

1 Static Shock

Write what the `main` method will print out once it is executed. It might be helpful to draw box and pointer diagrams to keep track of variables. (Spring '15, MT1)

```
1 public class Shock {  
2     public static int bang;  
3     public static Shock baby;  
4     public Shock() {  
5         this.bang = 100;  
6     } 指的是class!  
7     public Shock (int num) {  
8         this.bang = num; 改200  
9         baby = starter();  
10        this.bang += num;  
11    } 100 加上 class的bang變成300  
12    public static S200 tarter() {  
13        Shock gear = new Shock();  
14        return gear;  
15    }  
16    public static void shrink(Shock statik) {  
17        statik.bang -= 1;  
18    }  
19    public static void main(String[] args) {  
20        Shock gear = new Shock(200);  
21        System.out.println(gear.bang); -----  
22        shrink(gear); 99  
23        shrink(starter());  
24        System.out.println(gear.bang); -----  
25    }  
26 }
```

**只要是Static variable
如果instance去修改，就會改到class的**

不知道是class改變還是gear改變

AS IS

2 Horse-o-Scope

Given the following program, draw out the box and pointer diagram that results from executing the `main` method. What is the output printed by the program? (Summer '16, MT1)

```

1  public class Horse {
2      Horse same;
3      String jimmy;
4
5      public Horse(String lee) {
6          jimmy = lee;
7      }
8
9      public Horse same(Horse horse) {
10         if (same != null) {
11             Horse same = horse;
12             same.same = horse;
13             same = horse.same;
14         }
15         return same.same;
16     }
17
18     public static void main(String[] args) {
19         Horse horse = new Horse("you've been");
20         Horse cult = new Horse("horsed");
21         cult.same = cult;
22         cult = cult.same(horse);
23         System.out.println(cult.jimmy);
24         System.out.println(horse.jimmy);
25     }
26 }
```

Program Output:

NOTE:

This question (Horse-o-Scope) and variable shadowing in general (defining local variables with the same name as instance variables) is not in the scope of Spring 2019.

3 Give em the 'Ol Switcheroo

For each function call in the `main` method, write out the `x` and `y` values of both `foobar` and `baz` after executing that line. (Spring '15, MT1)

```

1  public class Foo {
2      public int x, y;
3
4      public Foo (int x, int y) {
5          this.x = x;
6          this.y = y;
7      }
8
9      public static void switcheroo (Foo a, Foo b) {
10         Foo temp = a;
11         a = b;
12         b = temp;
13     }
14
15     public static void fliperoo (Foo a, Foo b) {
16         Foo temp = new Foo(a.x, a.y);
17         a.x = b.x;
18         a.y = b.y;
19         b.x = temp.x;
20         b.y = temp.y;
21     }
22
23     public static void swaperoo (Foo a, Foo b) {
24         Foo temp = a;
25         a.x = b.x;
26         a.y = b.y;
27         b.x = temp.x;
28         b.y = temp.y;
29     }
30
31     public static void main (String[] args) {
32         Foo foobar = new Foo(10, 20); foobar取得地址, 指向的地方是
33         Foo baz = new Foo(30, 40); Foo這種資料結構
34         switcheroo(foobar, baz);    foobar.x: ___ foobar.y: ___ baz.x: ___ baz.y: ___
35         fliperoo(foobar, baz);    foobar.x: ___ foobar.y: ___ baz.x: ___ baz.y: ___
36         swaperoo(foobar, baz);   foobar.x: ___ foobar.y: ___ baz.x: ___ baz.y: ___
37     }
38 }
```

4 Quik Maths

What would the contents of the array be after being run through these functions in the *main* method? (Fall '16, MT1)



```

1 public class QuikMaths {
2     public static void mulitplyBy3(int[] A) {
3         for (int x: A) {
4             x = x * 3;
5         }
6     }
7
8     public static void multiplyBy2(int[] A) {
9         int[] B = A;
10        for (int i = 0; i < B.length; i+= 1) {
11            B[i] *= 2;
12        }
13    }
14
15    public static void swap (int A, int B ) {
16        int temp = B;
17        B = A;
18        A = temp;
19    }
20
21    public static void main(String[] args) {
22        int[] arr;
23        arr = new int[]{2, 3, 3, 4};
24        multiplyBy3(arr);
25        6, 9, 9, 12
26        /* Value of arr: {-----} */
27
28        arr = new int[]{2, 3, 3, 4};
29        multiplyBy2(arr);
30
31        /* Value of arr: {-----} */
32
33        int a = 6;
34        int b = 7;
35        swap(a, b);
36
37        /* Value of a: ----- Value of b: ----- */
38    }
39 }
```

改到的是裡面LOCAL的A和B!