1. Which of the following declaration statements create a reference type? (Check all that are correct.)

Show Results 22/24 Students Answered

A int x = 5; primitive -- value type

B boolean isOn = true; primitive -- value type

C String message = "Hello"; ✓ reference type

D int[] scores = new int[5]; ✓ reference type

E I don't know.

No Explanation

3. When a reference variable does not point to an object, it's value is _____.

Hide Answers Show Names 21/24 Students Answered

null
0
null
0
null
null
primitive
null

String name;

int[] myArray;

stack
name - null
myArray - null

3. When a reference variable does not point to an object, it's value is _____.

Hide Answers Show Names 21/24 Students Answered

null
0
null
0
null
null
primitive
null
null

String name;

int[] myArray;

stack
name - null
myArray - null

The value is null
because java doesn't know
how many bytes you will need

int num = 0;

RAM

stack
store primitive types are stored

heap

Strings are immutable -- they cannot change

```
String name = "Margaret";

name = "Bob";
```

Arrays are ~~immutable~~

Arrays are fixed in size

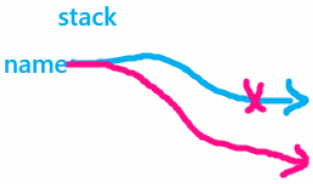

```
int[] myArray = new int[5];
int[] temp = new int[6];
//copy each element from myArray into temp
// rename temp to myArray
```

Strings are immutable -- they cannot change

```
String name = "Margaret";

name = "Bob";

name = name + "Smith";
```



garbage collector will come along and release the memory

Arrays are ~~immutable~~

Arrays are fixed in size

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0 1 2345 6789101112

5. String s1 = "ALL MEN ARE CREATED EQUAL";
String s2 = s1.substring(16, 19);

System.out.println(s2);

T E D

substring(starting index, one past the ending index);

What is the output of the preceding code snippet?

Hide Answers | Show Names | 21/24 Students Answered

TED

TED

TED

E, U

6. char[] awesomeArray = new char[] { 'A', 'w', 'e', 's', 'o', 'm', 'e' };
String awesomeString1 = new String(awesomeArray);
String awesomeString2 = new String(awesomeArray);

new operator will give you a new location in the heap

boolean areEqual = awesomeString1 == awesomeString2;

compare that they have the same address
or reference the same location in the heap

What is the value of the *areEqual* variable after this code executes?

Show Results | 21/24 Students Answered

== comparison operator for primitive types

A true

.equals method needs to be used to compare reference types

B false

String answer = ch1 + "" + ch2

C I don't know

i No Explanation

6. char[] awesomeArray = new char[] { 'A', 'w', 'e', 's', 'o', 'm', 'e' };
String awesomeString1 = new String(awesomeArray);
String awesomeString2 = new String(awesomeArray);

new operator will give you a new location in the heap

String st1 = "Awesome";
String st2 = new String("Awesome");

boolean areEqual = awesomeString1 == awesomeString2;

compare that they have the same address
or reference the same location in the heap

What is the value of the *areEqual* variable after this code executes?

Show Results | 21/24 Students Answered

== comparison operator for primitive types

A true

.equals method needs to be used to compare reference types

B false

String answer = ch1 + "" + ch2

C I don't know

System.out.println(awesomeString);

i No Explanation

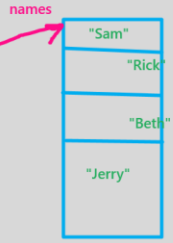
String name = new String("Bob");

List <T> objectName = new ArrayList<>();

Programming to an Interface

```
List <String> names = new ArrayList<>();
Interface                    Class
names.add("Rick");
names.add("Beth");
names.add("Jerry");
names.add(0, "Sam");

for (int i = 0; i < names.size(); i++) {
  System.out.println(names.get(i));
}
```



- T stands for data type
- The add method is overloaded – add name is the same, but takes in different parameter listings

```
####################
Lists can be sorted
####################
Bilbo    0
Gandalf  1
Merry    2
Pippin   3
Sam      4
####################
Lists can be reversed too
####################
Sam      0
Pippin   1
Merry    2
Gandalf  3
Bilbo    4
####################
       FOREACH
####################
```

Indexes have changed permanently