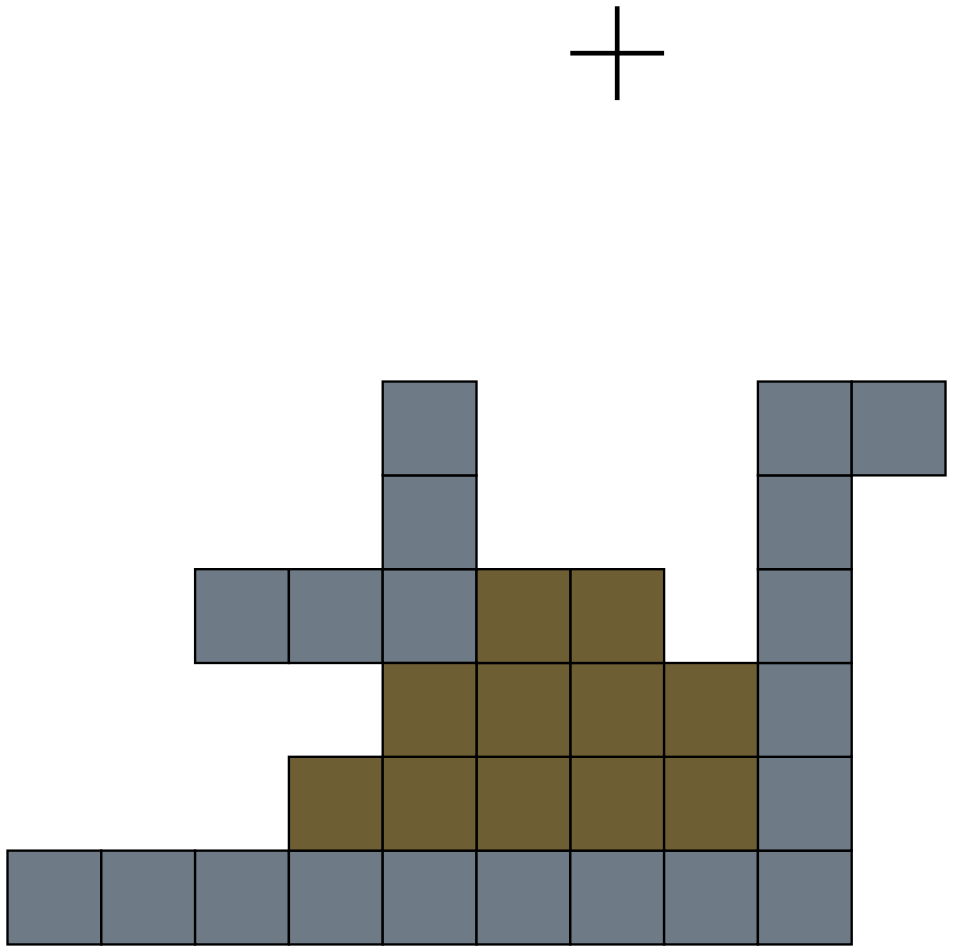
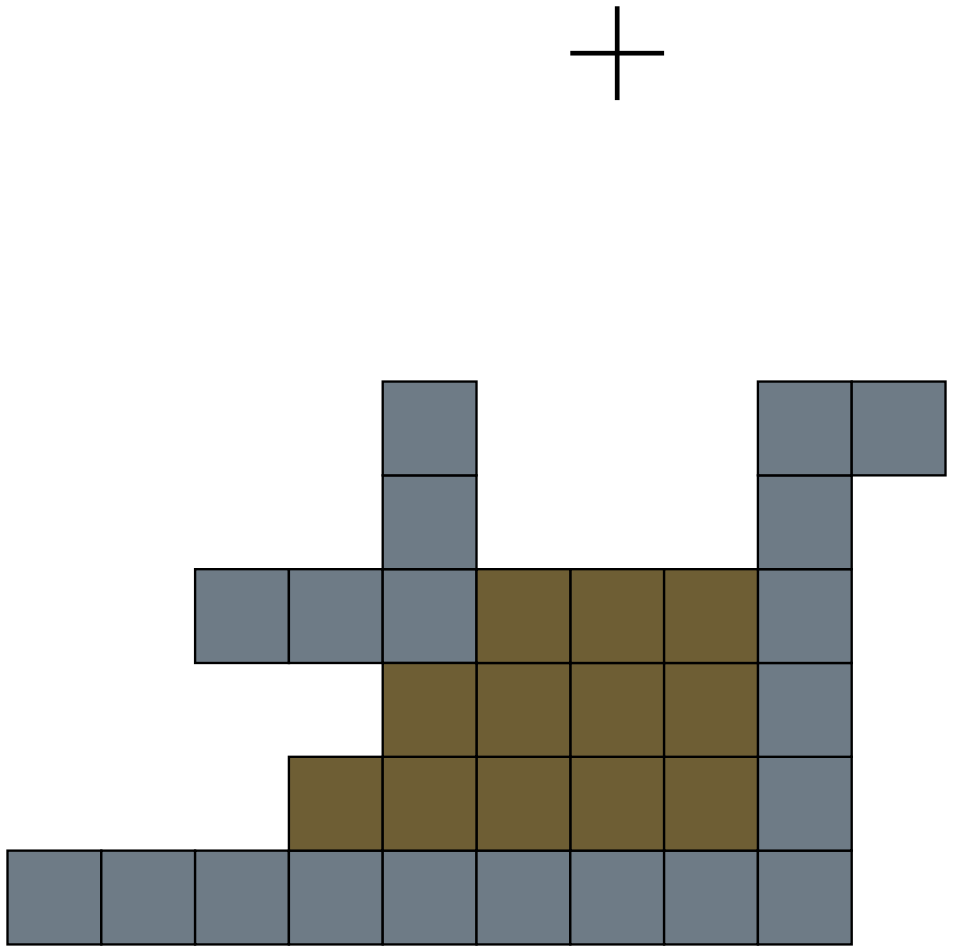


Problem Example



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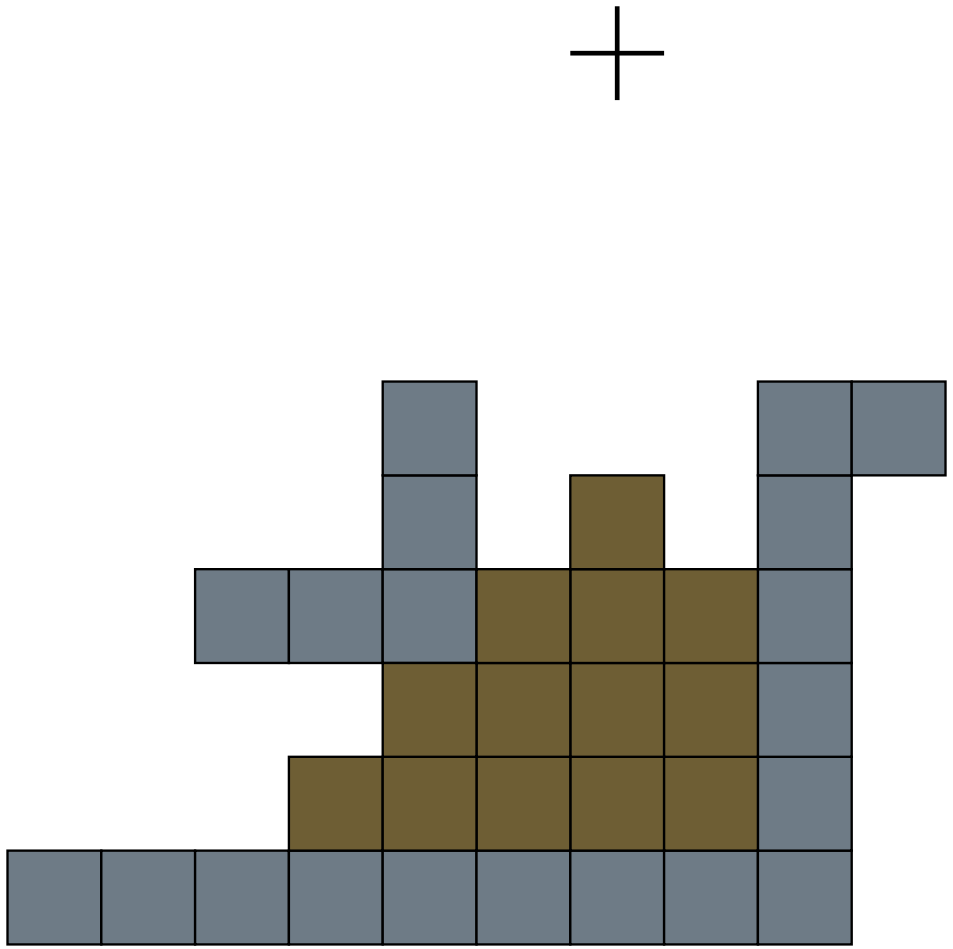

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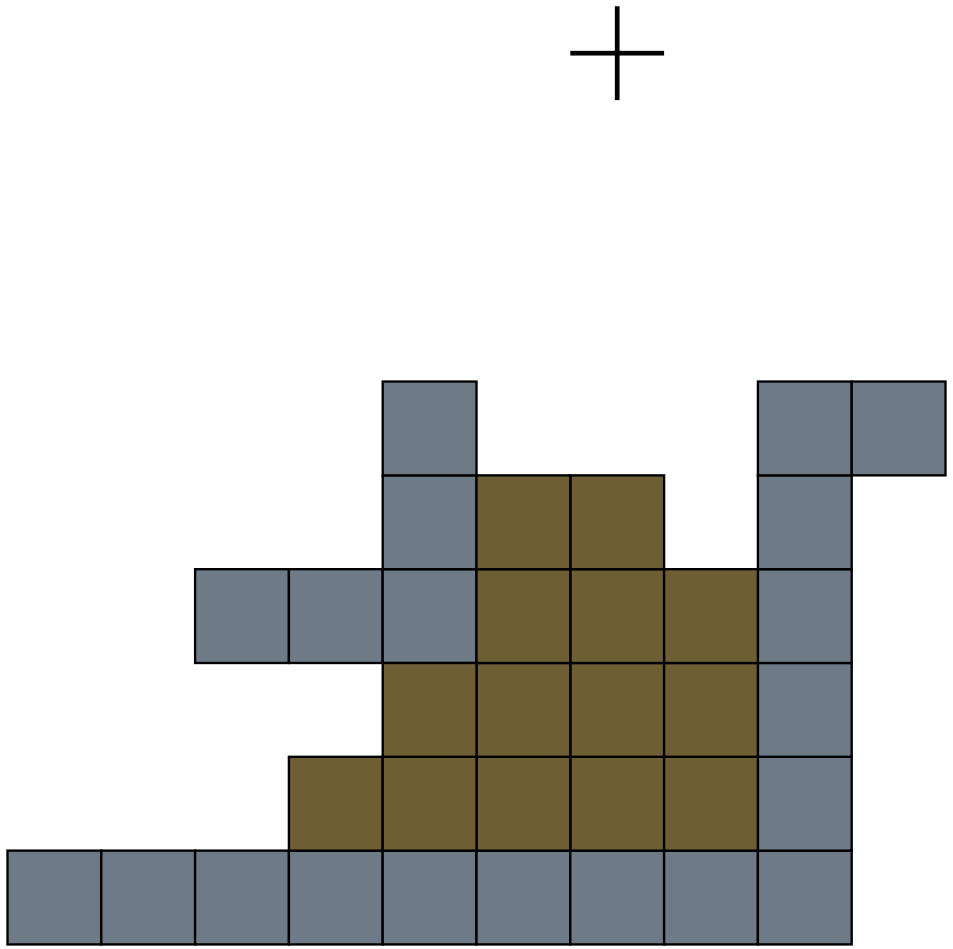

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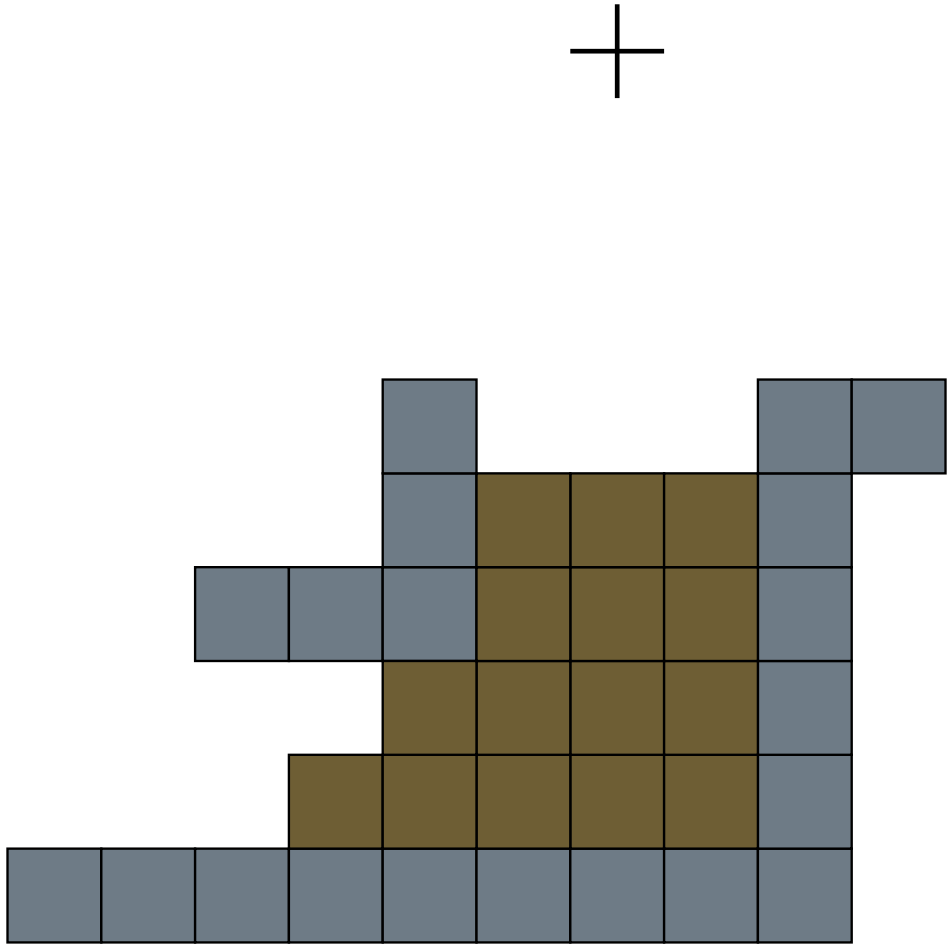

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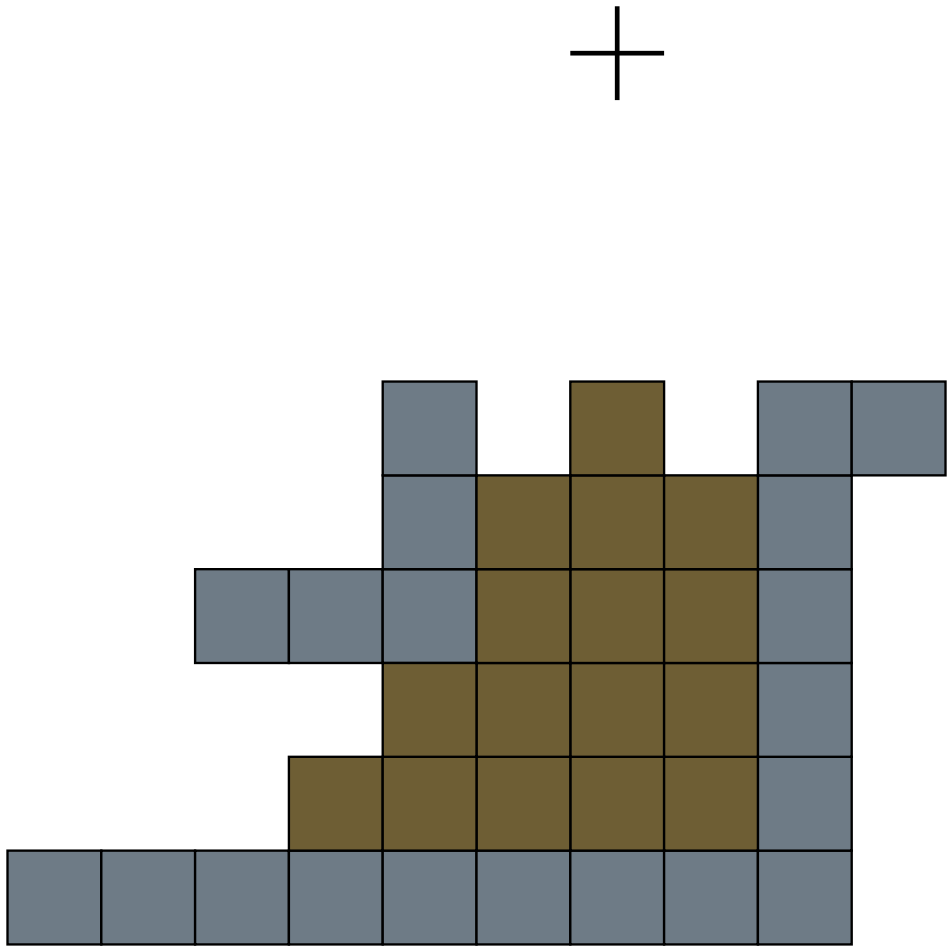

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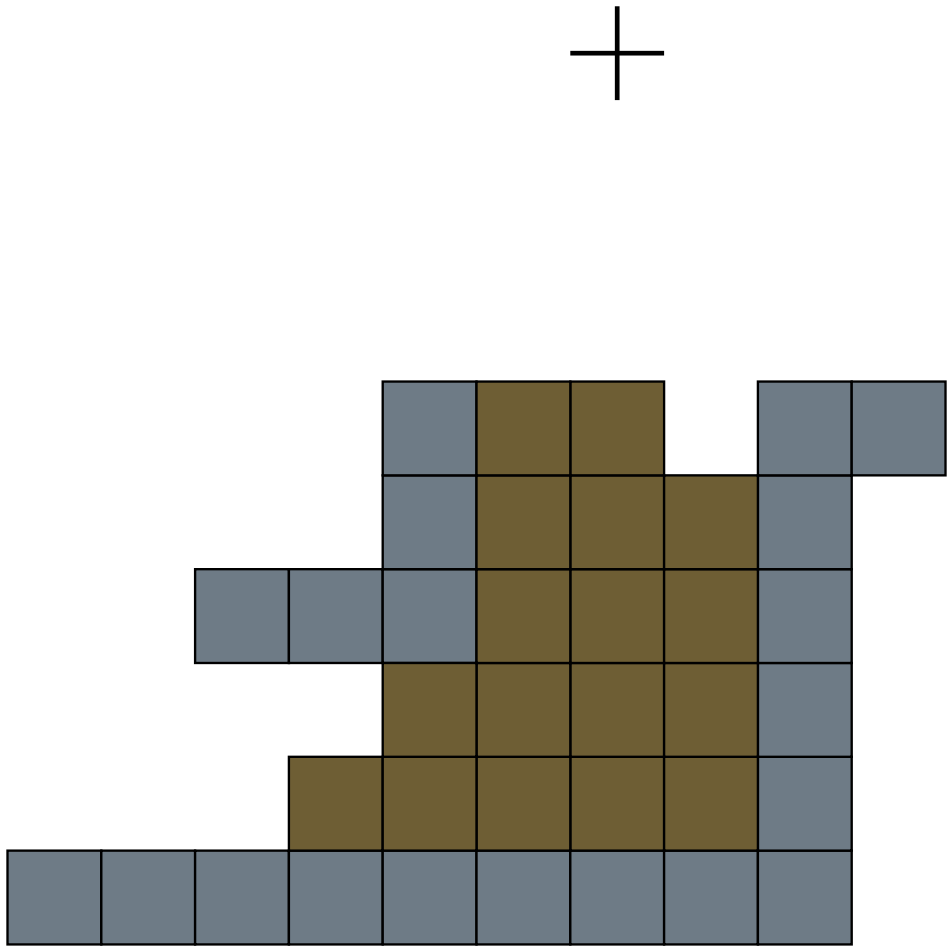

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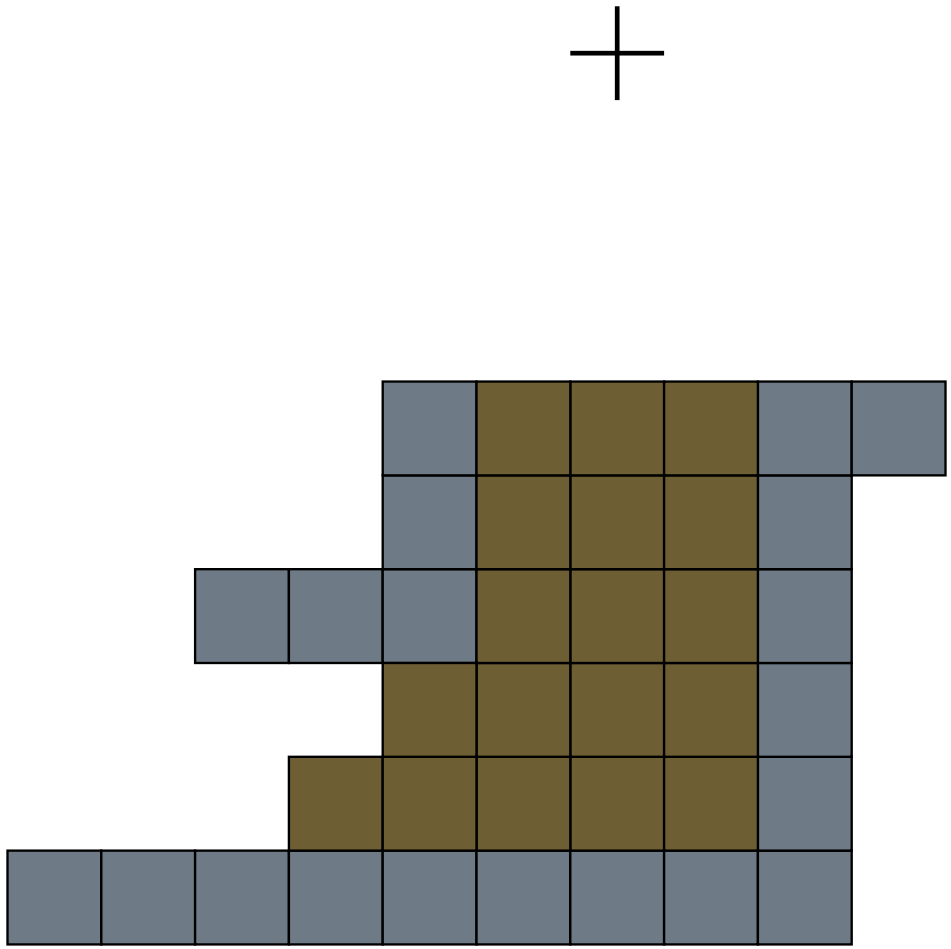

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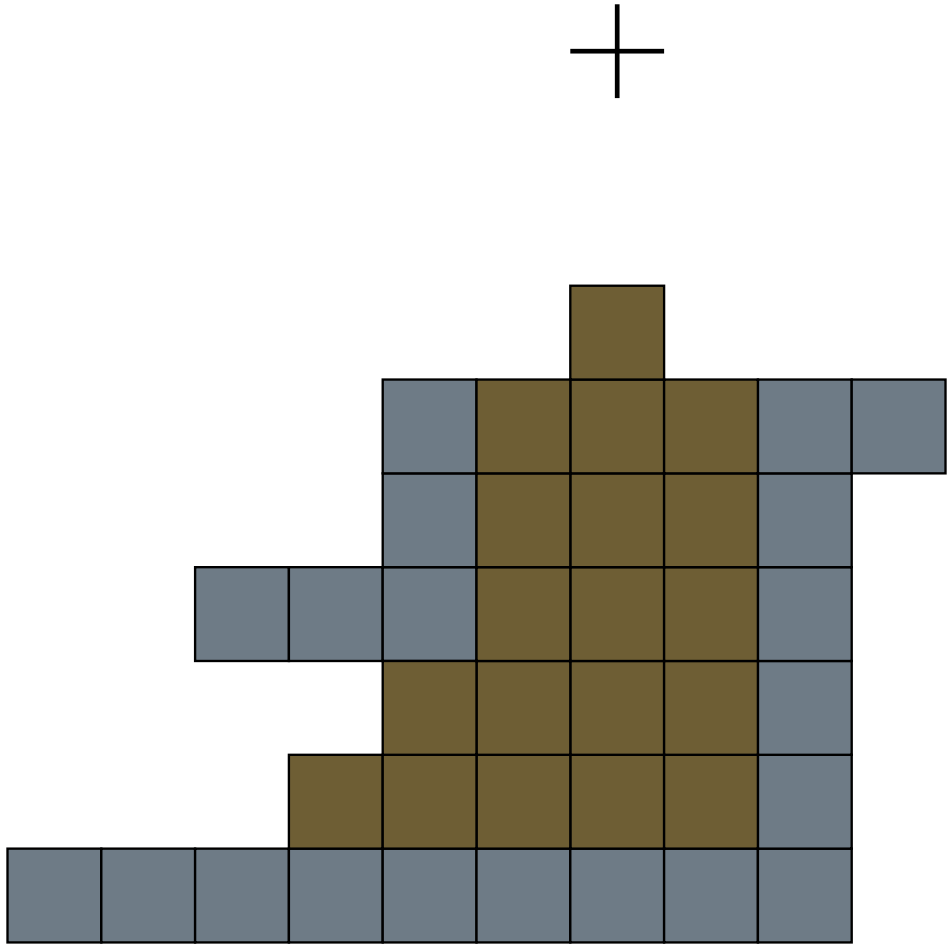

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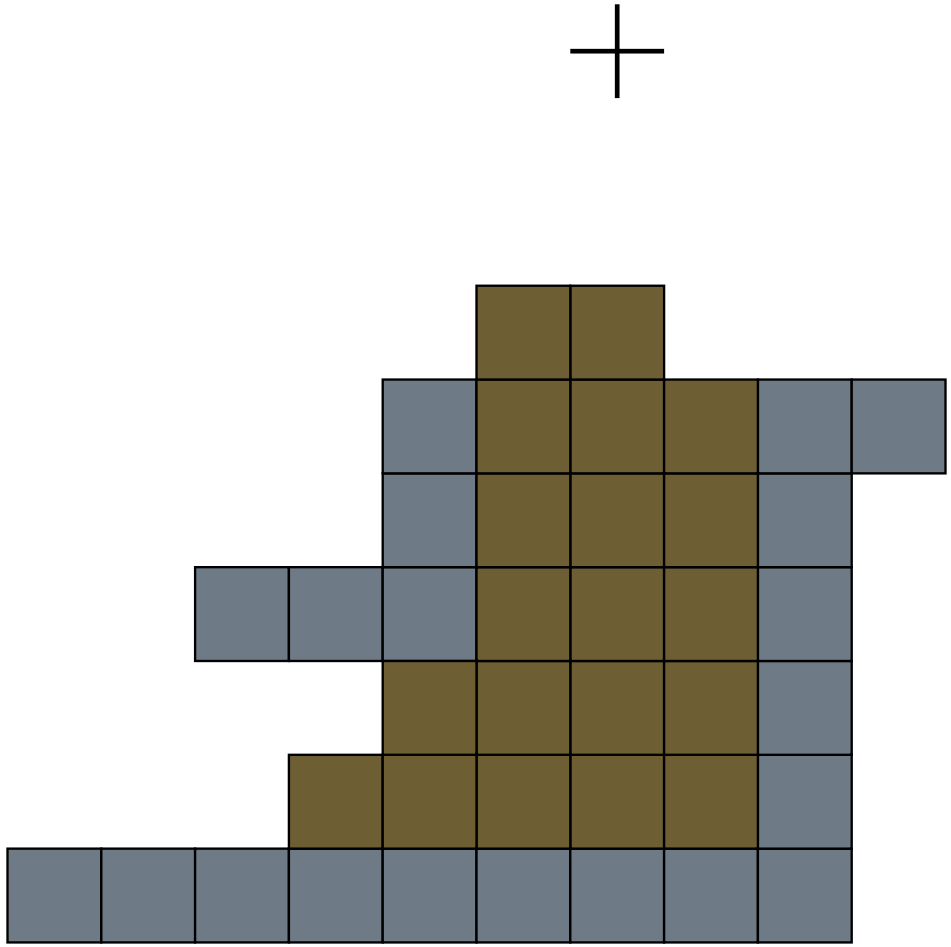

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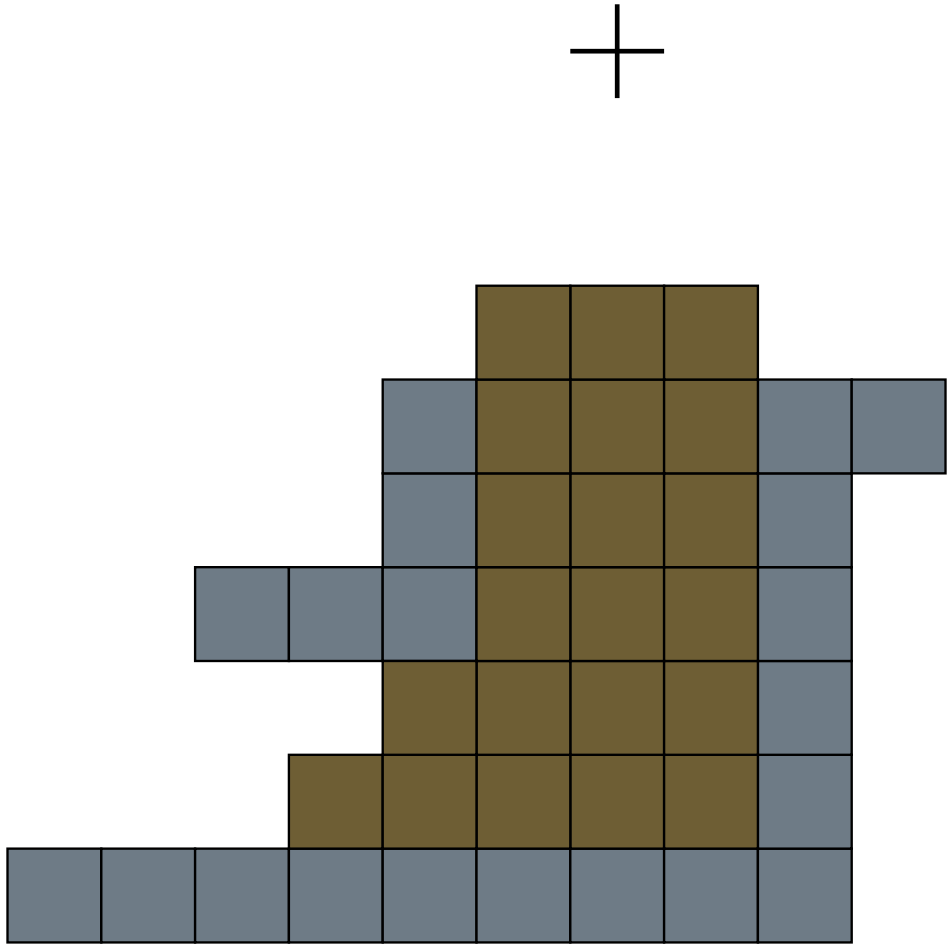

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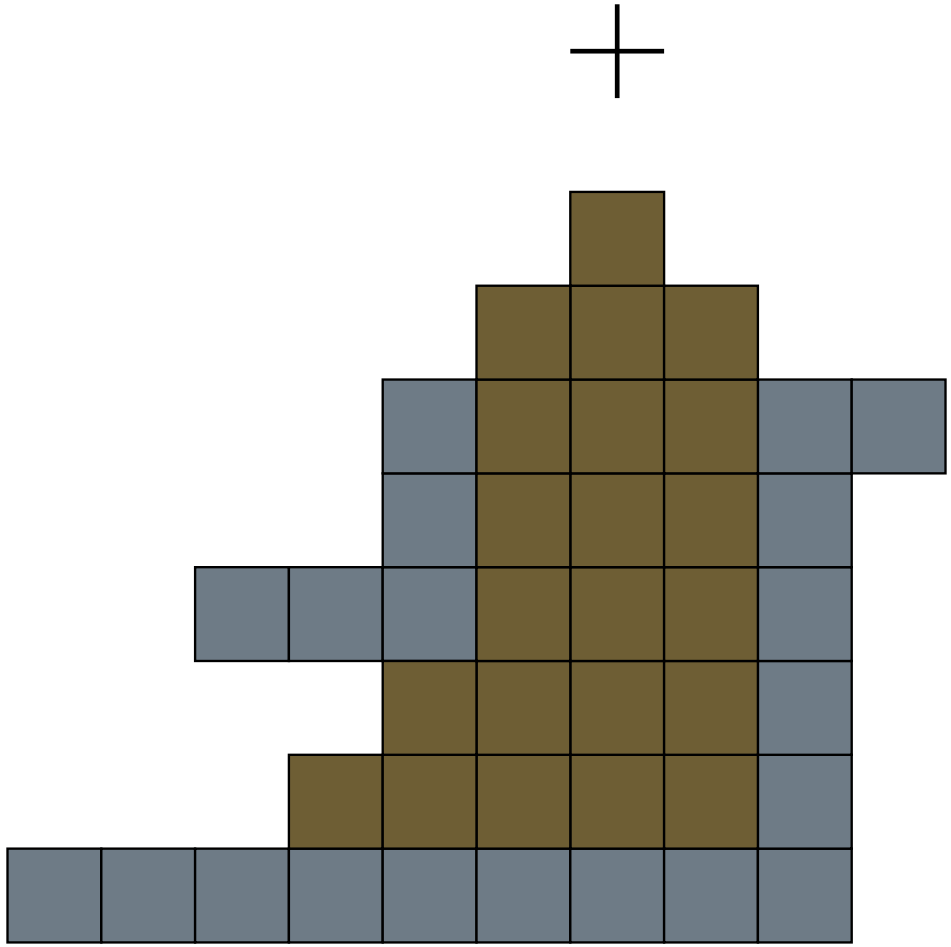

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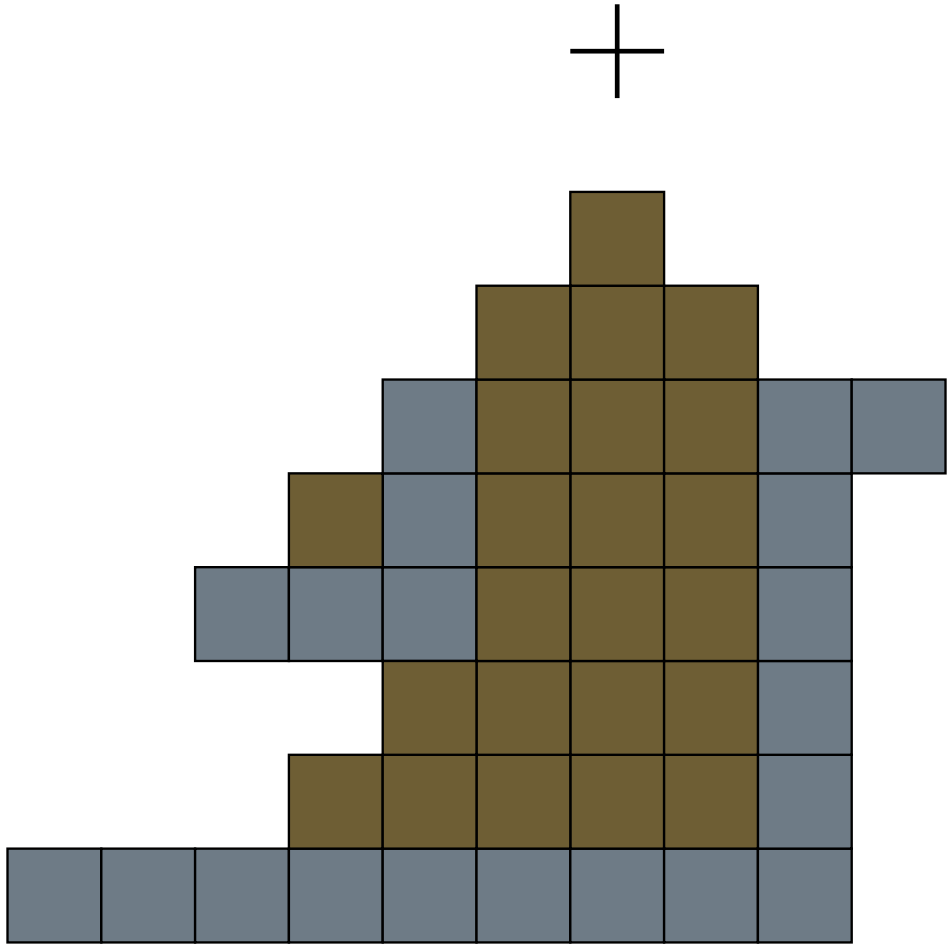

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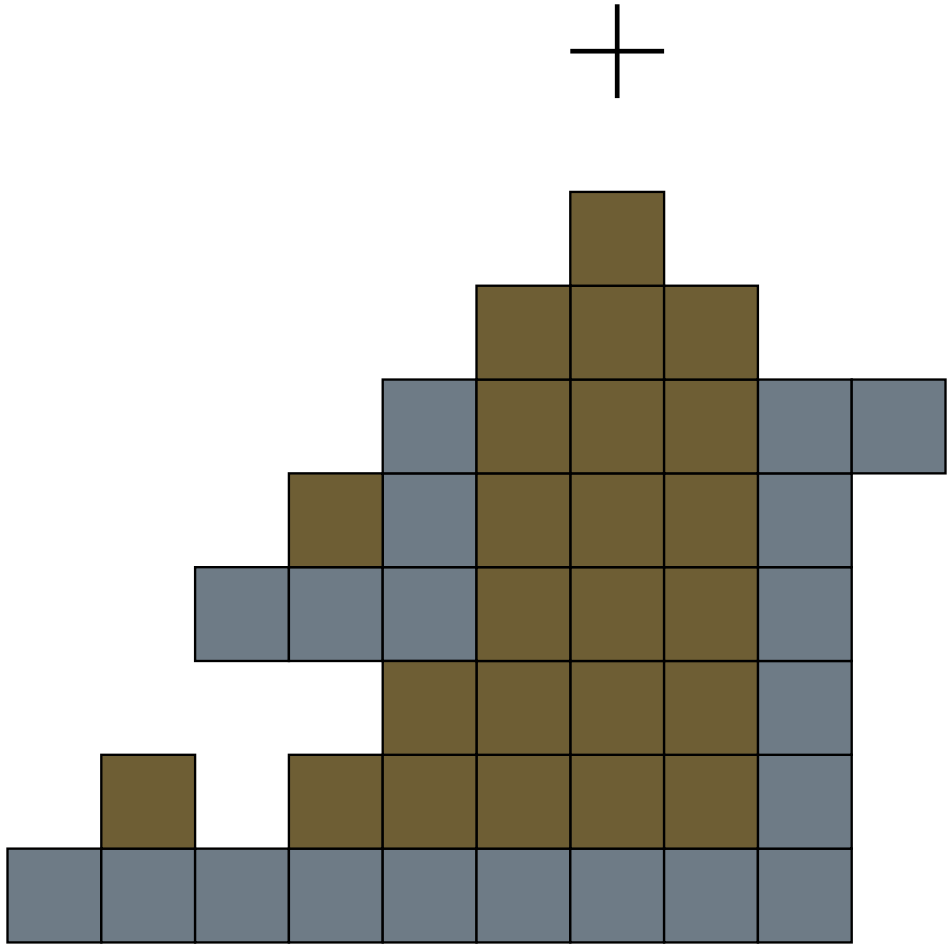

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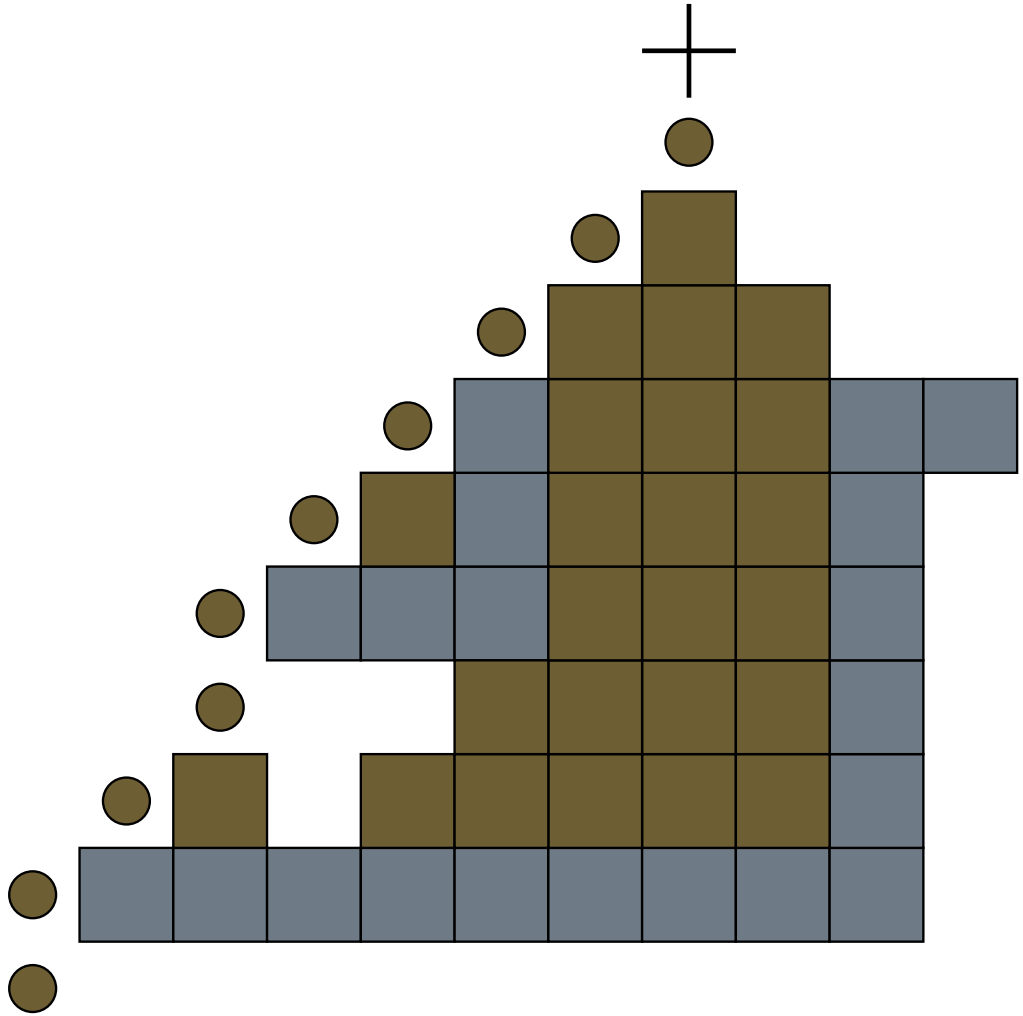
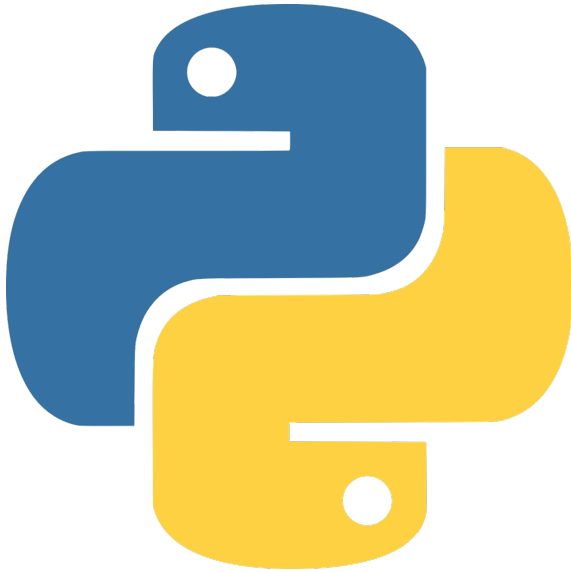


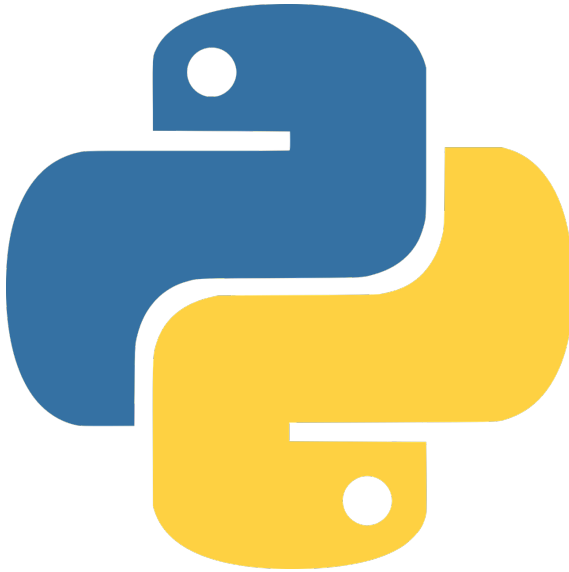
Programming Language

- ease of use



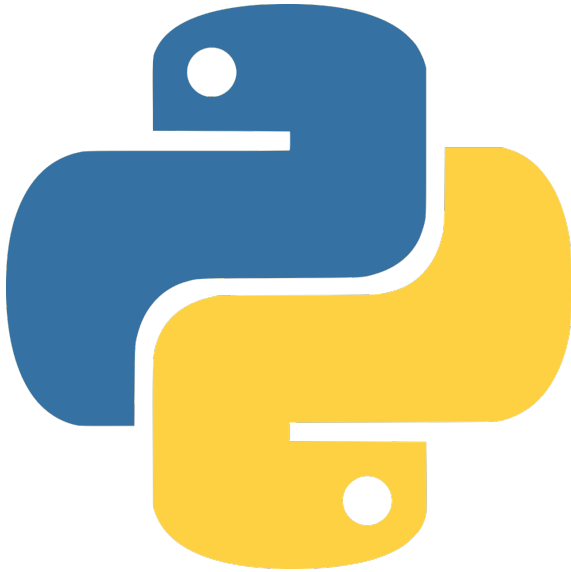
Programming Language

- ease of use
- no runtime or memory constraints



Programming Language

- ease of use
- no runtime or memory constraints
- me being proficient in the language



Input Details

```
498,4 -> 498,6 -> 496,6
503,4 -> 502,4 -> 502,9 -> 494,9
```

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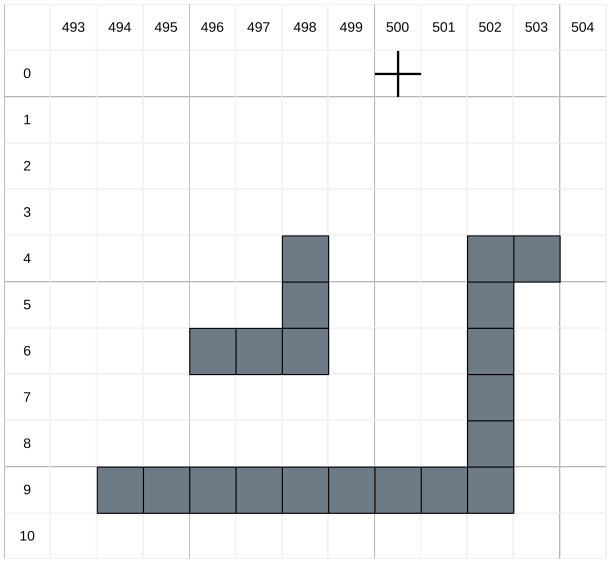
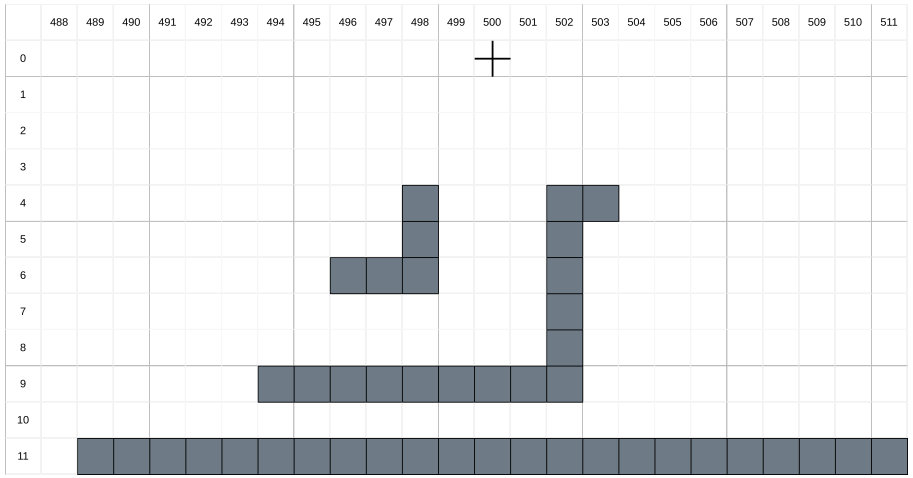
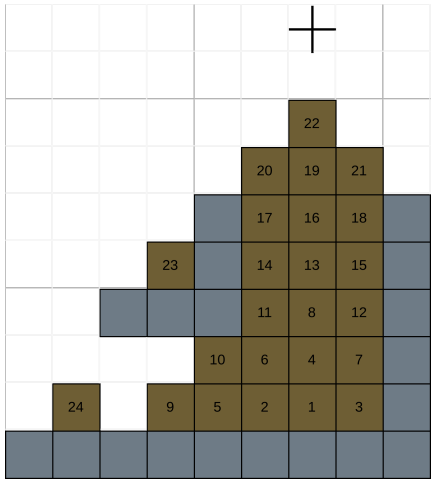
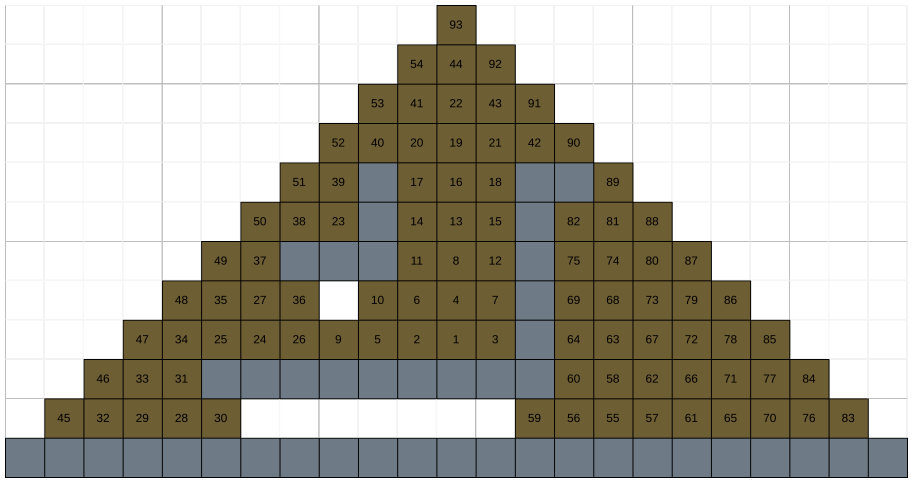
```
498,4 -> 498,6 -> 496,6
503,4 -> 502,4 -> 502,9 -> 494,9
```



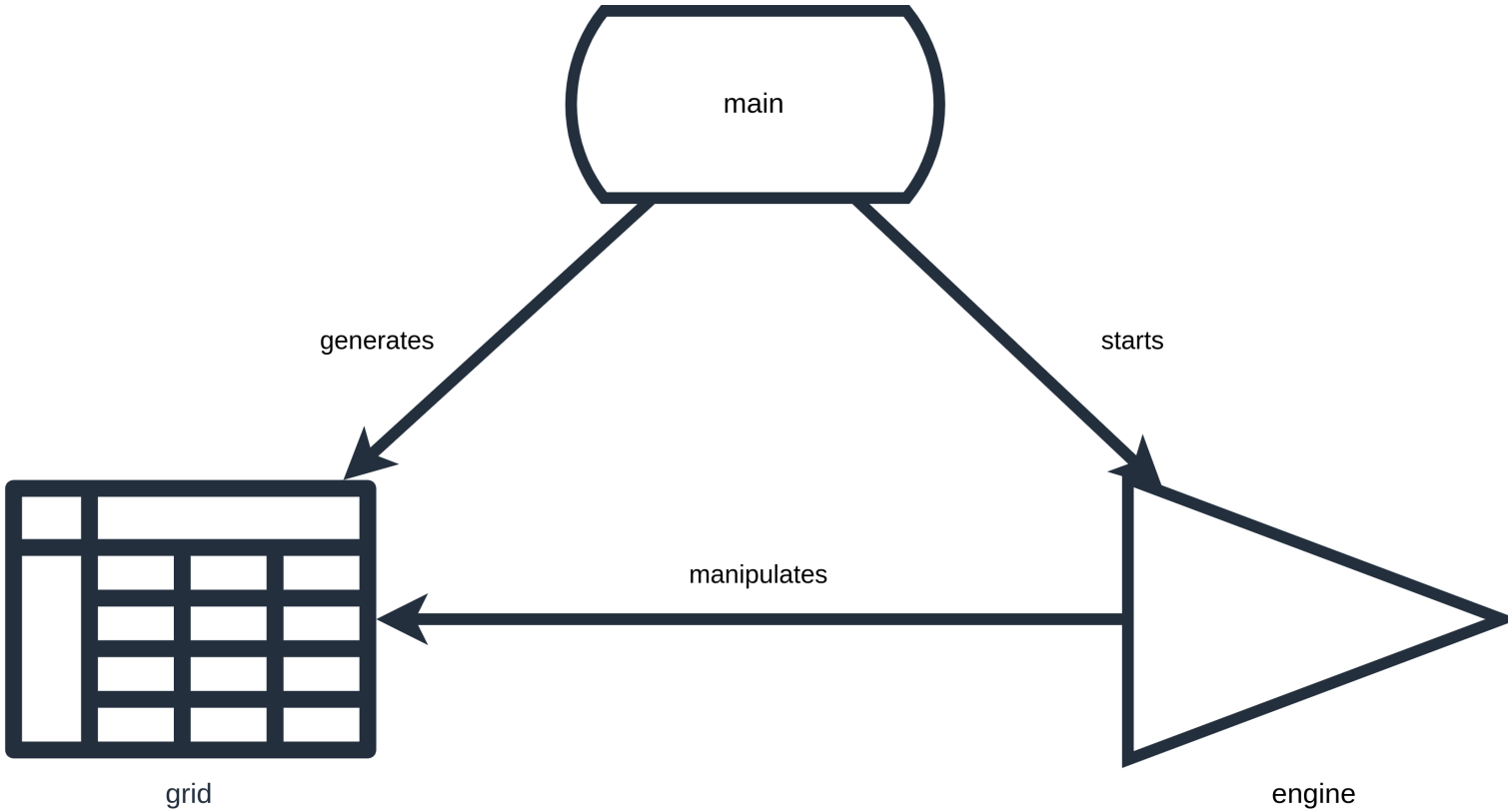


Output Details





Solution Approach



Code Example

```
num = 0
while True:
  sand = (500, 0)
  while True:
    if self.grid.is_air_at(Coordinate((sand[0], sand[1] + 1))):
      sand = (sand[0], sand[1] + 1)
    elif self.grid.is_air_at(Coordinate((sand[0] - 1, sand[1] + 1))):
      sand = (sand[0] - 1, sand[1] + 1)
    elif self.grid.is_air_at(Coordinate((sand[0] + 1, sand[1] + 1))):
      sand = (sand[0] + 1, sand[1] + 1)
    else:
      self.grid.add(Object((Material.solid_sand, Coordinate(sand))))
      break
    if sand[1] >= self.grid.get_last_row() + 1:
      if not part2:
        return num
      self.grid.add(Object((Material.solid_sand, Coordinate(sand))))
      break
  num += 1
  if sand == (500, 0):
    return num
```

Live Demo

Key Takeaways & Outlook

- rock structure is created using the input coordinates

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- rock structure is created using the input coordinates
- dynamically calculate the number of sand
- adjust grid to be optimized for memory or computational performance
- render falling sand