

# COMP 1010- Summer 2015 (A01)

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# Hello!

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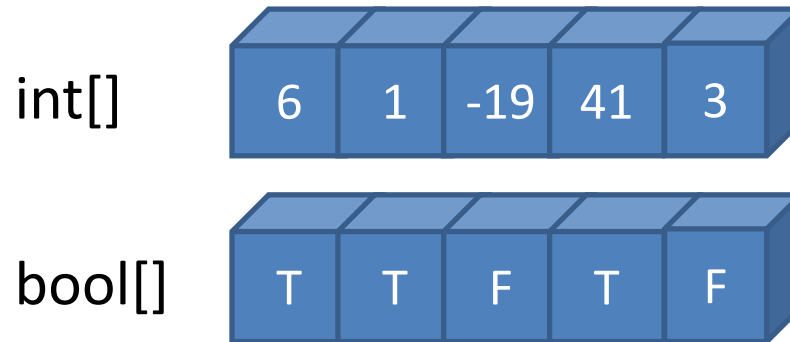
EITC-E2-582

(or by appointment, arrange by email)

partially filled arrays

# partially filled arrays

**note:** when you first create an array, the default data is generally useless to you: you need to put data into the array

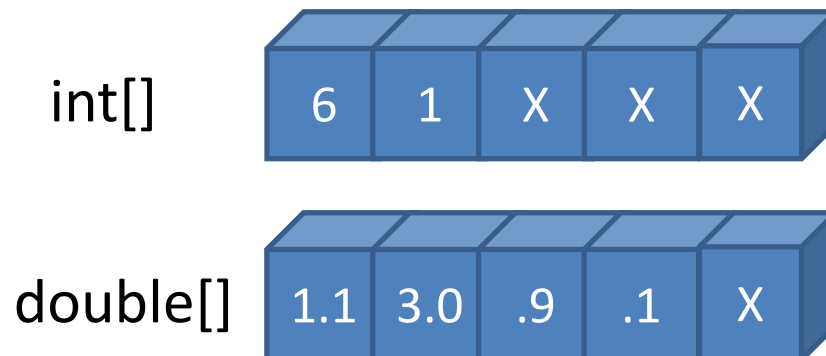


until now, all of our arrays were fully populated immediately

# partially filled arrays:

**note:** a **partially filled array** is an array that has data in some bins but not in others.

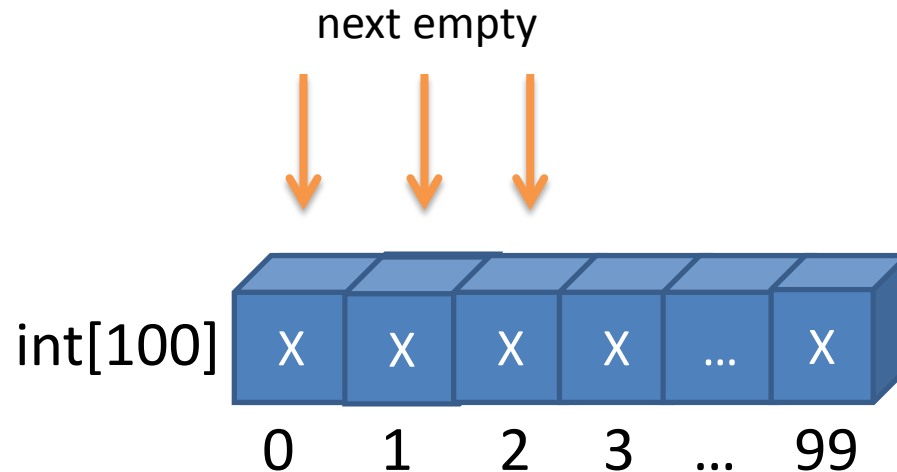
the challenge becomes identifying which bins have data, and which do not.



# simple technique for filling up an array

go left to right,

keep a pointer to the next empty spot



use pointer each time to decide where to put the next element

# Example: keep track of mouse path

Make arrays of x,y points that keep track of a mouse path. If the mouse is pressed, store the mouse location in the array

Draw the path with a random color

Setup partially filled arrays – actual arrays, and pointer to beginning

# Adding to array

- Update pointer to next empty bin
- Make sure we don't run off the end



# Using the array – draw the lines

- Don't use the array length! We need to know how many bins are valid

# Erasing the array

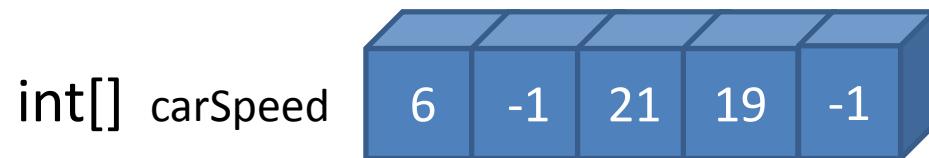
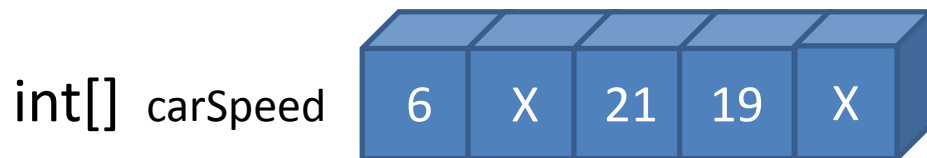
- Just reset the pointer, no need to actually trash the data

# Random color

On key press

# partially filled arrays: method #2

you can mark an empty bin by putting an impossible value in it.



Update our example to use new technique

Change from drawing path to ellipses

Introduce the capability to delete ellipses under the mouse (lets us empty bins and refill later)

Kill the nextEmpty variable and create an EMPTY constant

Rename mousePAth to mousePoints

# Make some helper functions

Clear an array

Find the first empty bin

# Do some updates...

Update setup to clear the arrays

Update drawPath to draw ellipses

Update the draw block to add to our data arrays using the new method

Make key press erase the data

# Erase an ellipse!

Two things:

make a function to find the first ellipse  
under the mouse

delete the ellipse!

Update the draw



# COMPLEXITY!

Compare the two techniques...

Second is more flexible (can delete / insert anywhere)

First is more efficient (erasing the array, inserting..)

Core component of computer science!

# Extension – automatically grow the array

If the array is full, then double the size.

How can we grow an array?

can't.

Instead, make a function that..

- takes array as parameter

- makes a new array (double size)

- copies data over

- sets additional bins to empty

- returns new array.

# Exercise..

Did we need to call `firstEmpty` again?

Can you find the shortcut?