

# Which Countries Export...?

Developing an Algorithm

# Problem: Which Countries Export...?

- CSV data about exports
  - Country, Exports, Value
- Problem:
  - Which countries export some particular thing?

# Step 1: Work an Instance of Problem

Country	Exports	Value (dollars)
Macedonia	tobacco, textiles	\$3,421,000,000
Madagascar	coffee, vanilla, shellfish	\$864,800,000
Malawi	tea, sugar, cotton, coffee	\$1,332,000,000
Malaysia	semiconductors, wood	\$231,300,000,000

- Work an instance of the problem yourself
  - 4 countries: which export coffee?

# Step 1: Work an Instance of Problem

Country	Exports	Value (dollars)
Macedonia	tobacco, textiles	\$3,421,000,000
Madagascar	coffee, vanilla, shellfish	\$864,800,000
Malawi	tea, sugar, cotton, coffee	\$1,332,000,000
Malaysia	semiconductors, wood	\$231,300,000,000

- Madagascar
- Malawi

# Step 2: Write Down What You Did

Country	Exports	Value (dollars)
Macedonia	tobacco, textiles	\$3,421,000,000
Madagascar	coffee, vanilla, shellfish	\$864,800,000
Malawi	tea, sugar, cotton, coffee	\$1,332,000,000
Malaysia	semiconductors, wood	\$231,300,000,000

- “Just looked at it and saw answer”
  - Will not help for Step 3

# Step 2: Write Down What You Did

Country	Exports	Value (dollars)
Macedonia	tobacco, textiles	\$3,421,000,000
Madagascar	coffee, vanilla, shellfish	\$864,800,000
Malawi	tea, sugar, cotton, coffee	\$1,332,000,000
Malaysia	semiconductors, wood	\$231,300,000,000

- Looked at first row, "Exports" column
  - Did not contain "coffee"



# Step 2: Write Down What You Did

Country	Exports	Value (dollars)
Macedonia	tobacco, textiles	\$3,421,000,000
Madagascar	coffee, vanilla, shellfish	\$864,800,000
Malawi	tea, sugar, cotton, coffee	\$1,332,000,000
Malaysia	semiconductors, wood	\$231,300,000,000

- Looked at second row, "Exports" column
  - Contains "coffee"
  - Wrote down "Madagascar"

# Step 2: Write Down What You Did

Country	Exports	Value (dollars)
Macedonia	tobacco, textiles	\$3,421,000,000
Madagascar	coffee, vanilla, shellfish	\$864,800,000
Malawi	tea, sugar, cotton, coffee	\$1,332,000,000
Malaysia	semiconductors, wood	\$231,300,000,000

- Looked at third row, "Exports" column
  - Contains "coffee"
  - Wrote down "Malawi"



# Step 2: Write Down What You Did

Country	Exports	Value (dollars)
Macedonia	tobacco, textiles	\$3,421,000,000
Madagascar	coffee, vanilla, shellfish	\$864,800,000
Malawi	tea, sugar, cotton, coffee	\$1,332,000,000
Malaysia	semiconductors, wood	\$231,300,000,000

- Looked at fourth row, "Exports" column
  - Did not contain "coffee"

# Step 2: Write Down What You Did

- 1 Looked at first row, “Exports” column
- 2 Checked if it contained “coffee” (did not)
- 3 Looked at second row, “Exports” column
- 4 Checked if it contained “coffee” (it did)
- 5 Wrote down “Madagascar”
- 6 Looked at third row, “Exports” column
- 7 Checked if it contained “coffee” (it did)
- 8 Wrote down “Malawi”
- 9 Looked at fourth row, “Exports” column
- 10 Checked if it contained “coffee” (did not)

# Step 3: Find Patterns, Generalize

Similar, but a few differences...

- 1 Looked at first row, “Exports” column
- 2 Checked if it contained “coffee” (did not)
- 3 Looked at second row, “Exports” column
- 4 Checked if it contained “coffee” (it did)
- 5 Wrote down “Madagascar”
- 6 Looked at third row, “Exports” column
- 7 Checked if it contained “coffee” (it did)
- 8 Wrote down “Malawi”
- 9 Looked at fourth row, “Exports” column
- 10 Checked if it contained “coffee” (did not)

# Step 3: Find Patterns, Generalize

Why “Madagascar” and “Malawi”?

- 1 Looked at first row, “Exports” column
- 2 Checked if it contained “coffee” (did not)
- 3 Looked at second row, “Exports” column
- 4 Checked if it contained “coffee” (it did)
- 5 Wrote down “Madagascar”
- 6 Looked at third row, “Exports” column
- 7 Checked if it contained “coffee” (it did)
- 8 Wrote down “Malawi”
- 9 Looked at fourth row, “Exports” column
- 10 Checked if it contained “coffee” (did not)



# Step 3: Find Patterns, Generalize

- 1 Looked at first row, “Exports” column
- 2 Checked if it contained “coffee” (did not)
- 3 Looked at second row, “Exports” column
- 4 Checked if it contained “coffee” (it did)
- 5 Wrote down second row’s “Country”
- 6 Looked at third row, “Exports” column
- 7 Checked if it contained “coffee” (it did)
- 8 Wrote down third row’s “Country”
- 9 Looked at fourth row, “Exports” column
- 10 Checked if it contained “coffee” (did not)

Value for “Country” on that row.



# Step 3: Find Patterns, Generalize

- 1 Looked at first row, “Exports” column
- 2 Checked if it contained “coffee” (did not)
- 3 Looked at second row, “Exports” column
- 4 Checked if it contained “coffee” (it did)
- 5 Wrote down second row’s “Country”
- 6 Looked at third row, “Exports” column
- 7 Checked if it contained “coffee” (it did)
- 8 Wrote down third row’s “Country”
- 9 Looked at fourth row, “Exports” column
- 10 Checked if it contained “coffee” (did not)

Sometimes write down country, others do not. Why?

# Step 3: Find Patterns, Generalize

Whether “Exports” column contains “coffee”

- 1 Looked at first row, “Exports” column
- 2 Checked if it contained “coffee” (did not)
- 3 Looked at second row, “Exports” column
- 4 Checked if it contained “coffee” (it did)
- 5 Wrote down second row’s “Country”
- 6 Looked at third row, “Exports” column
- 7 Checked if it contained “coffee” (it did)
- 8 Wrote down third row’s “Country”
- 9 Looked at fourth row, “Exports” column
- 10 Checked if it contained “coffee” (did not)

# Step 3: Find Patterns, Generalize

- 1 For each row in the CSV file
  - a Look at the “Exports” column of that row
  - b Check if it contains “coffee”
    - i If so, write down the “Country” from that row

# Step 4: Test by Hand

- 1 For each row in the CSV file
  - a Look at the “Exports” column of that row
  - b Check if it contains “coffee”
    - i If so, write down the “Country” from that row

Country	Exports	Value (dollars)
Anguilla	lobster, fish, livestock	\$11,700,000
Brazil	footwear, coffee, iron ore	\$242,700,000,000

Which countries export lobster? Brazil (oops!)



# Step 4: Test by Hand

- 1 For each row in the CSV file
  - a Look at the “Exports” column of that row
  - b Check if it contains `exportOfInterest`
    - i If so, write down the “Country” from that row

Country	Exports	Value (dollars)
Anguilla	lobster, fish, livestock	\$11,700,000
Brazil	footwear, coffee, iron ore	\$242,700,000,000

Which countries export lobster? Anguilla