Beyond Java 9

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HIGHLY SPECULATIVE

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```
class Point {
    final int x;
    final int y;
}
```

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```
Point[] points =
```

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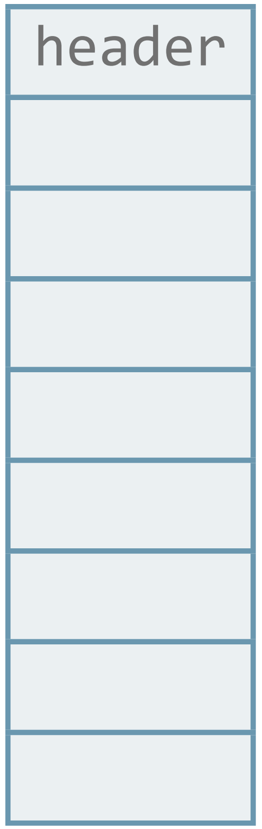
```
Point[] points =
```



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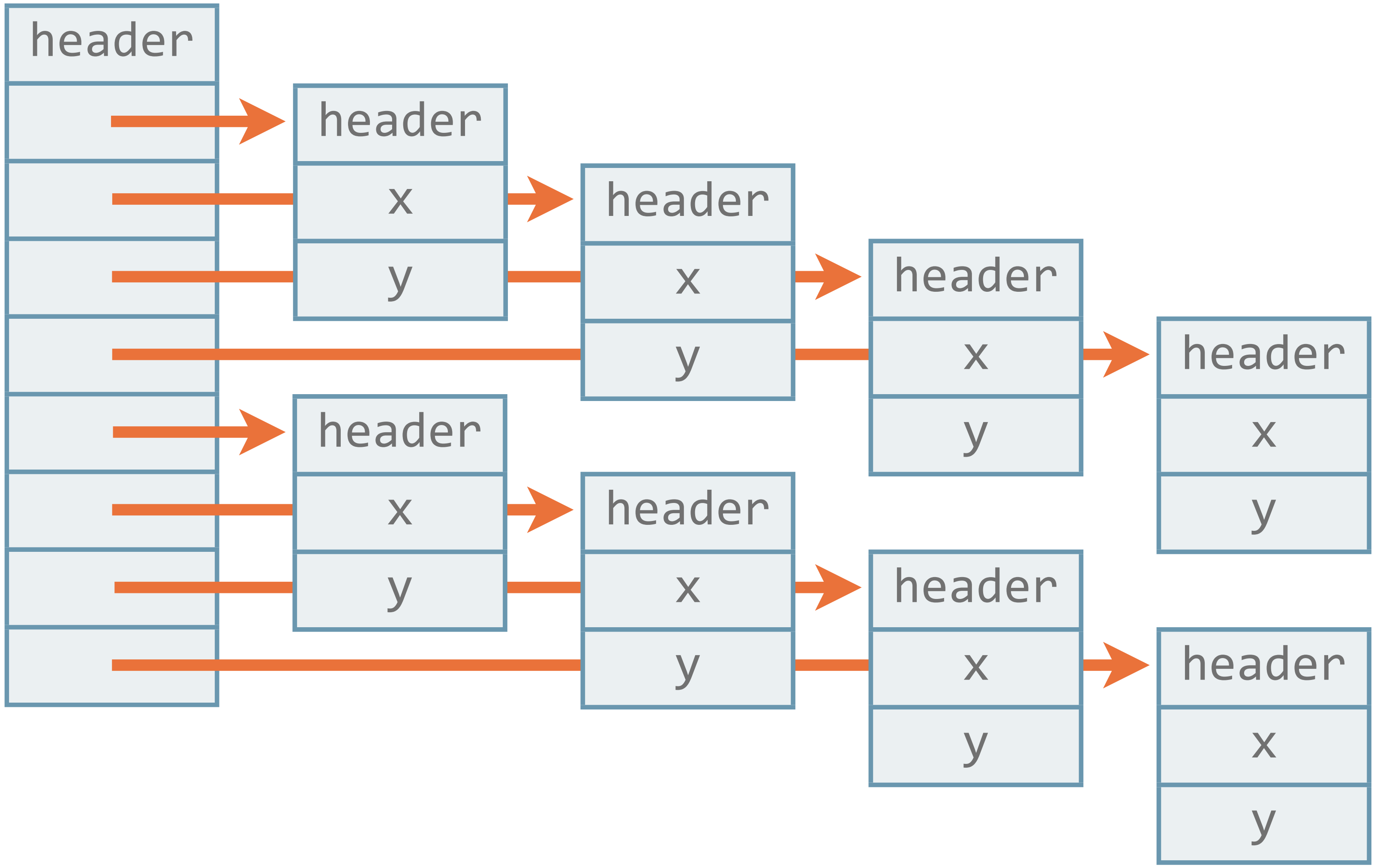
```
Point[] points =
```



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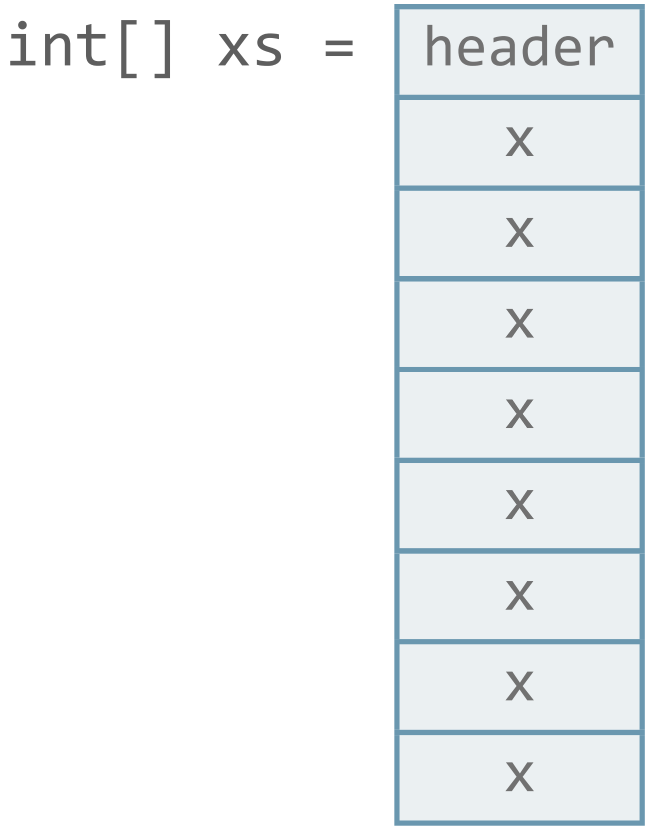

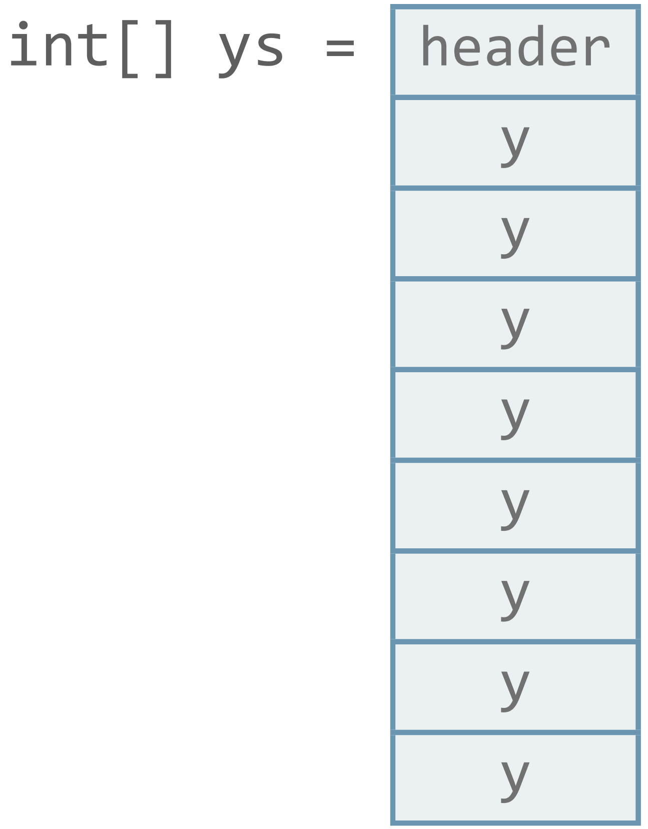

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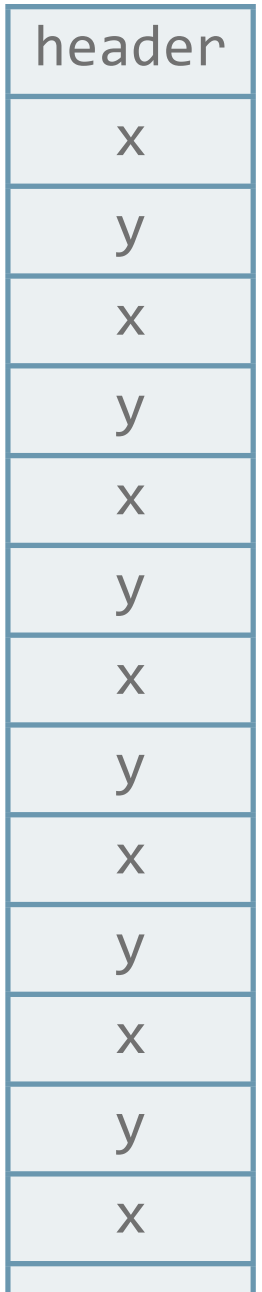
```
Point[] points =
```



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```
synchronized (points[i]) { ... }
```

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```
if (points[i] == p) { ... }
```

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```
System.identityHashCode(points[i])
```

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```
class Point {
    final int x;
    final int y;
}
```

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```
value class Point {
    final int x;
    final int y;
}
```

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```
value class Point {
    final int x;
    final int y;
}
```

“Codes like a class, works like an int!”

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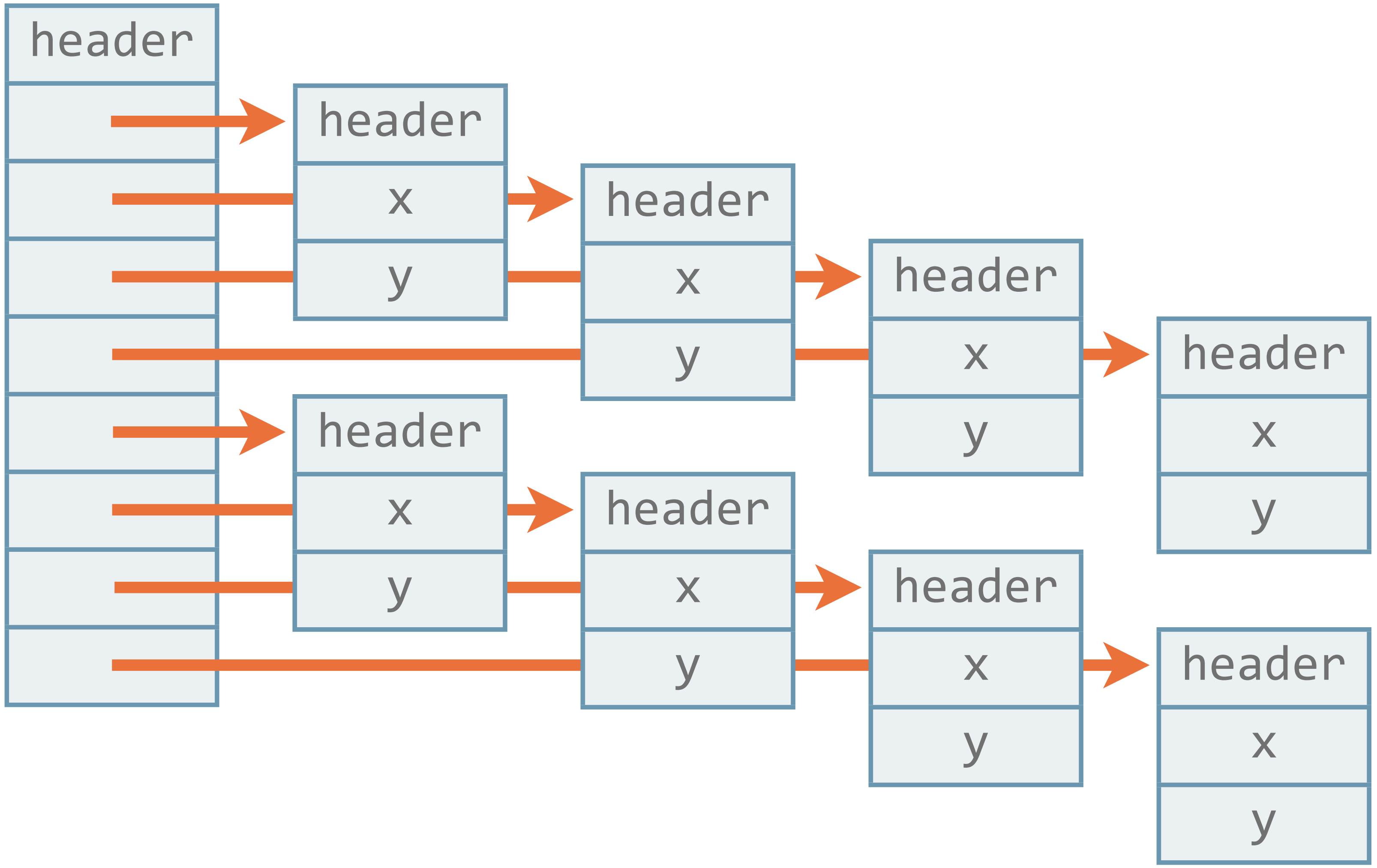
```
Point[] points =
```



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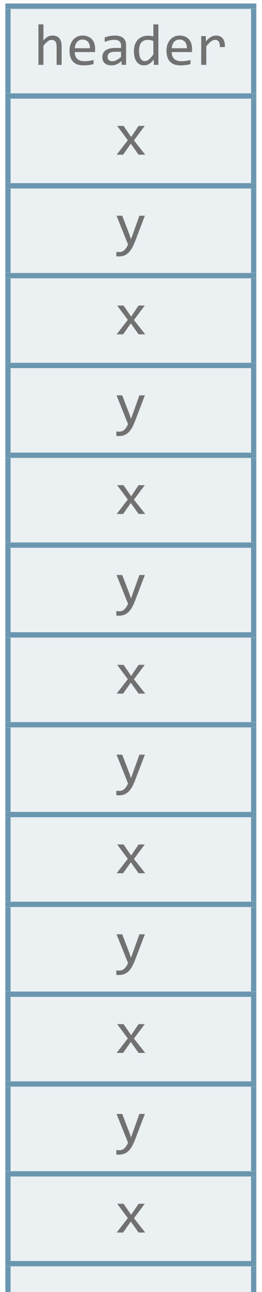
```
Point[] points =
```



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```
value class Point {
    final int x;
    final int y;
}
```

"Codes like a class, works like an int!"

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```
int128
Complex
Decimal
```

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```
int128
Complex
Decimal

Tuple<T,U,V>
```

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```
int128
Complex
Decimal

Tuple<T,U,V>

Optional<T>
Either<T,U>
```

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```
int128
Complex
Decimal

Tuple<T,U,V>

Optional<T>
Either<T,U>

Cursor<T>
```

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```
public value class Optional<T> {

    private final T value;

    public T get() {
        if (value == null)
            throw new NoSuchElementException();
        return value;
    }

    public T orElse(T other) {
        return value != null ? value : other;
    }

    // ...
```

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```
interface Iterator<T> {
    boolean hasNext();
    T next();
    void remove();
}
```

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```
class ArrayIterator<T> implements Iterator<T> {

    private T[] array;
    private int offset;

    public boolean hasNext() { return offset < array.length; }

    public T next() { return array[offset++]; }

    // ...
```

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```
value class ArrayCursor<T> implements Cursor<T> {

    private T[] array;
    private int offset;

    public boolean notEmpty() { return offset < array.length; }

    public T current() { return array[offset]; }

    public T next() { return new Cursor(array, offset + 1); }

    // ...
```

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```
Cursor<String> c = Arrays.cursor(...);
while (c.notEmpty()) {
    doSomething(c.current());
    c = c.next();
}
```

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```
new ArrayList<Point>()
```

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```
new ArrayList<int>()
```

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```
ArrayList<String>
ArrayList<Integer>
ArrayList<URL>
```

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```
ArrayList<String>            ArrayList.class
ArrayList<Integer>           ArrayList.class
ArrayList<URL>               ArrayList.class
```

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```
ArrayList<String>
ArrayList<Integer>
ArrayList<URL>
```

```
ArrayList.class
ArrayList.class
ArrayList.class
```

```
ArrayList<int>
```

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`ArrayList<String>`	`ArrayList.class`
`ArrayList<Integer>`	`ArrayList.class`
`ArrayList<URL>`	`ArrayList.class`
`ArrayList<int>`	`ArrayList${T=int}.class`

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`ArrayList<String>`	`ArrayList.class`
`ArrayList<Integer>`	`ArrayList.class`
`ArrayList<URL>`	`ArrayList.class`
`ArrayList<int>`	`ArrayList${T=int}.class`
`ArrayList<Point>`	

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```
ArrayList<String>              ArrayList.class
ArrayList<Integer>             ArrayList.class
ArrayList<URL>                 ArrayList.class


ArrayList<int>                 ArrayList${T=int}.class
ArrayList<Point>               ArrayList${T=Point}.class
```

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```
ArrayList<String>          ArrayList.class
ArrayList<Integer>         ArrayList.class
ArrayList<URL>             ArrayList.class
```

```
ArrayList<int>             ArrayList${T=int}.class
ArrayList<Point>           ArrayList${T=Point}.class
ArrayList<Complex>
```

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```
ArrayList<String>          ArrayList.class
ArrayList<Integer>         ArrayList.class
ArrayList<URL>             ArrayList.class
```

```
ArrayList<int>             ArrayList${T=int}.class
ArrayList<Point>           ArrayList${T=Point}.class
ArrayList<Complex>         ArrayList${T=Complex}.class
```

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```
public class ArrayList<T> {

    private int size;
    private T[] data;

    public void clear() {
        for (int i = 0; i < size; i++)
            data[i] = null;
        size = 0;
    }

    // ...
```

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```
public class ArrayList<any T> {

    private int size;
    private T[] data;

    public void clear() {
        for (int i = 0; i < size; i++)
            data[i] = null;
        size = 0;
    }

    // ...
```

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```
public class ArrayList<any T> {

    private int size;
    private T[] data;

    public void clear() {
        for (int i = 0; i < size; i++)
            data[i] = null;
        size = 0;
    }

    // ...
```

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```
public class ArrayList<any T> {

    private int size;
    private T[] data;

    public void clear() {
        where ref t {
            for (int i = 0; i < size; i++)
                data[i] = null;
        }
        size = 0;
    }

    // ...
```

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```java
public class ArrayList<any T> {
```

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```
public class ArrayList<any T> {

    public T remove(int index) { ... }
    public boolean remove(T element) { ... }

    // ...
```

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```
public class ArrayList<any T> {

    public T removeAt(int index) { ... }
    public boolean remove(T element) { ... }

    // ...
```

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```
public class ArrayList<any T> {

    public T removeAt(int index) { ... }
    public boolean remove(T element) { ... }

   where ref T {
        default public T remove(int index) {
            return removeAt(index);
        }
    }

    // ...
```

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```
ArrayList<boolean>
```

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Project Panama

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Project Valhalla

Value Types
Specialized Generics
Var Handles

Project Panama

OpenJDK

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Project Valhalla

Value Types
Specialized Generics
Var Handles

Project Panama

Foreign Function Interface
Data Layout Control
Arrays 2.0

OpenJDK

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Oracle

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