Object Oriented Programming

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String in Java

- String consists of multiple characters to represent a sentence in Java program
- Type name – String (note the Capital S)
- Variable declaration and initialization is similar to primitive types
- Different from primitive type (int, char, long, double, …), String is a reference type variable

About String Variable

- Different from primitive type variable, you can do a variety of stuffs with String variable
  - A variable name followed by “dot” and function name it needs to perform
- charAt (int index) – return a character at a specific index
- equals (String str) – check if two string has same content
- indexOf (String str) – return index of input string
- length() – return a length of a string
- substring(int begin, int end) – return a subset of string from a given index [begin ~ end)
- toLowerCase() – convert a string to lowercase
- toUpperCase() – convert a string to uppercase

String Methods (Functions)

- Parsing a string using split method
  - Among many String method, split is quite handy to parse an input string
  - Syntax
    - stringVariable.split("SEPARATOR")
  - Return type is string array

```
String input = "leeky,1g,bokyeong,chohye,cjy97424";
String[] ids = input.split(",");
for (String id : ids) {
    System.out.println(id);
}
```

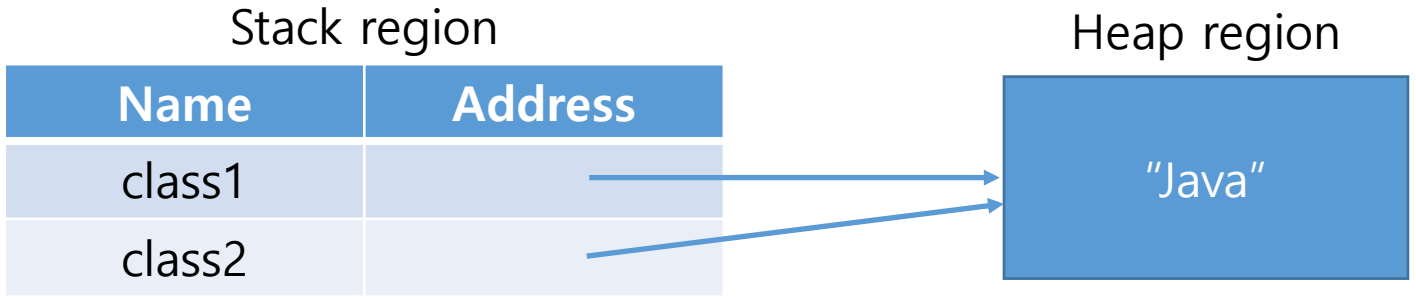
```
public class StringExercise {
    public static void main(String[] args) {
        String input = "oop, python, c++";
        String[] courses = input.split(",");
        for (String course : courses) {
            System.out.println(course);
        }
        String name = "object oriented programming";
        char thirdChar = name.charAt(2);
        System.out.println(thirdChar);
        int indexOfProgram = name.indexOf("programming");
        System.out.println(indexOfProgram);
        System.out.println(name.indexOf("software"));
        System.out.println(name.length());
        System.out.println(name.substring(7, 15));
        System.out.println(name.toUpperCase());
        System.out.println("KOOKMIN UNIV".toLowerCase());
    }
}
```

String Variable Diverse Actions

- Do you remember how a primitive type variable is stored?
  - int variable – 4 byte (32bit) in a consecutive memory area as a binary number
  - 9 – 00000000 00000000 00000000 00001001
- If a string variable is stored similar to primitive type, how can it perform such diverse actions?
- Reference type (참조타입)
  - In a variable value, an address where an actual object exists is stored
  - Class, array, …

How to Create String Variable

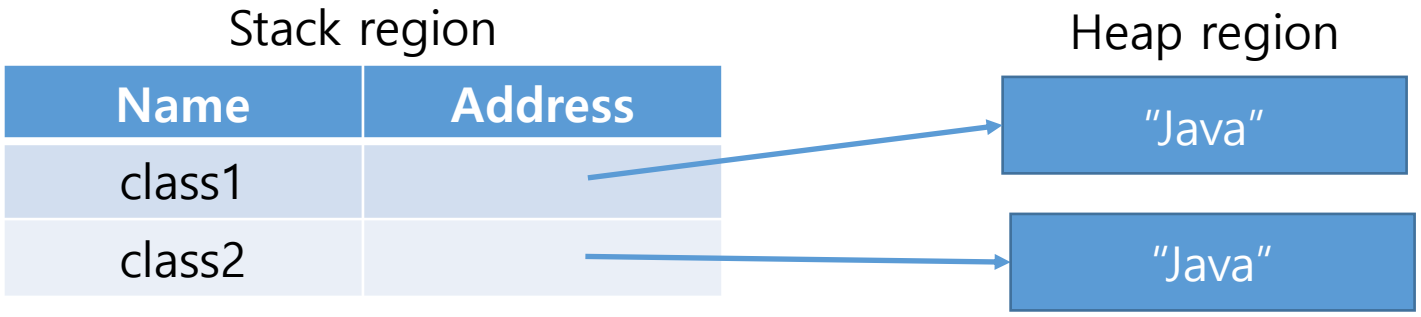
- Creating a string variable using quotes
  - String class1 = “Java”;
  - String class2 = “Java”;
  - Using quotes to specify a String variable results in pointing to a same heap region (StringPool)



class1 == class2; true

Creating a New String Object with new

- A keyword new is utilized to create a new object in a heap area
  - String class1 = new String("Java");
  - String class2 = new String("Java");
  - class1 == class2; //false
  - class1.equals(class2); //true



class1 == class2; false

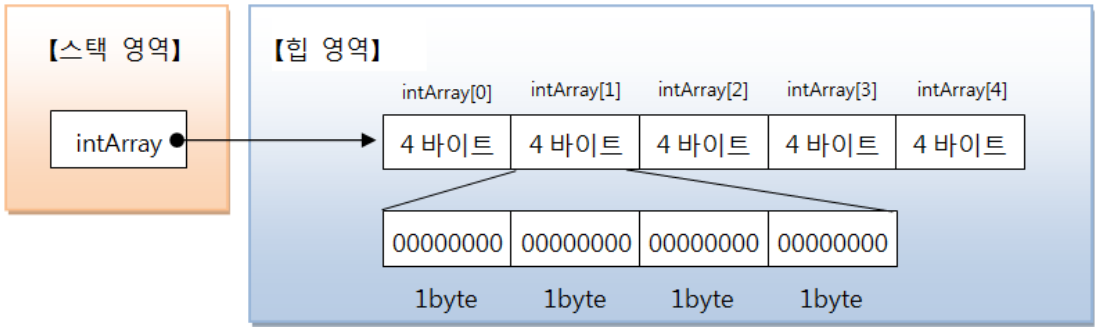
```
public class StringEquality {
    public static void main(String[] args) {
        String name = "object oriented programming";
        String sbj1 = new String("object oriented programming");
        String sbj2 = "open source software";
        boolean isSbj1Same = name.equals(sbj1);
        boolean isSbj2Same = name.equals(sbj2);
        boolean equalCheck = name == sbj1;
        System.out.println("sbj1 : " + sbj1 + " sbj2: " + sbj2 + " equal check: " + equalCheck);

        String class1 = "Java Programming";
        String class2 = "Java Programming";
        String class3 = new String("Java Programming");
        System.out.println(class1 + " " + class2 + " " + class3);
        System.out.println(class1 == class2);
        System.out.println(class1 == class3);
        System.out.println(class1.equals(class3));
    }
}
```

Array with a Reference Variable

- Multiple String, a reference variable, variables can be declared using an array
- Compare with an array of primitive type (int, double, float, …)
  - Each element in a heap has the value
- An array with reference objects contains address of the real value

Primitive type



Reference type