

Counting Website Visits

Developing an Algorithm

Counting Visits per Visitor

- Step 1: Work an Example
 - Basic problem: Count occurrences of a String

Counting Visits per Visitor

Cat

Snake

T-Rex

Snake

Cat

- Step 1: Work an Example
 - Basic problem: Count occurrences of a String

Counting Visits per Visitor

Cat

Snake

T-Rex

Snake

Cat

Name	Count
Cat	2
Snake	2
T-Rex	1

- Step 1: Work an Example
 - Basic problem: Count occurrences of a String

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

- Step 2: Write down what you did

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Name	Count
------	-------

- Step 2: Write down what you did

1 Made an empty table

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Name	Count
------	-------

- Step 2: Write down what you did

HashMap from Strings to Integers

① ~~Made an empty table~~

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
-----	-------

- Step 2: Write down what you did

HashMap from Strings to Integers

① ~~Made an empty table~~

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
-----	-------

counts

- Step 2: Write down what you did

HashMap from Strings to Integers

① ~~Made an empty table~~

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key

Value

counts

- Step 2: Write down what you did

Step 2: Write Down What You Did

Cat

Key

Value

counts

Snake

T-Rex

Snake

Cat

- Step 2: Write down what you did
 - ② Looked at first String (Cat)

Step 2: Write Down What You Did

Cat

Key

Value

counts

Snake

T-Rex

Snake

Cat

- Step 2: Write down what you did
 - 2 Looked at first String (Cat)
 - 3 Looked for “Cat” in counts (not there)

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1

counts

- Step 2: Write down what you did
 - 2 Looked at first String (Cat)
 - 3 Looked for “Cat” in counts (not there)
 - 4 Put “Cat” into counts with value 1

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1

counts

- Step 2: Write down what you did

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	1

counts

- Step 2: Write down what you did
 - ⑤ Looked at second String (Snake)
 - ⑥ Looked for “Snake” in counts (not there)
 - ⑦ Put “Snake” into counts with value 1

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	1

counts

- Step 2: Write down what you did

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	1
T-Rex	1

counts

- Step 2: Write down what you did
 - ⑧ Looked at third String (T-Rex)
 - ⑨ Looked for “T-Rex” in counts (not there)
 - ⑩ Put “T-Rex into counts with value 1

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	1
T-Rex	1

counts

- Step 2: Write down what you did

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	1
T-Rex	1

counts

- Step 2: Write down what you did
 - 11 Looked at fourth String (Snake)

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	1
T-Rex	1

counts

- Step 2: Write down what you did
 - 11 Looked at fourth String (Snake)
 - 12 Looked for “Snake” in counts (found 1)

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	2
T-Rex	1

counts

- Step 2: Write down what you did
 - 11 Looked at fourth String (Snake)
 - 12 Looked for “Snake” in counts (found 1)
 - 13 Put “Snake” into counts with value 2

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	1
Snake	2
T-Rex	1

counts

- Step 2: Write down what you did

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	2
Snake	2
T-Rex	1

counts

- Step 2: Write down what you did
 - 14 Looked at fifth String (Cat)
 - 15 Looked for “Cat” in counts (found 1)
 - 16 Put “Cat” into counts with value 2

Step 2: Write Down What You Did

Cat

Snake

T-Rex

Snake

Cat

Key	Value
Cat	2
Snake	2
T-Rex	1

counts

- Step 2: Write down what you did

17 Counts is the answer

Step 2: Write Down What You Did

- ① Made an empty HashMap from Strings to Integers
- ② Looked at first String (Cat)
- ③ Looked for “Cat” in counts (not there)
- ④ Put “Cat” into counts with value 1
- ⑤ Looked at second String (Snake)
- ⑥ Looked for “Snake” in counts (not there)
- ⑦ Put “Snake” into counts with value 1
- ⑧ Looked at third String (T-Rex)
- ⑨ Looked for “T-Rex” in counts (not there)
- ⑩ Put “T-Rex” into counts with value 1
- ⑪ Looked at fourth String (Snake)
- ⑫ Looked for “Snake” in counts (found 1)
- ⑬ Put “Snake” into counts with value 2
- ⑭ Looked at fifth String (Cat)
- ⑮ Looked for “Cat” in counts (found 1)
- ⑯ Put “Cat” into counts with value 2
- ⑰ counts is the answer

Step 3: Find Patterns/Generalize

- ① Made an empty HashMap from Strings to Integers
- ② Looked at first String (Cat)
- ③ Looked for “Cat” in counts (not there)
- ④ Put “Cat” into counts with value 1
- ⑤ Looked at second String (Snake)
- ⑥ Looked for “Snake” in counts (not there)
- ⑦ Put “Snake” into counts with value 1
- ⑧ Looked at third String (T-Rex)
- ⑨ Looked for “T-Rex” in counts (not there)
- ⑩ Put “T-Rex” into counts with value 1
- ⑪ Looked at fourth String (Snake)
- ⑫ Looked for “Snake” in counts (found 1)
- ⑬ Put “Snake” into counts with value 2
- ⑭ Looked at fifth String (Cat)
- ⑮ Looked for “Cat” in counts (found 1)
- ⑯ Put “Cat” into counts with value 2
- ⑰ counts is the answer

Step 3: Find Patterns/Generalize

- 1 Made an empty HashMap from Strings to Integers
- 2 Looked at first String (Cat)
- 3 Looked for "Cat" in counts (not there)
- 4 Put "Cat" into counts with value 1
- 5 Looked at second String (Snake)
- 6 Looked for "Snake" in counts (not there)
- 7 Put "Snake" into counts with value 1
- 8 Looked at third String (T-Rex)
- 9 Looked for "T-Rex" in counts (not there)
- 10 Put "T-Rex" into counts with value 1
- 11 Looked at fourth String (Snake)
- 12 Looked for "Snake" in counts (found 1)
- 13 Put "Snake" into counts with value 2
- 14 Looked at fifth String (Cat)
- 15 Looked for "Cat" in counts (found 1)
- 16 Put "Cat" into counts with value 2
- 17 counts is the answer

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- ① Made an empty HashMap from Strings to Integers
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- ⑨ Looked for “T-Rex” in counts (not there)
- ⑩ Put “T-Rex” into counts with value 1
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- ⑫ Looked for “Snake” in counts (found 1)
- ⑬ Put “Snake” into counts with value 2
- ⑭ Looked at fifth String (Cat)
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- ⑰ counts is the answer

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- ⑨ Looked for “T-Rex” in counts (not there)
- ⑩ Put “T-Rex” into counts with value 1
- ⑪ Looked at fourth String (Snake)
- ⑫ Looked for “Snake” in counts (found 1)
- ⑬ Put “Snake” into counts with value 2
- ⑭ Looked at fifth String (Cat)
- ⑮ Looked for “Cat” in counts (found 1)
- ⑯ Put “Cat” into counts with value 2
- ⑰ counts is the answer

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- ① Made an empty HashMap from Strings to Integers
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- ⑥ Looked for “Snake” in counts (not there)
- ⑦ Put “Snake” into counts with value 1
- ⑧ Looked at third String (T-Rex)
- ⑨ Looked for “T-Rex” in counts (not there)
- ⑩ Put “T-Rex” into counts with value 1
- ⑪ Looked at fourth String (Snake)
- ⑫ Looked for “Snake” in counts (found 1)
- ⑬ Put “Snake” into counts with value 2
- ⑭ Looked at fifth String (Cat)
- ⑮ Looked for “Cat” in counts (found 1)
- ⑯ Put “Cat” into counts with value 2
- ⑰ counts is the answer

Step 3: Find Patterns/Generalize

- 1 Made an empty HashMap from Strings to Integers
- 2 Looked at first String (Cat)
- 3 Looked for “Cat” in counts (not there)
- 4 Put “Cat” into counts with value 1
- 5 Looked at second String (Snake)
- 6 Looked for “Snake” in counts (not there)
- 7 Put “Snake” into counts with value 1
- 8 Looked at third String (T-Rex)
- 9 Looked for “T-Rex” in counts (not there)

10 Put “T-Rex” into counts with value 1

11 Looked at fourth String (Snake)

12 Looked for “Snake” in counts (found 1)

13 Put “Snake” into counts with value 2

+1

14 Looked at fifth String (Cat)

15 Looked for “Cat” in counts (found 1)

16 Put “Cat” into counts with value 2

+1

17 counts is the answer

Step 3: Find Patterns/Generalize

- 1 Make an empty `HashMaps<String,Integer>` (counts)
- 2 For each name in strings
 - a Check if name is in counts
 - i If not: put name in with a value of 1
 - ii If so: update the value to be 1 more
- 3 counts is the answer

Step 4: Test Algorithm

- 1 Make an empty `HashMaps<String,Integer>` (counts)
- 2 For each name in strings
 - a Check if name is in counts
 - i If not: put name in with a value of 1
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- 3 counts is the answer

Step 4: Test Algorithm

Name	Count
Fish	3
Dog	1

Now it's your turn.

Test on Fish Dog Fish Fish

- 1 Make an empty `HashMaps<String,Integer>` (counts)
- 2 For each name in strings
 - a Check if name is in counts
 - i If not: put name in with a value of 1
 - ii If so: update the value to be 1 more
- 3 counts is the answer

Step 4: Test Algorithm

Name	Count
Fish	3
Dog	1

Algorithm appears to be good!

- 1 Make an empty `HashMaps<String,Integer>` (counts)
- 2 For each name in strings
 - a Check if name is in counts
 - i If not: put name in with a value of 1
 - ii If so: update the value to be 1 more
- 3 counts is the answer

Slight Changes for LogEntry

- 1 Make an empty `HashMap<String,Integer>` (counts)
- 2 For each `le` in records
 - a `ip` is `le`'s `ipAddress`
 - b check if `ip` is in counts
 - i If not: put `ip` in with a value of 1
 - ii If so: update the value to be 1 more
- 3 counts is the answer

Slight Changes for LogEntry

- 1 Make an empty `HashMap<String,Integer>` (counts)
- 2 For each **le** in records
 - a ip is le's ipAddress
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