# Sorting Data

Motivation



### By the end of this video you will be able to...

- Define sorting
- Explain why sorting data can be useful

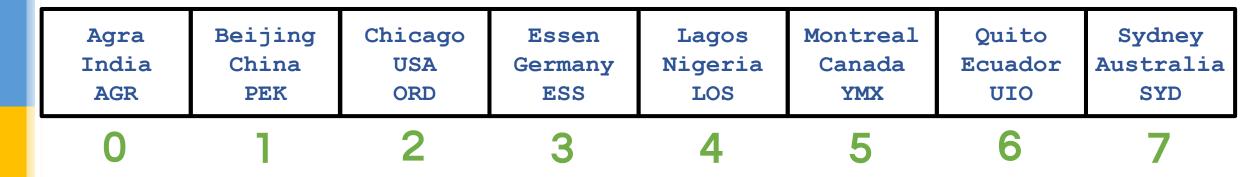
#### Binary Search:

#### Cut the list in half, only search half the list

Montreal	Lagos	Essen	Chicago	Beijing	Sydney	Quito	Agra
Canada	Nigeria	Germany	USA	China	Australia	Ecuador	India
YMX	LOS	ESS	ORD	PEK	SYD	UIO	AGR
0	1	2	3	4	5	6	

#### Binary Search:

#### Cut the list in half, only search half the list



List must be sorted on what you are searching (city)

Agra	Beijing	Chicago	Essen	Lagos	Montreal	Quito	Sydney Australia SYD
India	China	USA	Germany	Nigeria	Canada	Ecuador	
AGR	PEK	ORD	ESS	LOS	YMX	UIO	
0	1	2	3	4	5	6	7

Agra	Beijing	Chicago	Essen	Lagos	Montreal	Quito	Sydney
India AGR	China PEK	USA ORD	Germany ESS	Nigeria LOS	Canada YMX	Ecuador UIO	Australia SYD
0	1	2	3	4	5	6	7

7	Sydney	Montreal	Beijing	Quito	Essen	Agra	Lagos	Chicago
	Australia	Canada	China	Ecuador	Germany	India	Nigeria	USA
	SYD	YMX	PEK	UIO	ESS	AGR	LOS	ORD
	0	1	2	3	4	5	6	7

Sydnev	Montreal	Bei jing	Quito	Essen	Agra	Lagos	Chicago
Australia	Canada	China	Ecuador	Germany	India	Nigeria	USA
SYD	YMX	PEK	010	ESS	AGK	LOS	ORD
0	1	2	3	4	5	6	7

#### Linear Search:

#### Step through from beginning of the array to end

	Montreal	Lagos	Essen	Chicago	Beijing	Sydney	Quito	Agra
	Canada	Nigeria	Germany	USA	China	Australia	Ecuador	India
	YMX	LOS	ESS	ORD	PEK	SYD	UIO	AGR
ľ	0	1	2	3	4	5	6	7

### Linear Search: Step through from beginning of the array to end

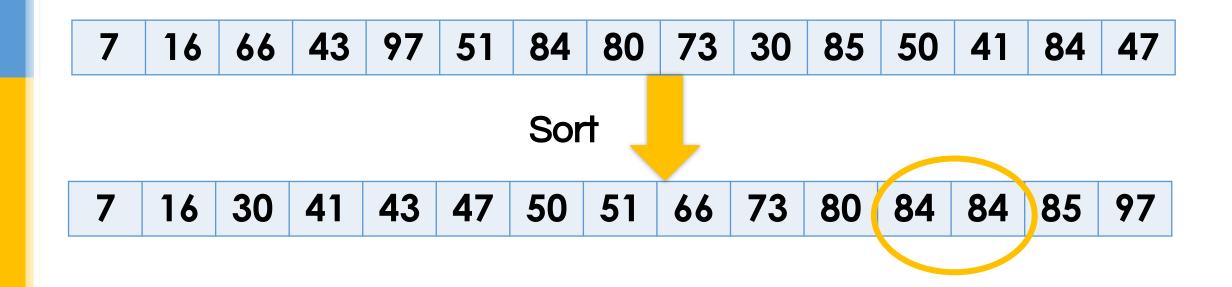
Agra India AGR		Chicago USA ORD	Essen Germany ESS	Lagos Nigeria LOS	Montreal Canada YMX	Quito Ecuador UIO	Sydney Australia SYD
0	1	2	3	4	5	6	7

Performance payoff if list is sorted

### **Duplicates?**

7	16	66	43	97	51	84	80	73	30	85	50	41	84	47
•			70		<b>O</b> 1	<b>O</b> -1		70					<b>0</b> -1	<b>T</b>

#### **Duplicates?**



## Thought questions

- How lucky can we be?
- How unlucky can we be?
- Can upfront work help us later?