Collections, Part Two

Announcements

- Sections announced over email and room locations are now posted.
- Not in a section? Sign up for an open section at

http://cs198.stanford.edu/section

- Mac Users: We now have two versions of the starter files:
  - One version is purely for 10.7
  - The other version is for 10.6 and 10.8.
- When submitting, make sure to submit your .cpp source files, not the Xcode or Visual Studio project files!

Announcements

- Casual dinner for women studying CS **tonight** at 5:00PM at the Gates Patio.
- Everyone is welcome!
- RSVP through link sent out last Friday, or by visiting

http://bit.ly/casualcsdinner

she++

Vector

Vector

- The **`Vector`** is a collection class representing a list of things.
  - Similar to Java's `ArrayList` type.
- Probably the single most commonly used collection type in all programming.

Example: Cell Tower Purchasing

Buying Cell Towers

137 42 95 272 52

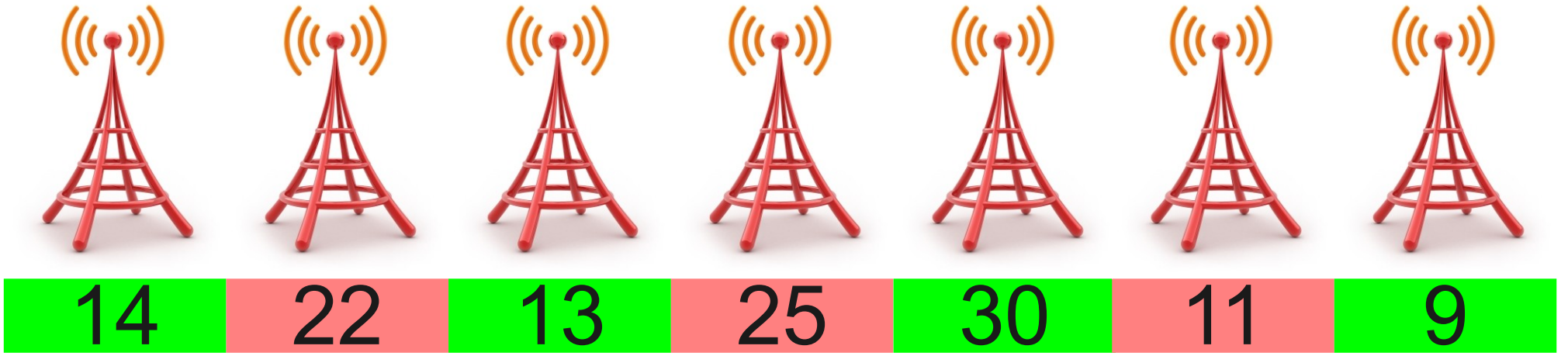
Buying Cell Towers

137	42	95	272	52

Buying Cell Towers

14 22 13 25 30 11 9

Buying Cell Towers



Buying Cell Towers

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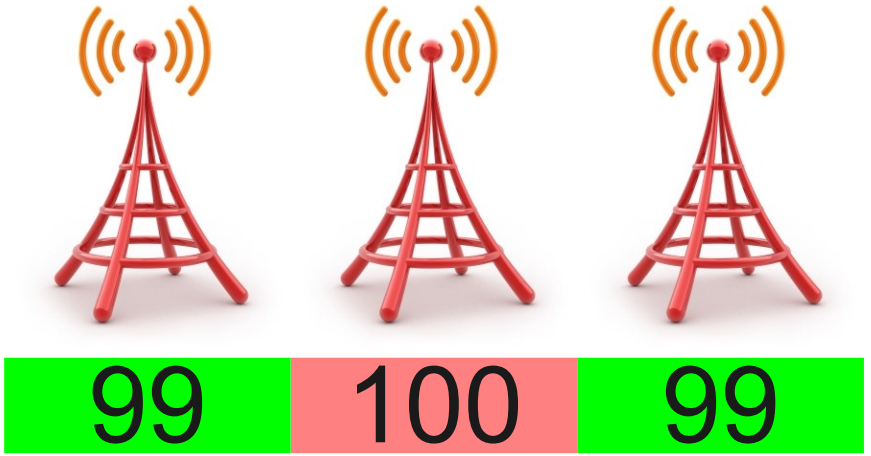
Buying Cell Towers



Given the populations of each city, what is the largest number of people you can provide service to?

Pass-by-Reference and Objects

- Recall: In C++, *all* parameters are passed by value unless specified otherwise.
- When using container types (**`Stack`**, **`Vector`**, etc.) it is often useful to use pass-by-reference for efficiency reasons.
  - Takes a *long* time to make a copy of a large collection!







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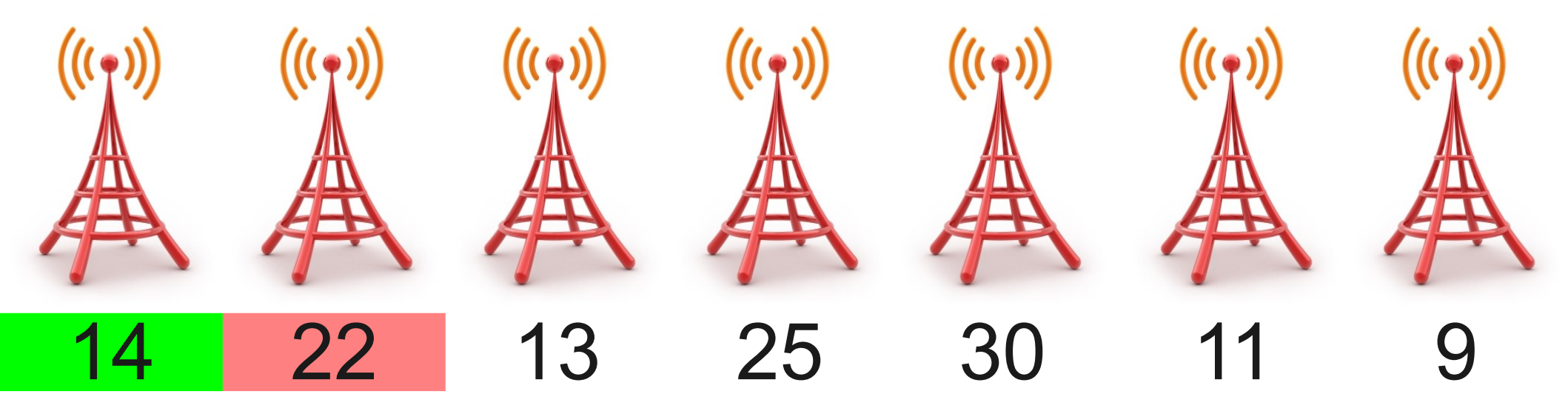
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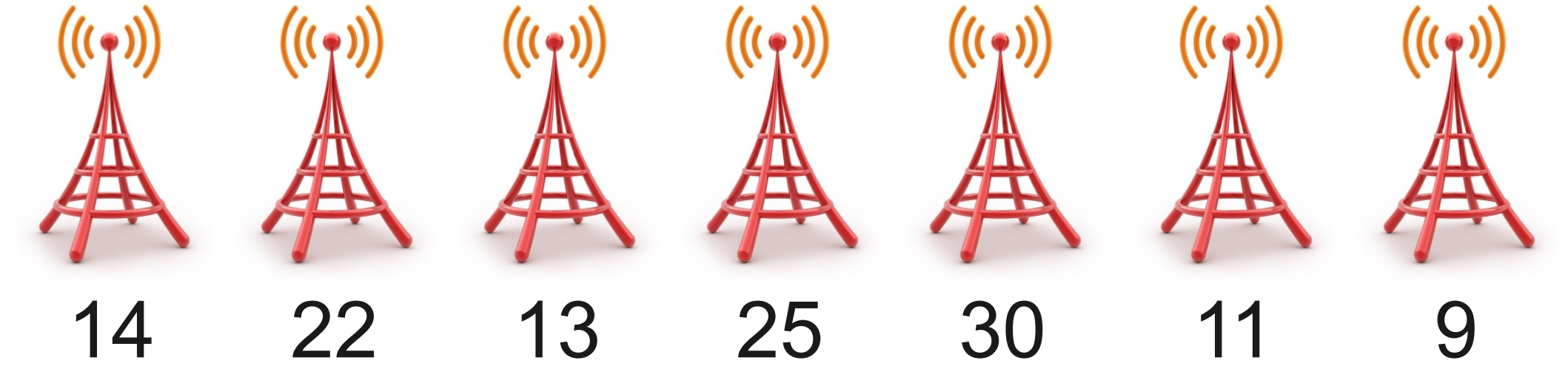
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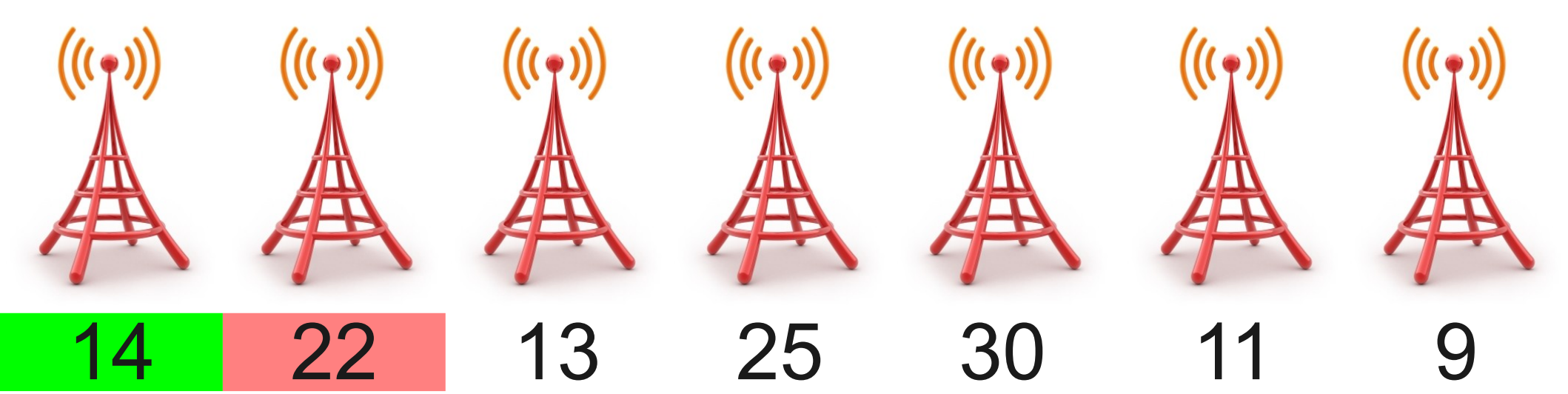
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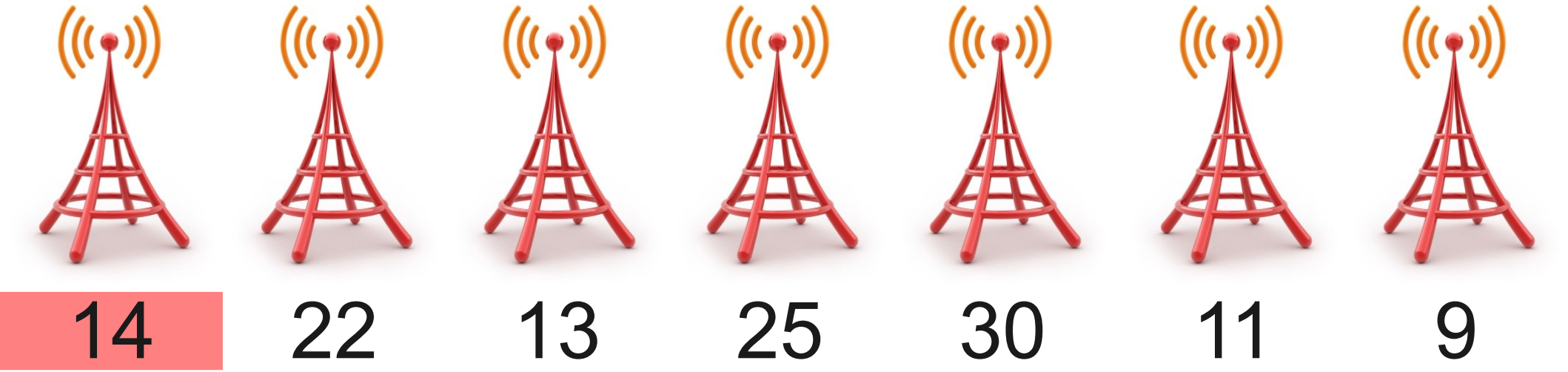
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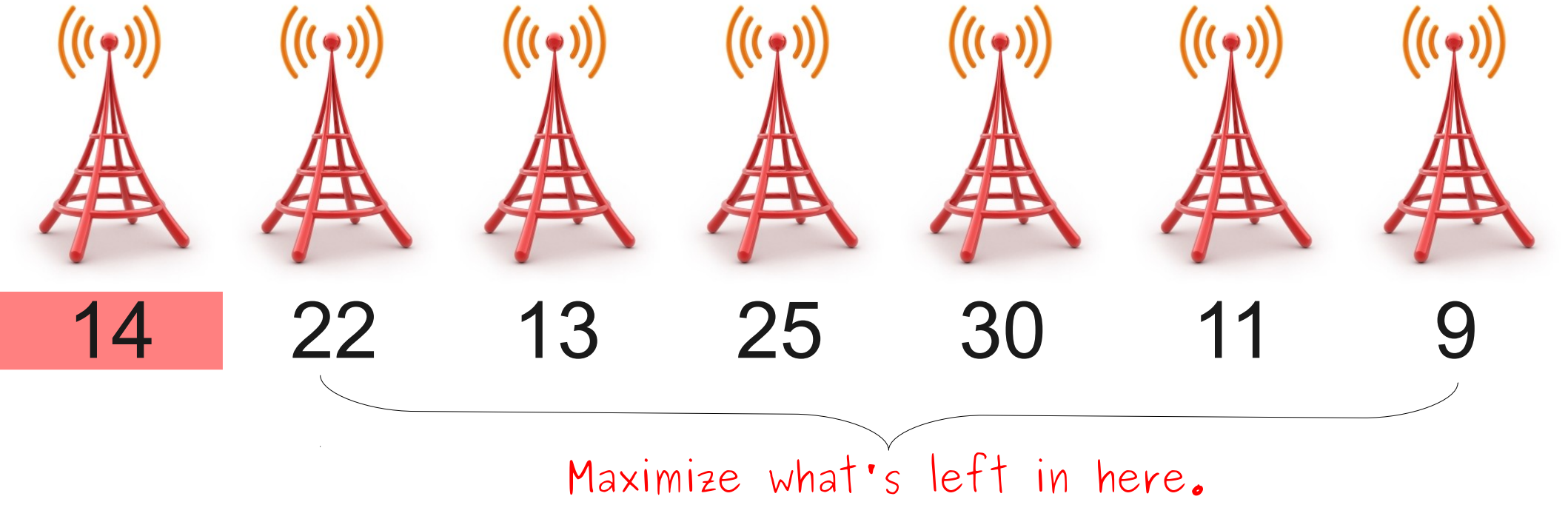
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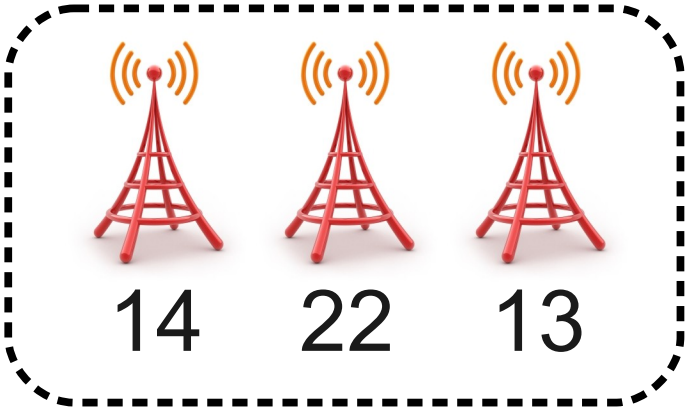
How the Recursion Works



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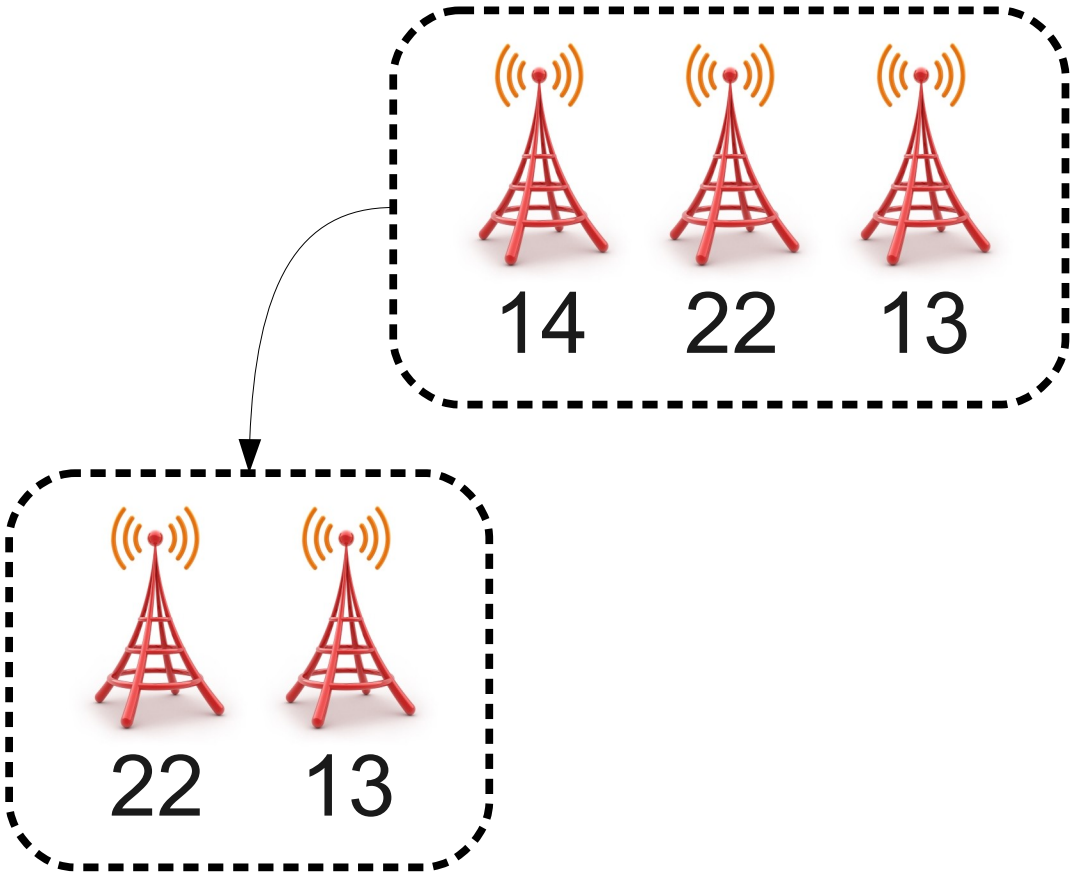

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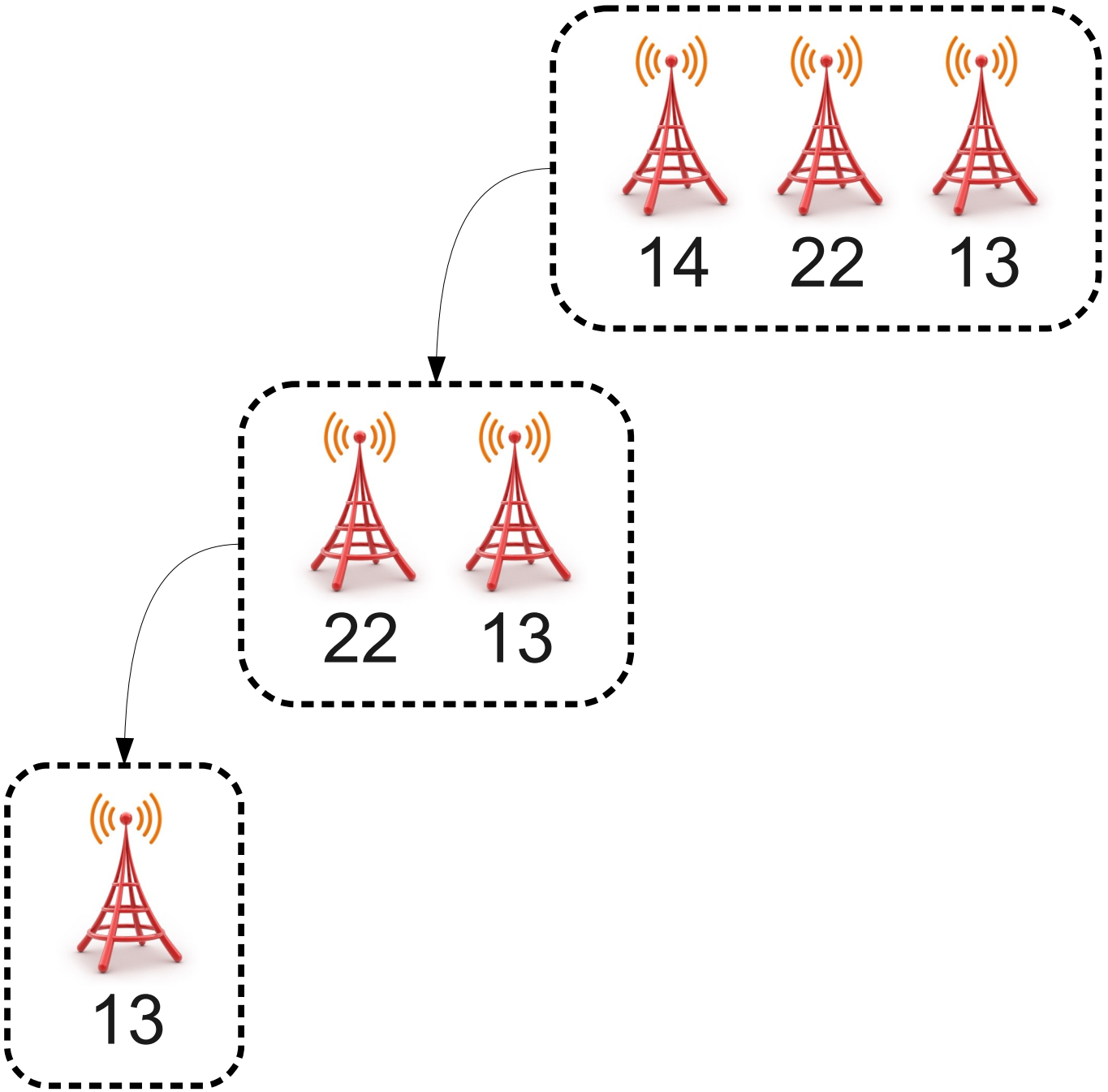

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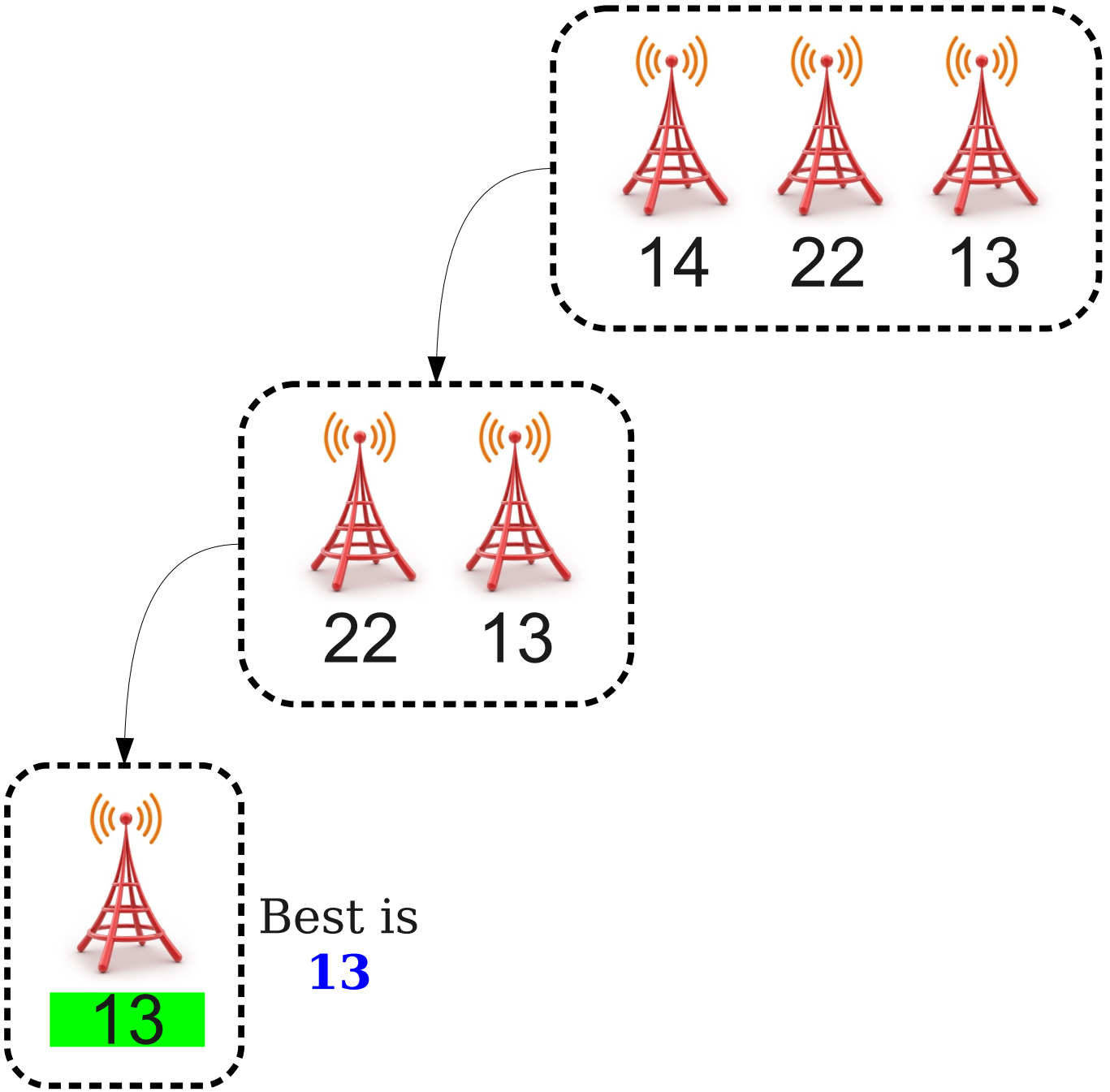

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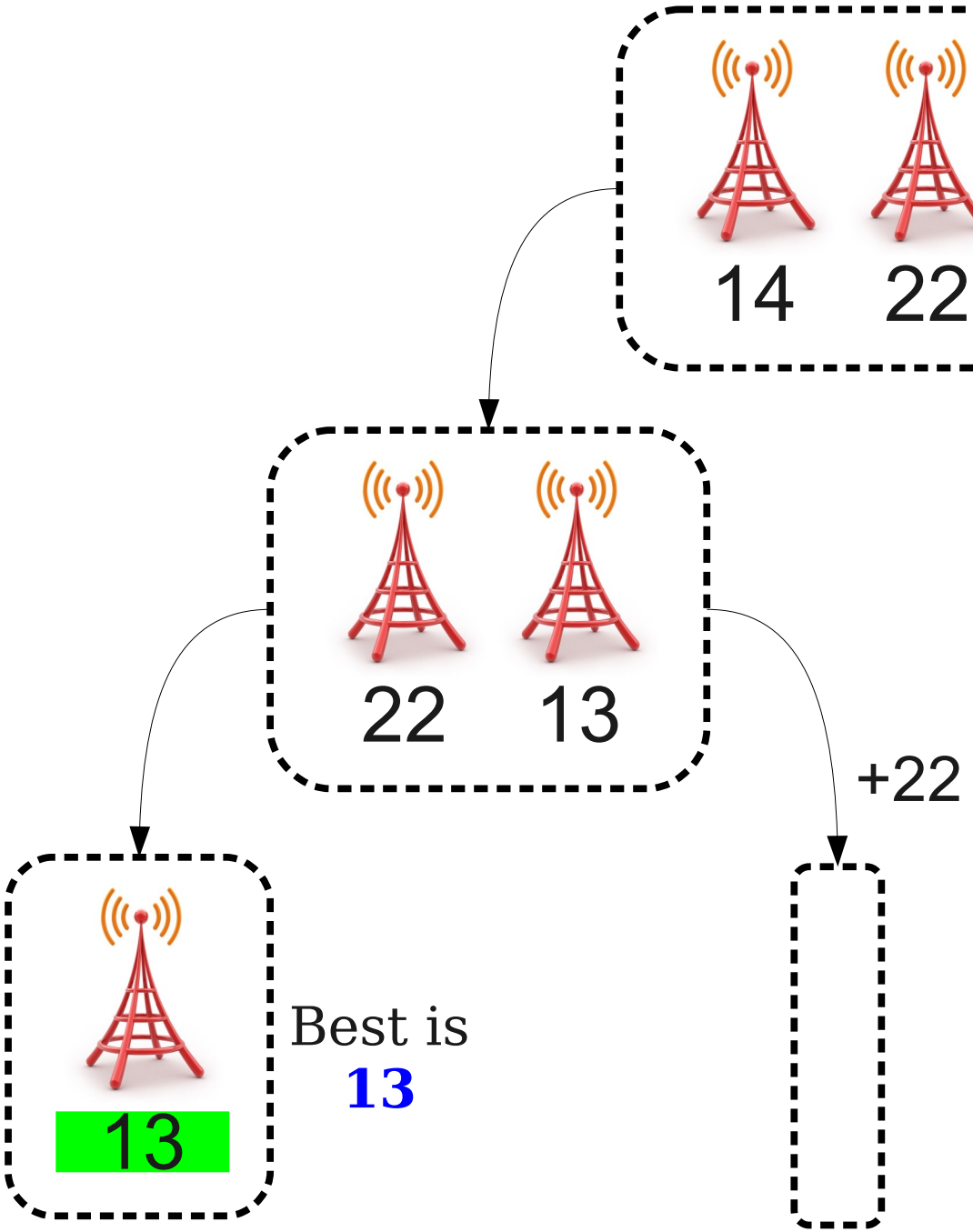

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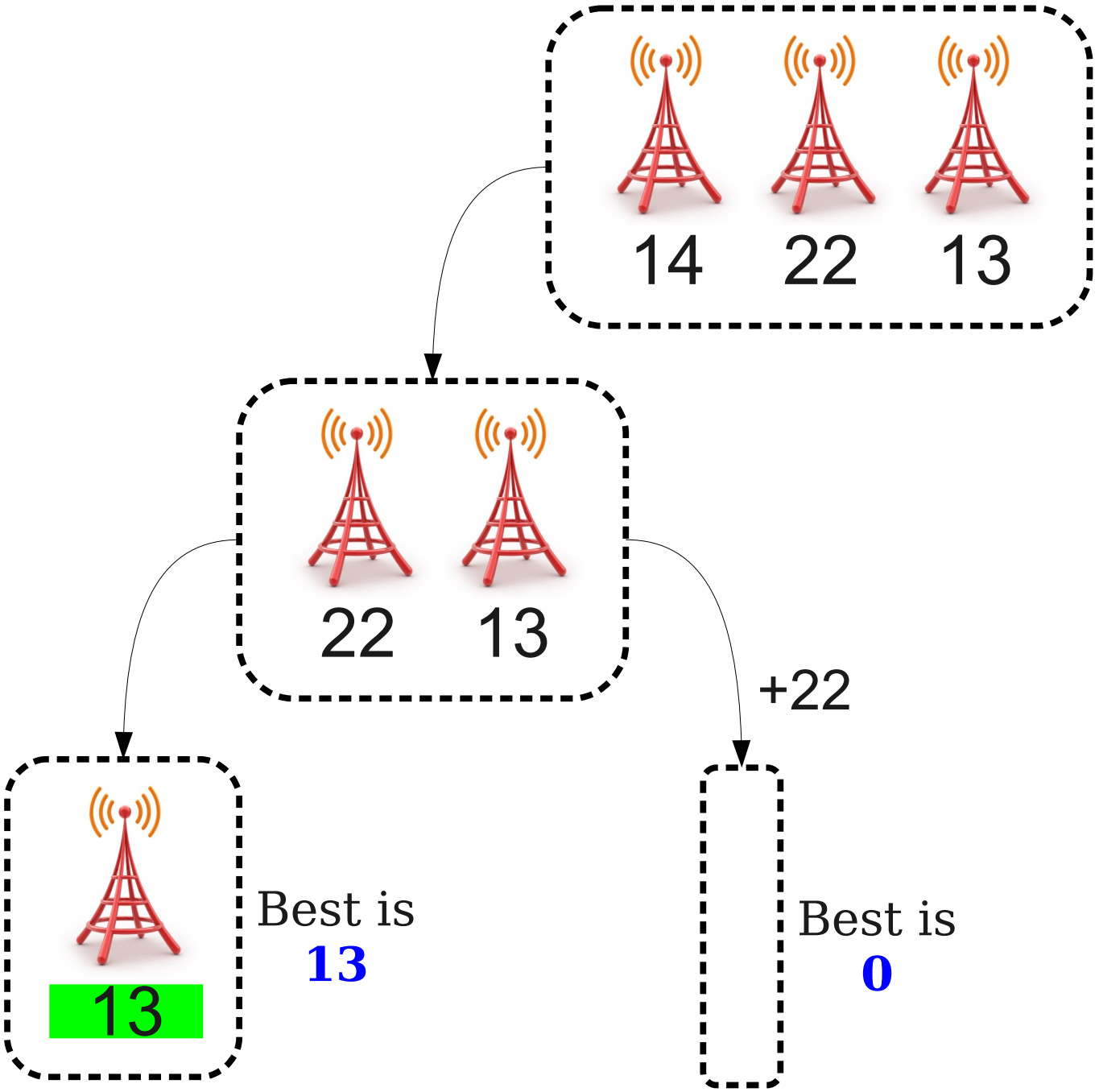

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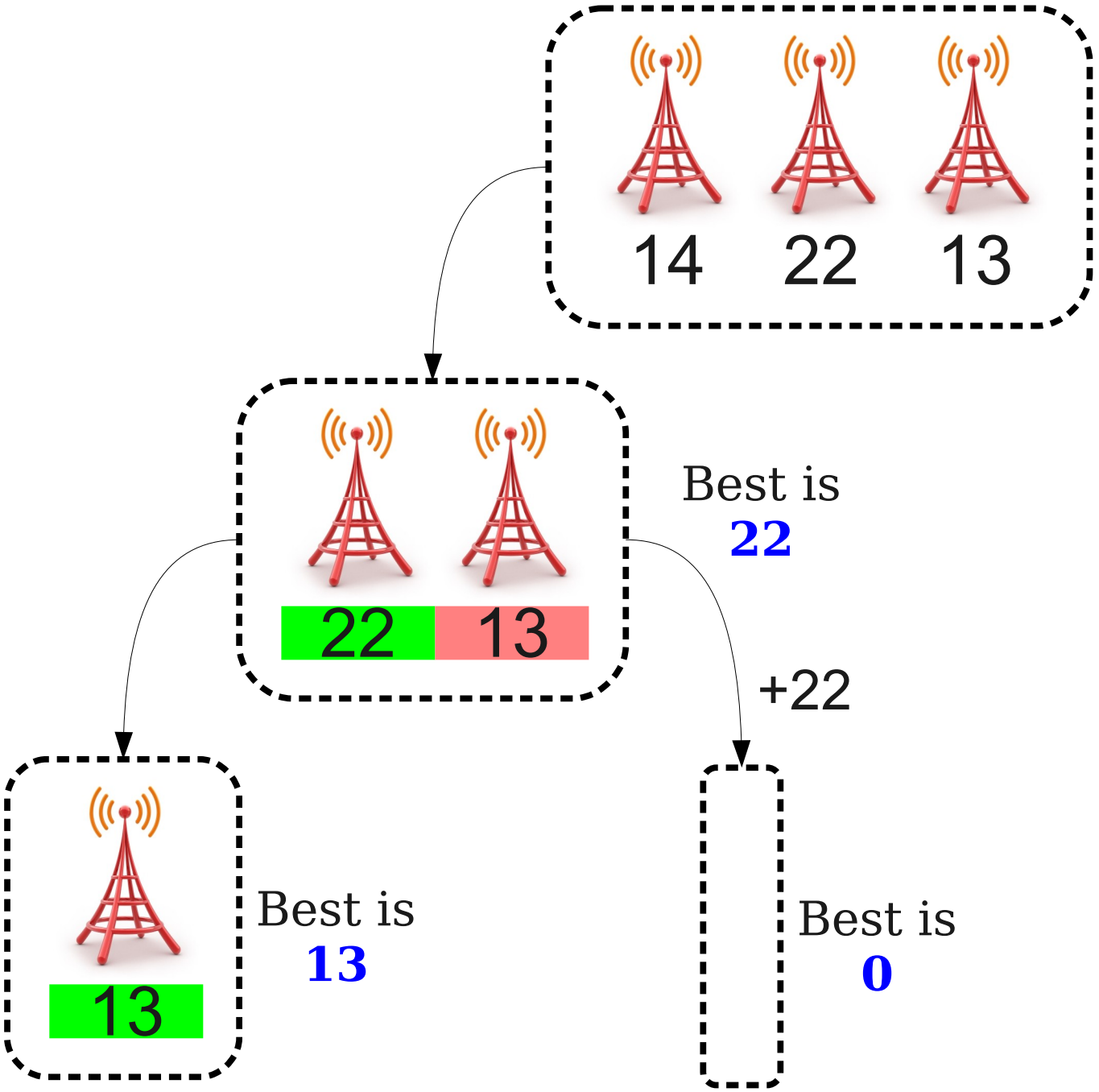

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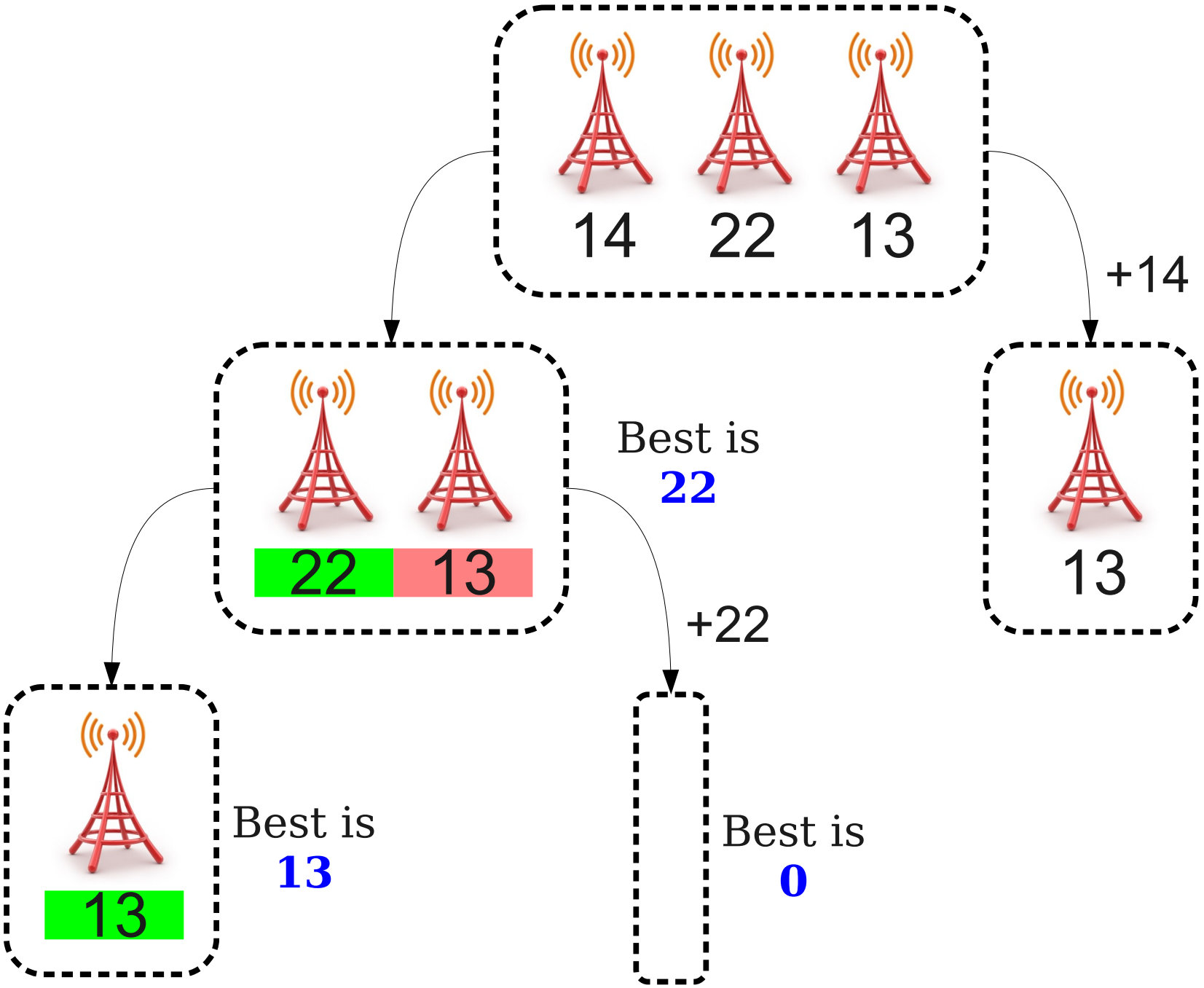

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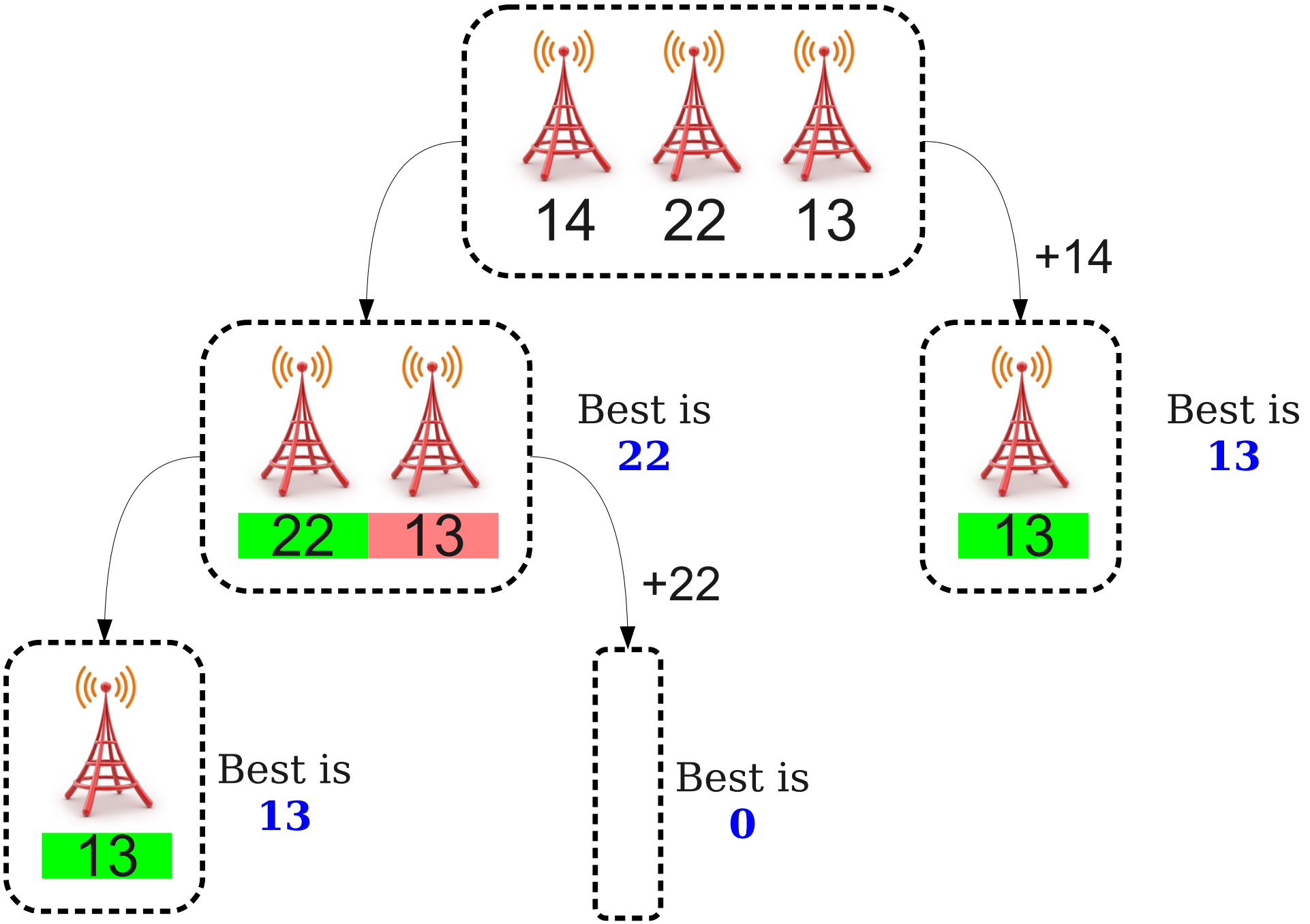

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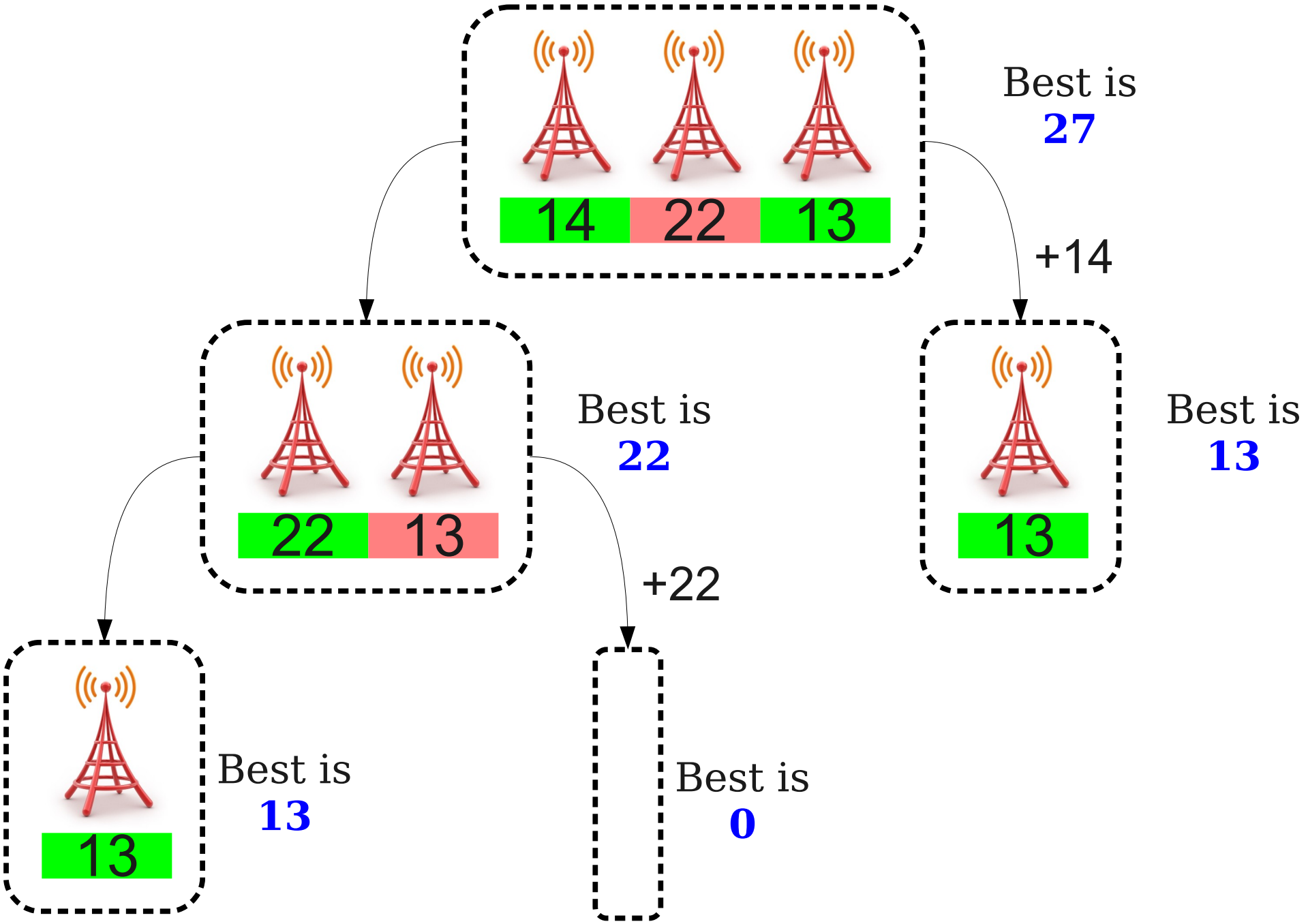

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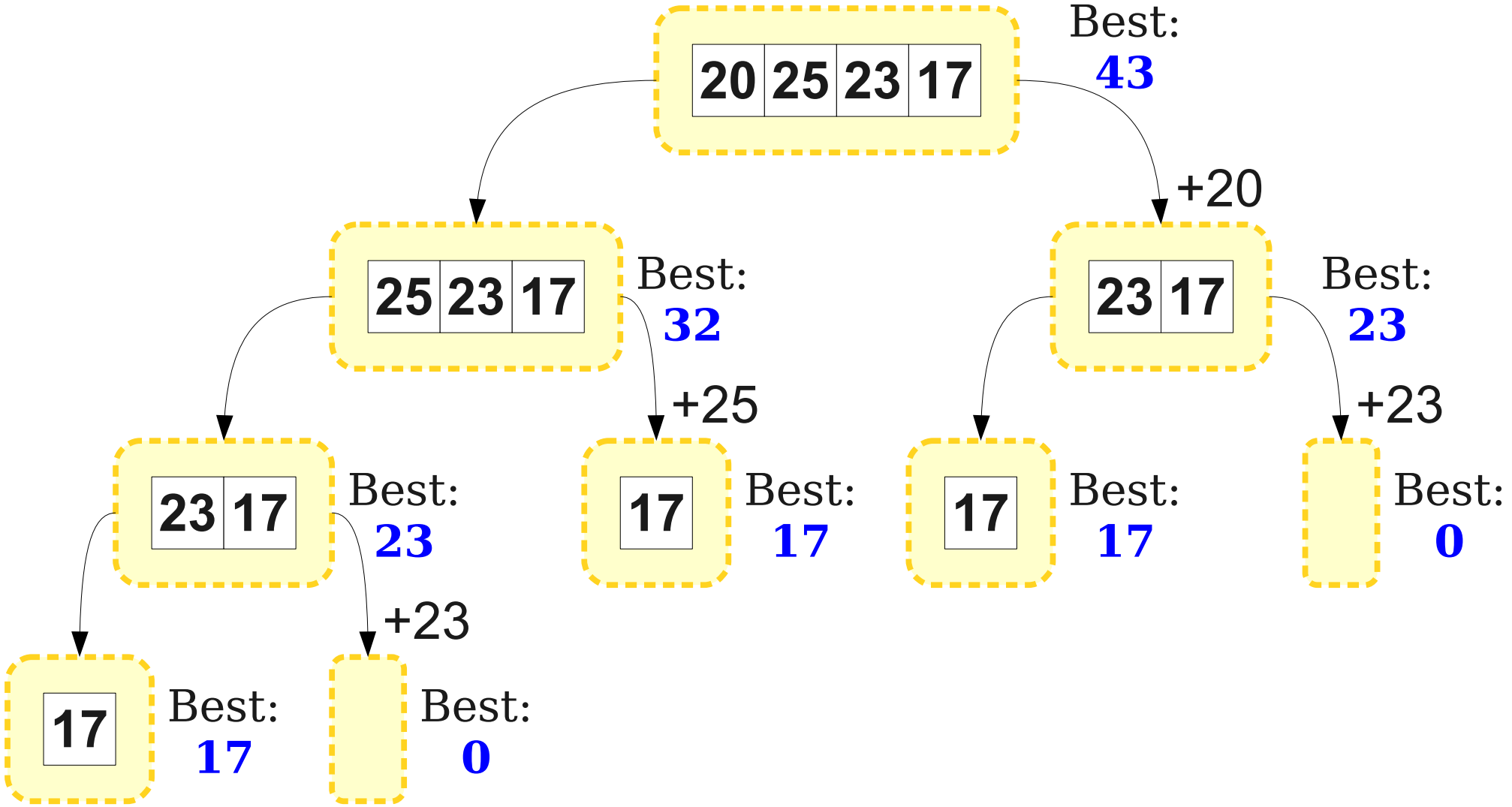

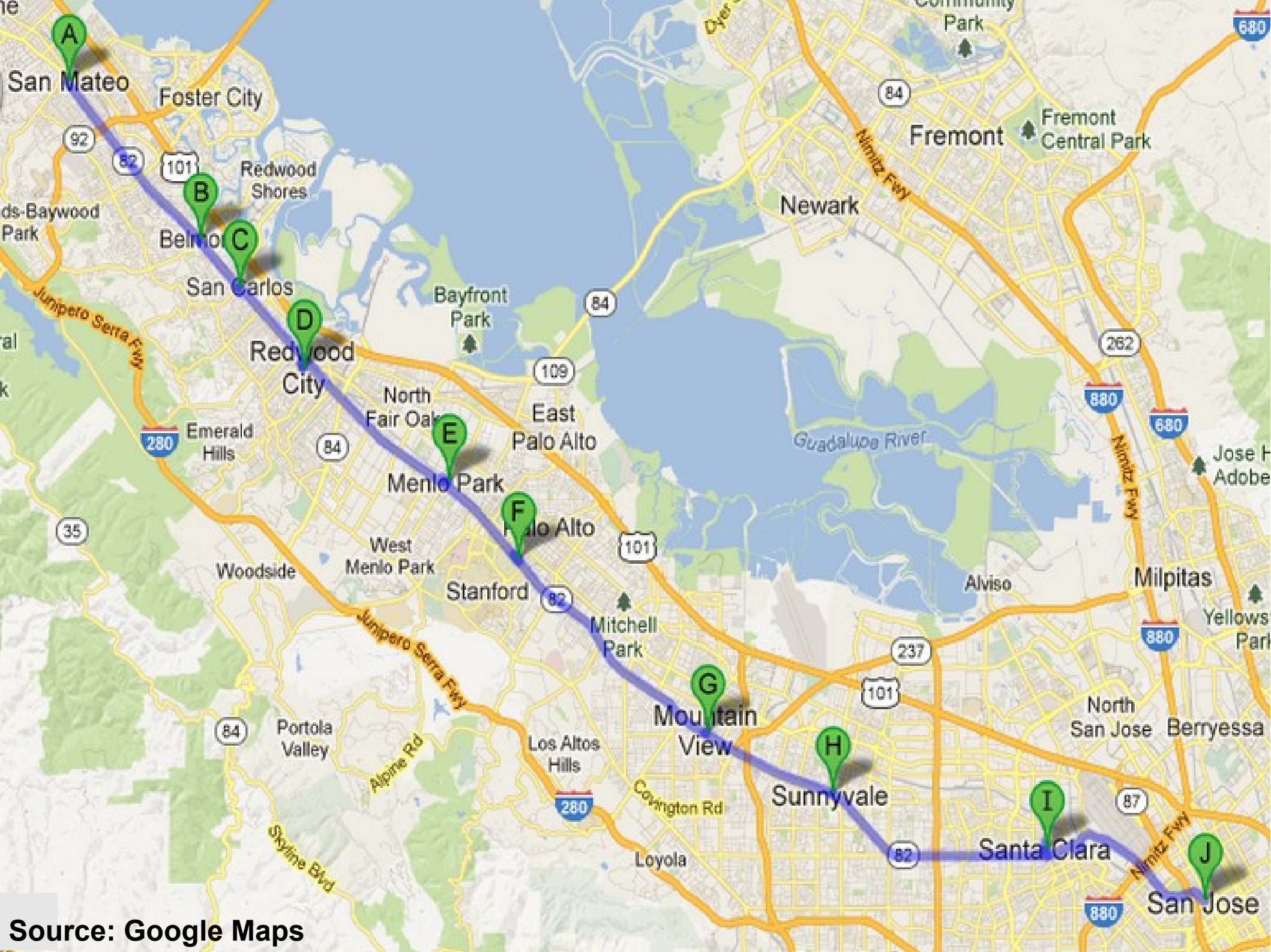

Source: Google Maps

Grid

Two-Dimensional Data

- The **`Grid`** type can be used to store two-dimensional data.
  - e.g. matrices, scrabble boards, etc.
- Can construct a grid of a certain size by writing

```
Grid<Type> g(numRows, numCols);
```

- Can access individual elements by writing

```
g[rows][cols]
```

Next Time

- **`Map`**
  - A collection for storing associations between elements.
- **`Set`**
  - A collection for storing an unordered group of elements.
- **`Lexicon`**
  - A special kind of **`Set`**.