



ARRAY OF OBJECTS

zyBook 6.11

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STUDENT OBJECT

- Student stores student name, major, and graduation year.
- Must be constructed using the new keyword

```
Student <name> = new Student(<student_name>, <major>, <grad_year>);
```

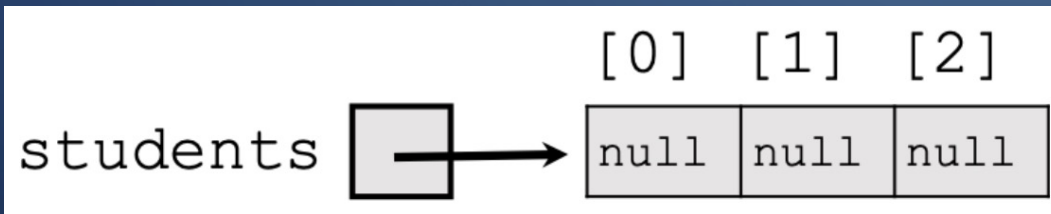
- Example

```
Student studentA = new Student("Student A", "CSC", 2020);
```

- API → https://pages.github.ncsu.edu/engr-csc116-staff/Schmidt/assets/lectureCode/Array_of_Objects/Student.html
- Student.java **must be included** in src directory → https://pages.github.ncsu.edu/engr-csc116-staff/Schmidt/assets/lectureCode/Array_of_Objects/Student.java

ARRAY OF OBJECTS

```
Student [] students = new Student [3];
```



NULL

- It is **legal** (will not throw an exception) to:
 - **store null in a variable or array element** (often as a dummy value, an initial value to be overwritten later)

```
String s = null;
```

```
words[2] = null;
```

- **print a null reference**

```
System.out.println(s); // will print: null
```

- **ask whether a variable or array element is null**

```
if (words[i] == null) { ... }
```

- **pass null as a parameter to a method**

- **return null from a method** (often as an indication of failure, such as a method that searches for an object in a file/array but does not find it)

NULL POINTER EXCEPTION

- It is not legal to dereference a null value (trying to access any of its methods or data using . (dot) notation)
- Since null is not an actual object, it has no methods or data. Trying to access them crashes your program.

```
1 public class ExampleNull {  
2  
3     public static void main(String[] args) {  
4         String[] words = new String[5];  
5         System.out.println("word 0 is: " + words[0]);  
6         words[0] = words[0].toUpperCase(); // bad  
7         System.out.println("word 0 is now: " + words[0]);  
8     }  
9  
10 }
```

```
$ java -cp bin ExampleNull
```

```
word 0 is: null
```

```
Exception in thread "main" java.lang.NullPointerException  
    at ExampleNull.main(ExampleNull.java:6)
```

AVOIDING NULLPOINTEREXCEPTION

When dealing with elements that may be null, you must take care to check for null before any calls.

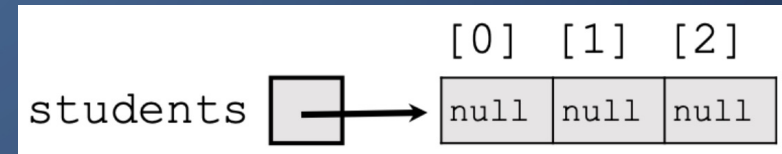
```
1 public class WordCounts {  
2  
3     public static void main(String[] args) {  
4         String[] words = new String[5];  
5         words[0] = "hello";  
6         words[2] = "goodbye";  
7         // words[1], [3], [4] are null  
8         int totalLetters = 0;  
9         for (int i = 0; i < words.length; i++) {  
10             if (words[i] != null) {  
11                 totalLetters += words[i].length();  
12             }  
13         }  
14         System.out.println("letters: " + totalLetters); // 12  
15     }  
16  
17 }
```

```
$ java -cp bin WordCounts  
letters: 12
```

TWO-PHASE INITIALIZATION

- Arrays of objects should use a 2-phase initialization
 - initializing the array itself

`Student [] students = new Student [3];`

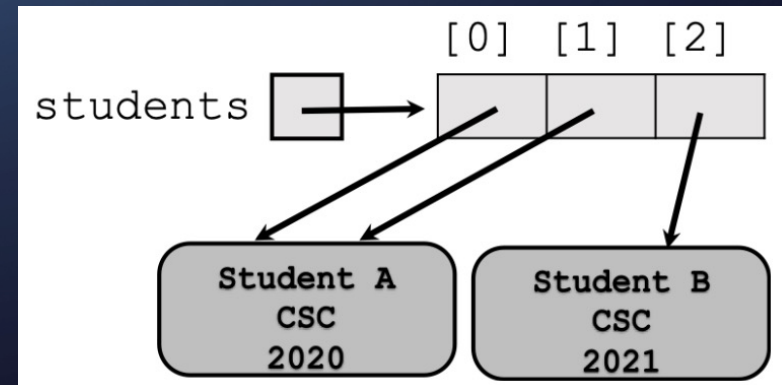


- initializing the object stored into each element of the array

`students[0] = new Student("Student A", "CSC", 2020);`

`students[1] = students[0];`

`students[2] = new Student("Student B", "CSC", 2021);`



COMMAND-LINE ARGUMENTS

Array initialized by Java if user provides command-line arguments

```
public class Hello {  
    public static void main(String[] args) {  
        System.out.print("Hello");  
        for (int i = 0; i < args.length; i++) {  
            System.out.print(" " + args[i]);  
        }  
        System.out.println();  
    }  
}
```

```
$ java -cp bin Hello Jessica Schmidt  
Hello Jessica Schmidt
```

