More about vectors.

Tools:

- append new elements:

```
V.push_back(x); // V must not be empty!
```

- remove from end:

```
x = V.back();
V.pop_back();
```

(always removes V[V.size() - 1] !!! V.back())

- access / modify elements:

```
V[i] = 29;
```

⊗ Warning: must have $0 \le i < V.size()$!

⊗ Note: not efficient to remove from middle of vector

(cost is proportional to distance from the last element...

Don't use erase(...))

- reminder: vectors are "templates".

~~vector V;~~

vector<int> V; ✓

⊗ element datatypes are homogeneous

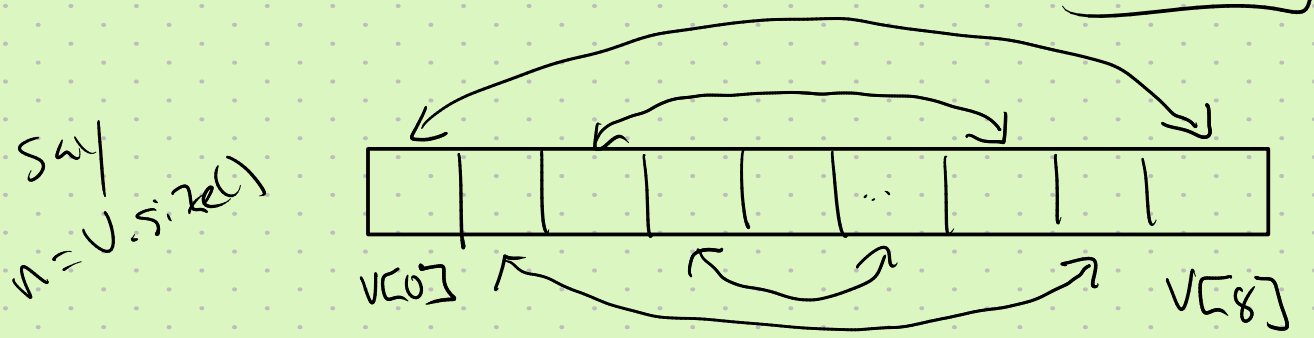
(if using vector<int>, all V[i] have type int)

Exercise: write a function to reverse the contents of a vector.

E.g. if V = {1, 2, 3}

& we call reverse(V), then

V = {3, 2, 1}.



i	swap with
0	n-1
1	n-2
2	n-3
⋮	
i	n-1-i

```
void reverse(vector<int>& V);
```

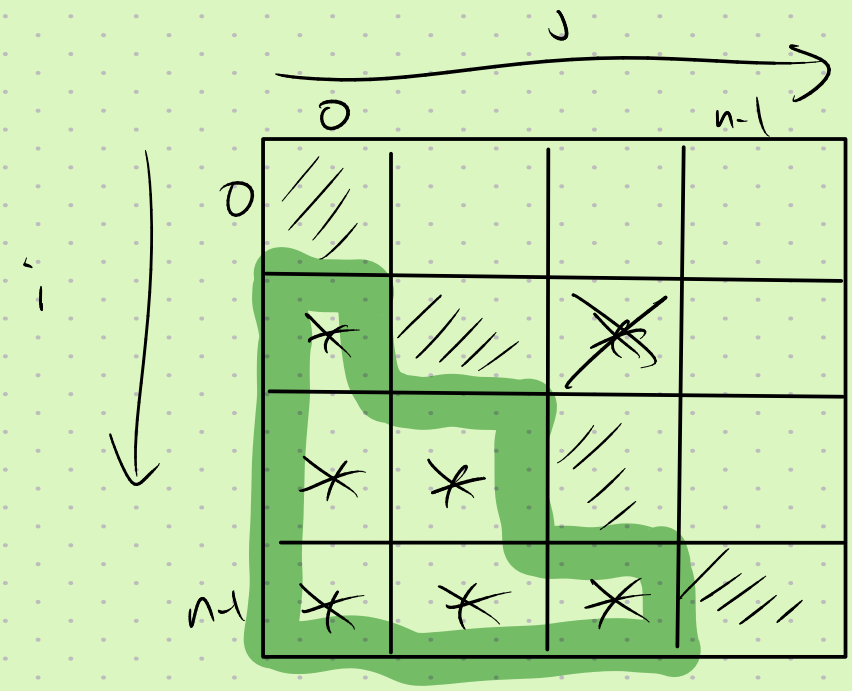
Exercise: given a vector<int> V & a target int t, find out if

$\exists\ i \neq j$ s.t $V[i] + V[j] == t$.

↗ "there exists"

Strategy? Try all pairs...

$V[i] + V[j] = V[j] + V[i]$



How to enumerate all the * entries, perhaps using for loops.