



<http://algs4.cs.princeton.edu>

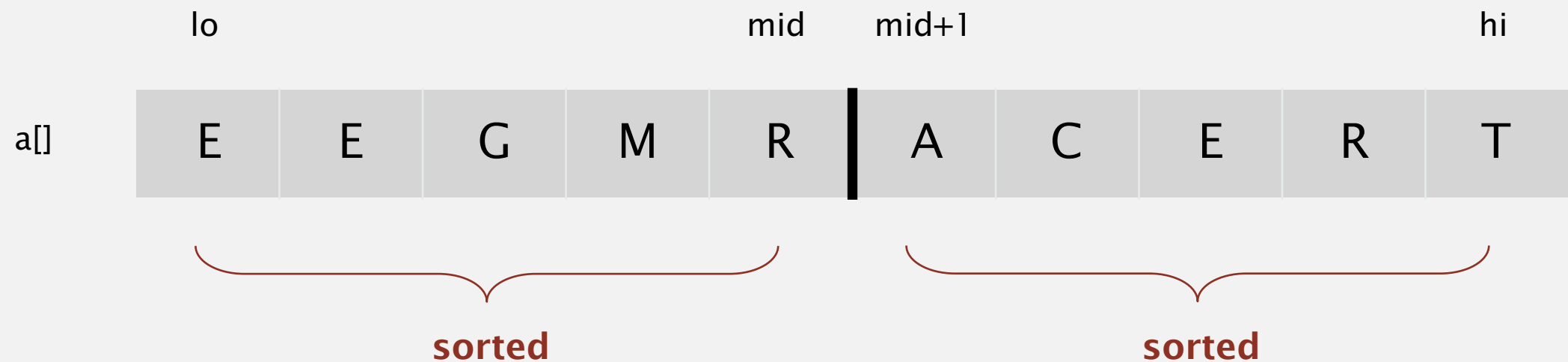
## 2.2 MERGING DEMO

---

# Merging demo

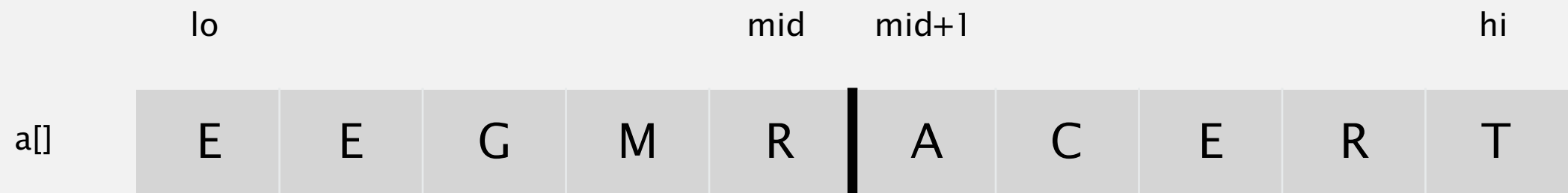
---

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .

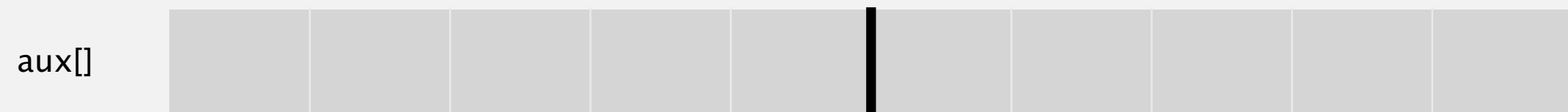


# Merging demo

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .



## copy to auxiliary array



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .

a[]

E	E	G	M	R	A	C	E	R	T
---	---	---	---	---	---	---	---	---	---

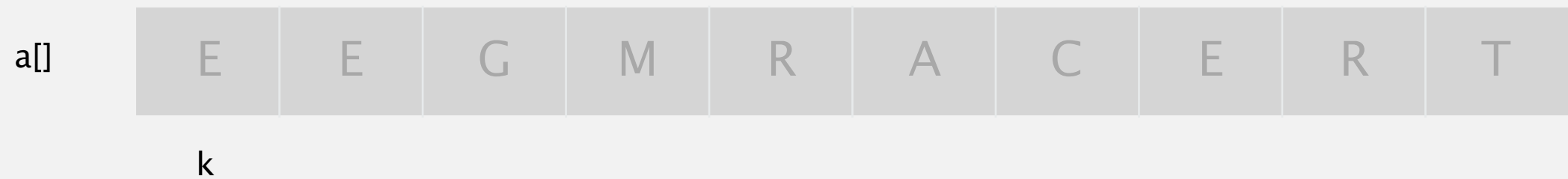
aux[]

E	E	G	M	R		A	C	E	R	T
---	---	---	---	---	--	---	---	---	---	---

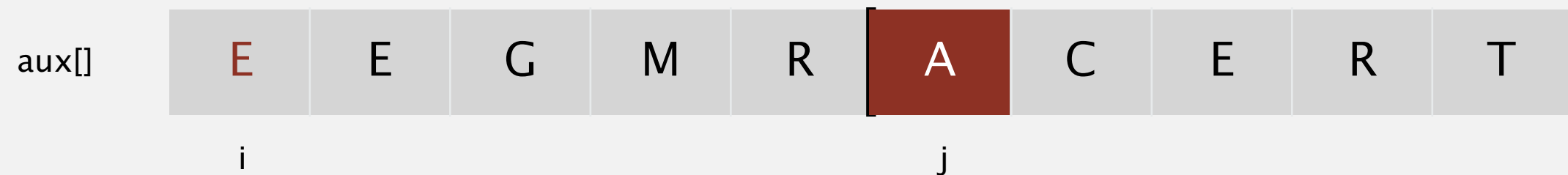
# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



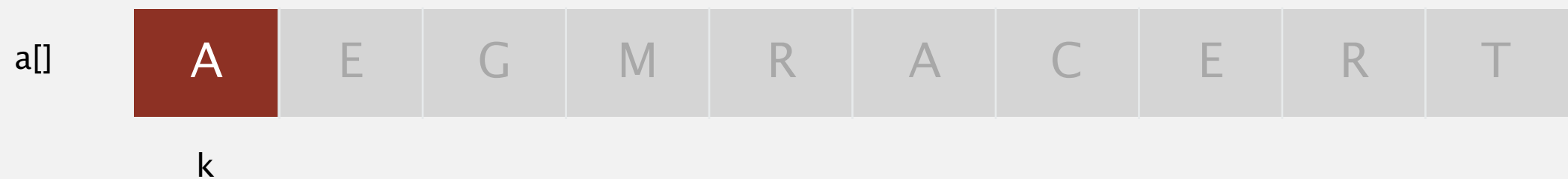
**compare minimum in each subarray**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



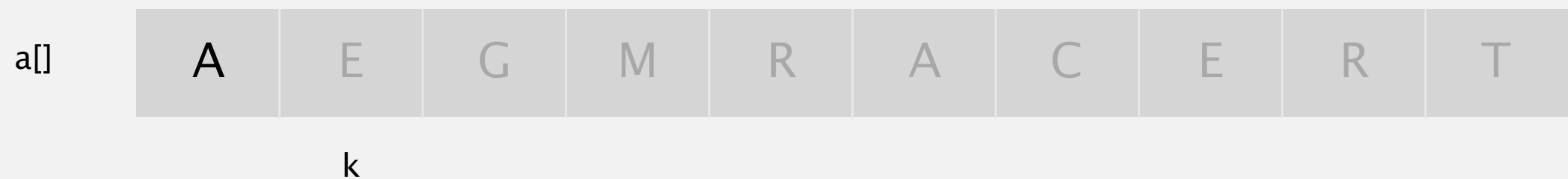
**compare minimum in each subarray**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .



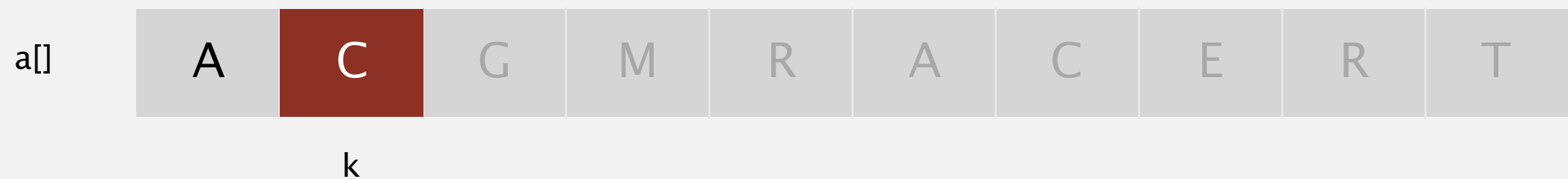
**compare minimum in each subarray**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



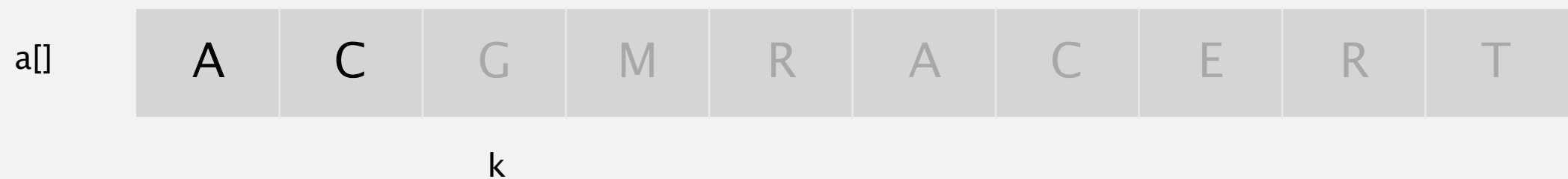
**compare minimum in each subarray**





# Merging demo

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



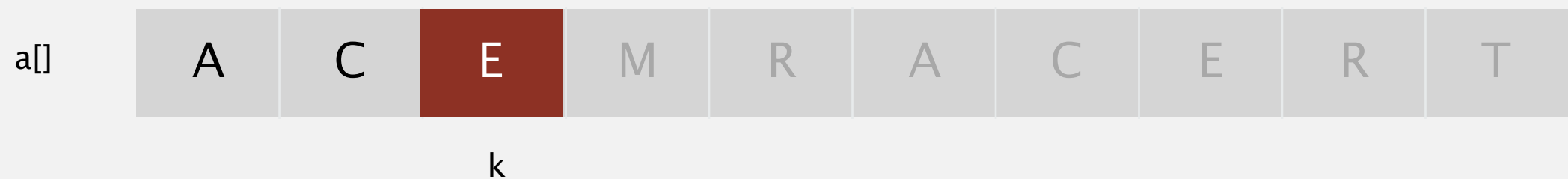
**compare minimum in each subarray**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



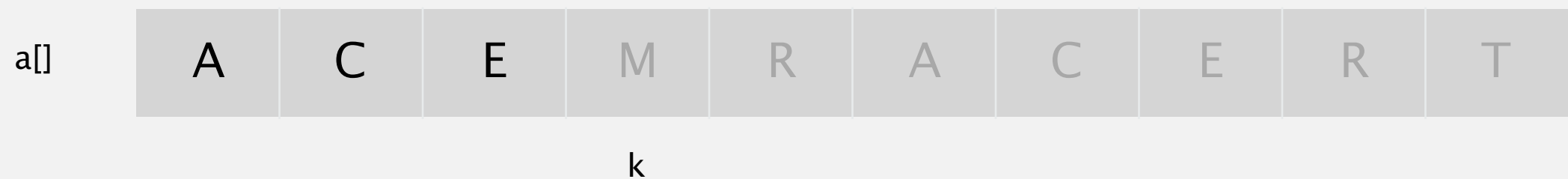
**compare minimum in each subarray**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .



**compare minimum in each subarray**



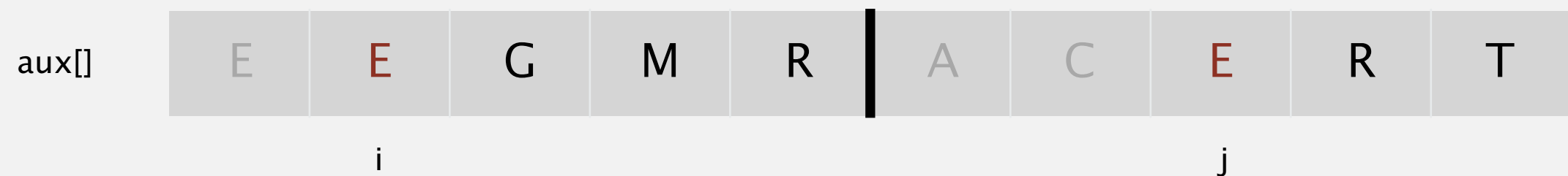
# Merging demo

---

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .

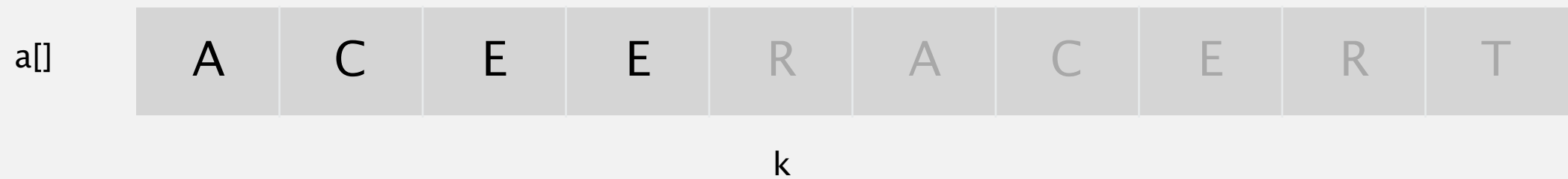


compare minimum in each subarray



# Merging demo

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



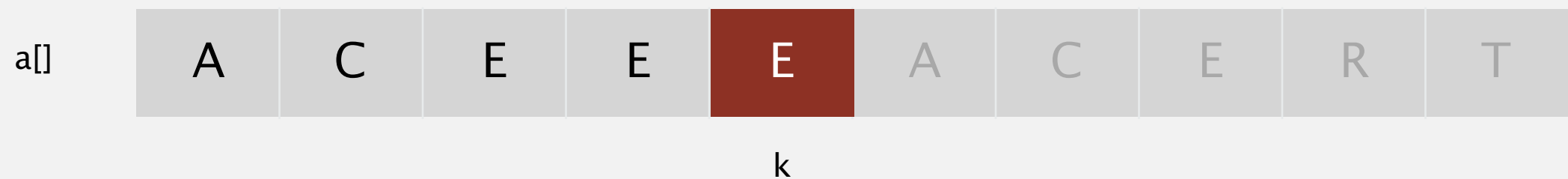
**compare minimum in each subarray**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



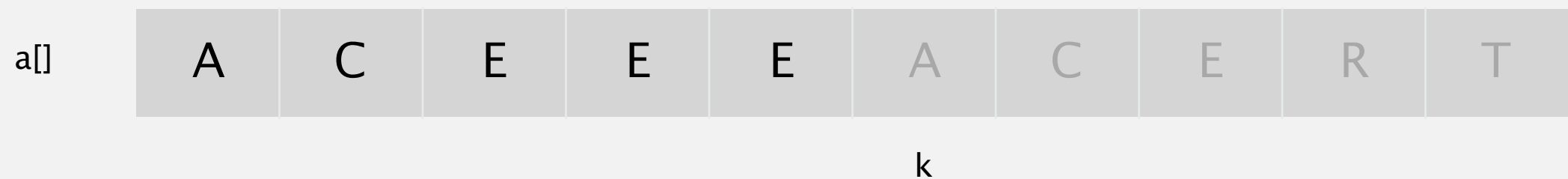
compare minimum in each subarray



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .



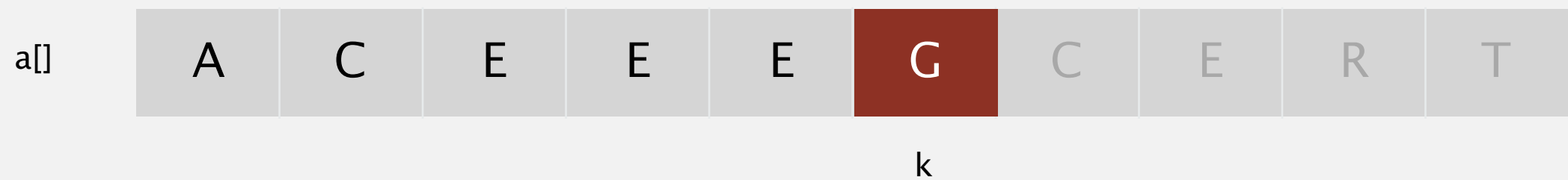
compare minimum in each subarray



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



compare minimum in each subarray

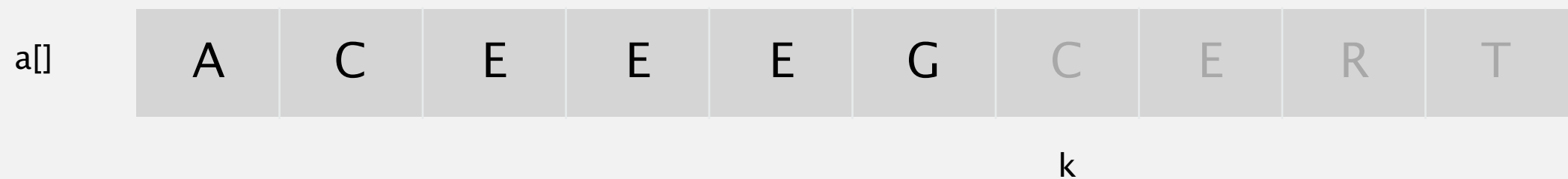




# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



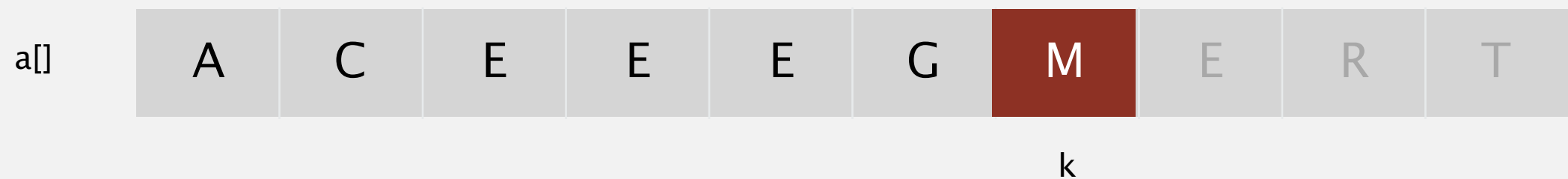
compare minimum in each subarray



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



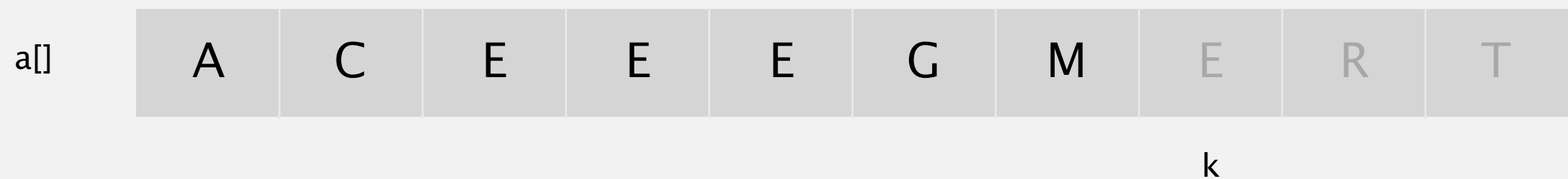
compare minimum in each subarray



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .



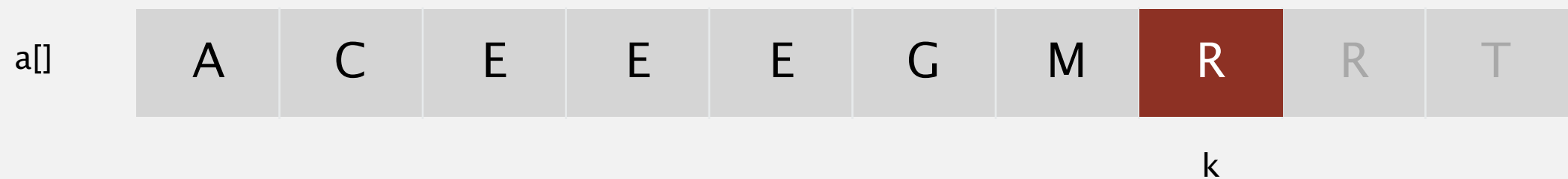
**compare minimum in each subarray**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



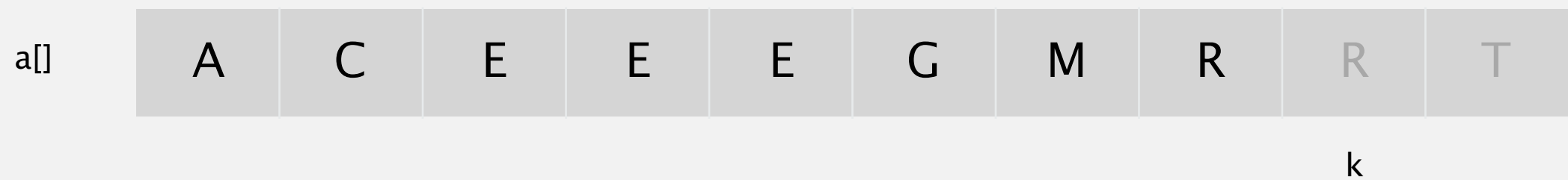
compare minimum in each subarray



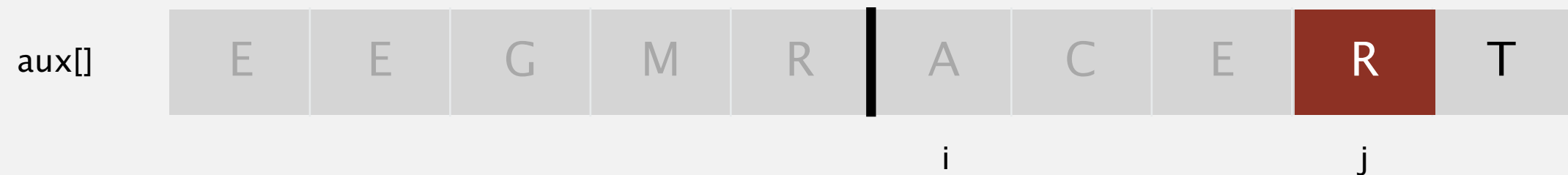
# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



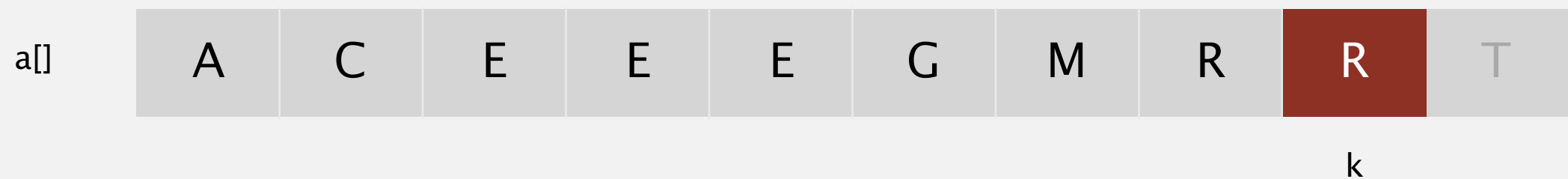
one subarray exhausted, take from other



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



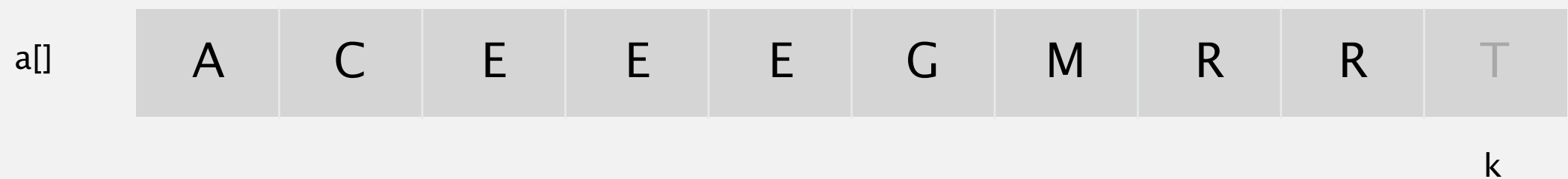
one subarray exhausted, take from other



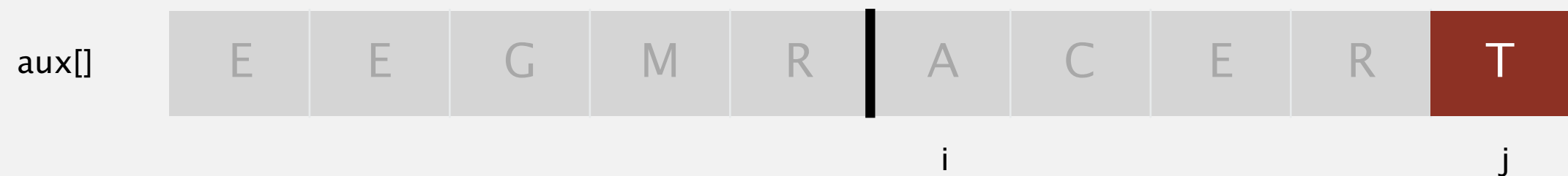
# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



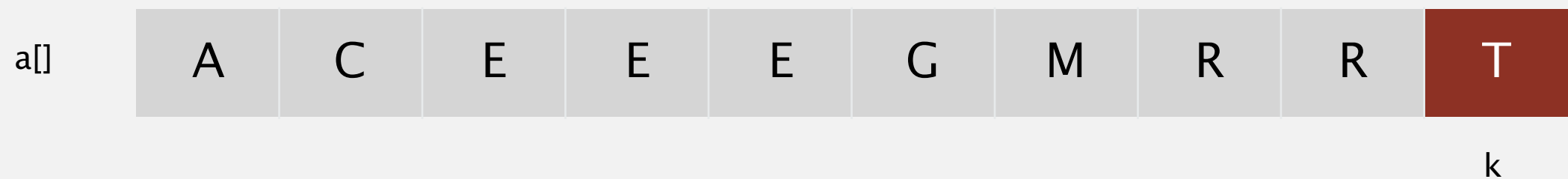
one subarray exhausted, take from other



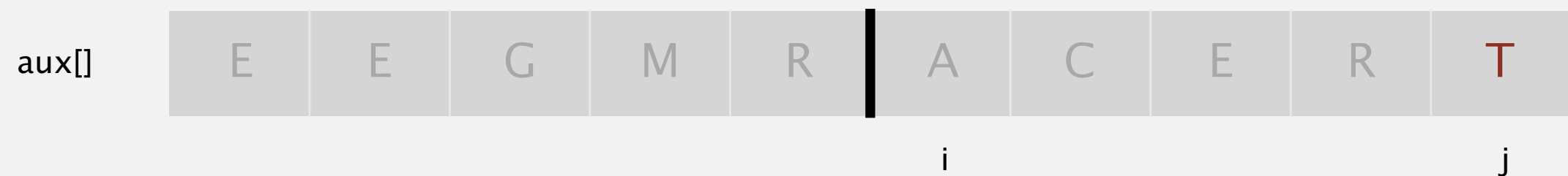
# Merging demo

---

**Goal.** Given two sorted subarrays  $a[lo]$  to  $a[mid]$  and  $a[mid+1]$  to  $a[hi]$ , replace with sorted subarray  $a[lo]$  to  $a[hi]$ .



one subarray exhausted, take from other

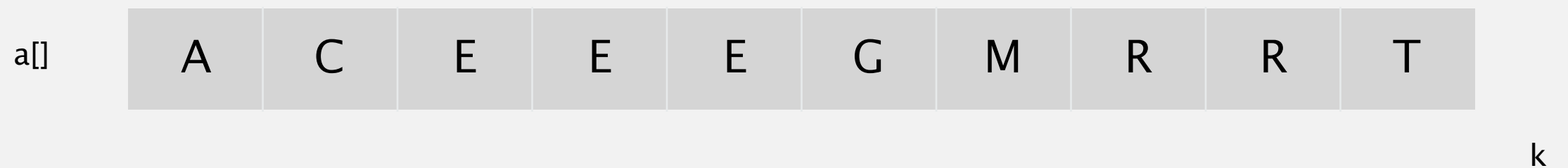




# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .



**both subarrays exhausted, done**



# Merging demo

---

**Goal.** Given two sorted subarrays  $a[\text{lo}]$  to  $a[\text{mid}]$  and  $a[\text{mid}+1]$  to  $a[\text{hi}]$ , replace with sorted subarray  $a[\text{lo}]$  to  $a[\text{hi}]$ .

