

# Java review, ADTs, and ArrayList

3/30/26

# Administrivia

- HW 1 (clicker ID, codingbat, and essay) due tonight and Wednesday night

Which of the following declares  
an array of integers?

- A. `int[] nums;`
- B. `integer[] nums;`
- C. `nums = new int[10];`
- D. `nums = new integer[10];`
- E. Not exactly one of the above

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B. `integer[] nums;`

C. `nums = new int[10];`

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E. Not exactly one of the above

Which of the following is the signature for a method that takes a Person and returns a Dwelling?

- A. `public Dwelling(Person resident)`
- B. `public Dwelling getResidence(Person p)`
- C. `public Person(Dwelling d)`
- D. `public Person getResident(Dwelling d)`
- E. Not exactly one of the above

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- D. public Person getResident(Dwelling d)
- E. Not exactly one of the above

Which of the following returns whether integer  $x$  is between 5 and 10 (inclusive)?

- A. `if((x <= 5) || (x >= 10))  
    return true;`
- B. `if((x >= 5) && (x <= 10))  
    return true;`
- C. `return ((x >= 5) && (x <= 10));`
- D. `return !((x < 5) || (x > 10));`
- E. Not exactly one of the above

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`return true;`

B. `if((x >= 5) && (x <= 10))`

`return true;`

C. `return ((x >= 5) && (x <= 10));`

D. `return !((x < 5) || (x > 10));`

E. Not exactly one of the above (C & D)

# Abstract data types (ADTs)

- Set of operations that are supported on a particular kind of data
  - Example: List is ADT for storing ordered collection of objects. Supports operations to add objects, remove them, count them, test for a particular object, ...
- Does not include implementation details
  - Language independent
  - May have different implementations that optimize different operations

# Which of the following is part of the List ADT (stores ordered sequence)?

- A. An attribute num storing the number of values in the List
- B. A size method that returns the number of values in the List
- C. The size of the array storing values that are put into the List
- D. The main function that creates a List and tests it by calling the methods
- E. Not exactly one of the above

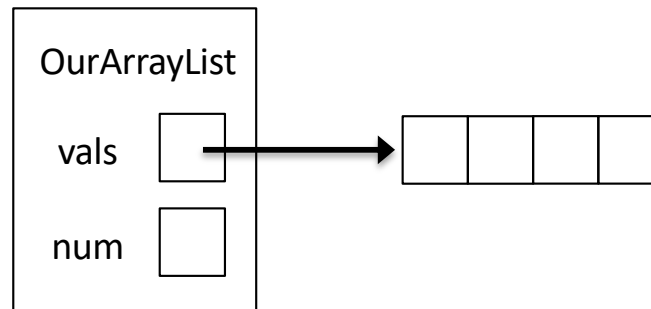
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- E. Not exactly one of the above

# List ADT

- Store ordered collection of values
  - void add(item) //add to end
  - void add(int, item) //add at a given position
  - int size()
  - void remove(item)
  - item remove(int) //remove from given position
  - void clear()
  - item set(int, item)
  - item get(int)
  - ...

# Basic setup for OurArrayList



# What type of item should a List contain?

- List of Strings
- List of ints
- List of Students
- ...

# Generics: Generalizing the type

- Allow a single List declaration to work for lists of different kinds of items

```
public class OurArrayList<T > {  
    public void add(T item) { ... }  
  
    public T get(int i) { ... }  
}
```

# List ADT

- Store ordered collection of values
  - void add(T) //add to end
  - void add(int, T) //add at a given position
  - int size()
  - void remove(T)
  - T remove(int) //remove from given position
  - void clear()
  - T set(int, T)
  - T get(int)
  - ...

# Messy details about generics

- T must be an object type (not “int” or other primitive type)
- Tricky syntax to create an array of this type:  
`@SuppressWarnings("unchecked")`  
`public OurArrayList() {`  
    `num = 0;`  
    `vals = (T[]) new Object[3];`  
`}`
- Also, `toArray` needs to return `Object[]`

# Which of the following lines is incorrect?

(E = not exactly one of the above)

```
public boolean contains(T val) { //A
    for(int i=0; i < vals.length; i++) //B
        if(vals[i] == val) //C
            return true;
    return false; //D
}
```

# Which of the following lines is incorrect?

(E = not exactly one of the above) B and C

```
public boolean contains(T val) { //A
    for(int i=0; i < vals.length; i++) //B
        if(vals[i] == val) //C
            return true;
    return false; //D
}
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