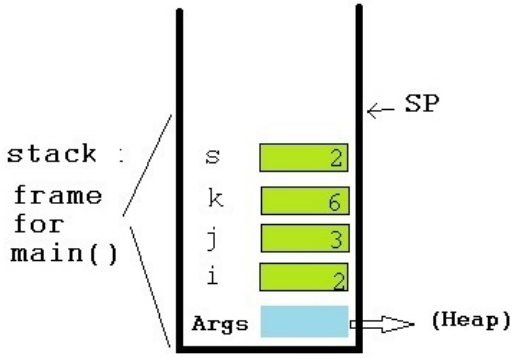
Lab 10

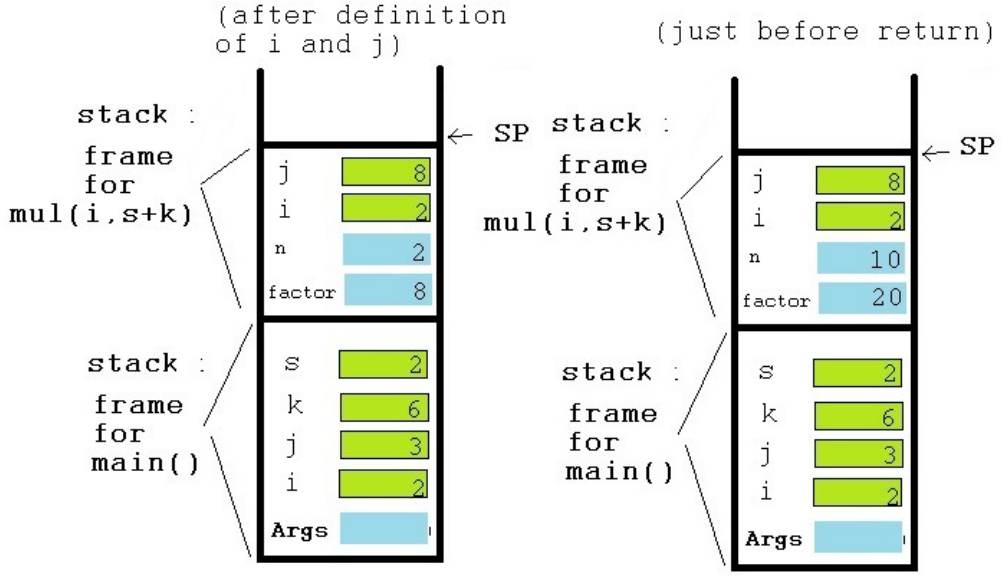
CSE114 – Intro to Object Oriented Programming

Declare (1)

```
public class Declare {
…
   public static void main (String[] args) {
      int i;
      i = 2;
      int j = 3;

      int k;
      k = i * j;
      System.out.println("sum is: " + i + j + k);
      int s = 2;
      i = mul(i, s + k);
      j = mul(s, s);
      System.out.println("sum is: " + i + j + s);
   }
}
```

Before first call to mul()

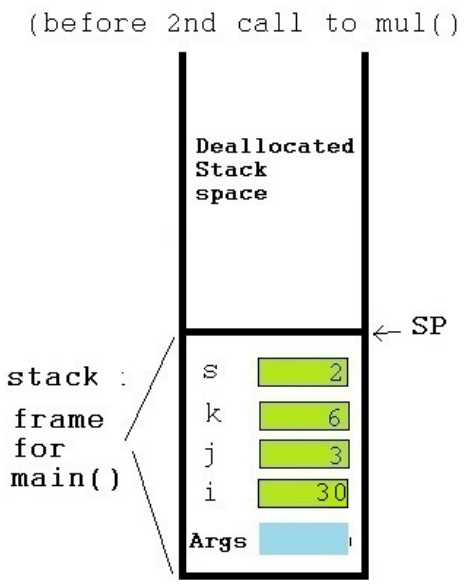


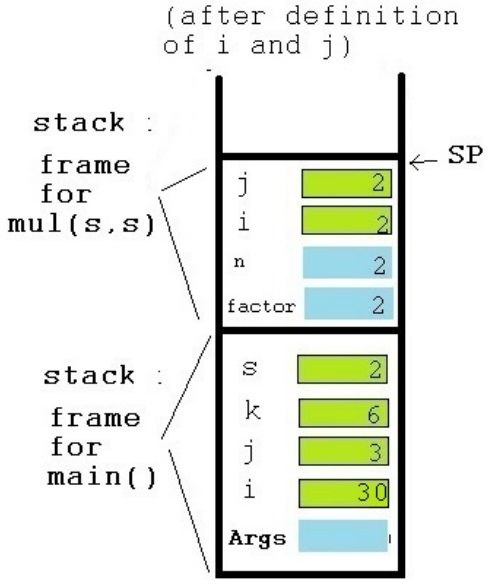


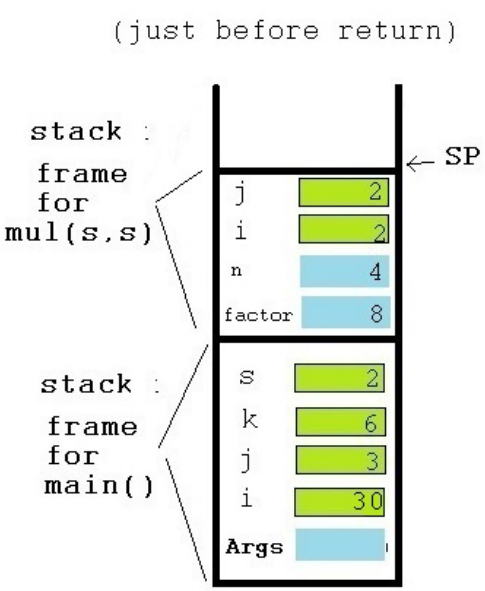

```
public static int mul(int n, int factor) {
      int i = n;
      int j = factor;
      n = i + j;
      factor = n + n;
      return n + factor;
   }
```

Declare (2)

```
public class Declare {
…
   public static void main (String[] args) {
      int i;
      i = 2;
      int j = 3;

      int k;
      k = i * j;
      System.out.println("sum is: " + i + j + k);
      int s = 2;
      i = mul(i, s + k);
      j = mul(s, s);
      System.out.println("sum is: " + i + j + s);
   }
}
```



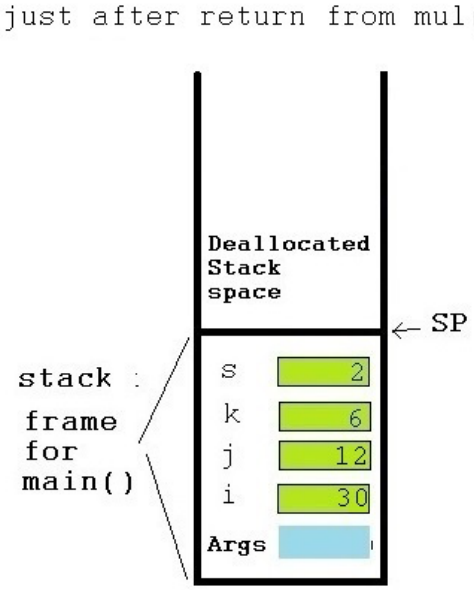





```
public static int mul(int n, int factor) {
      int i = n;
      int j = factor;
      n = i + j;
      factor = n + n;
      return n + factor;
   }
```

Declare (3)

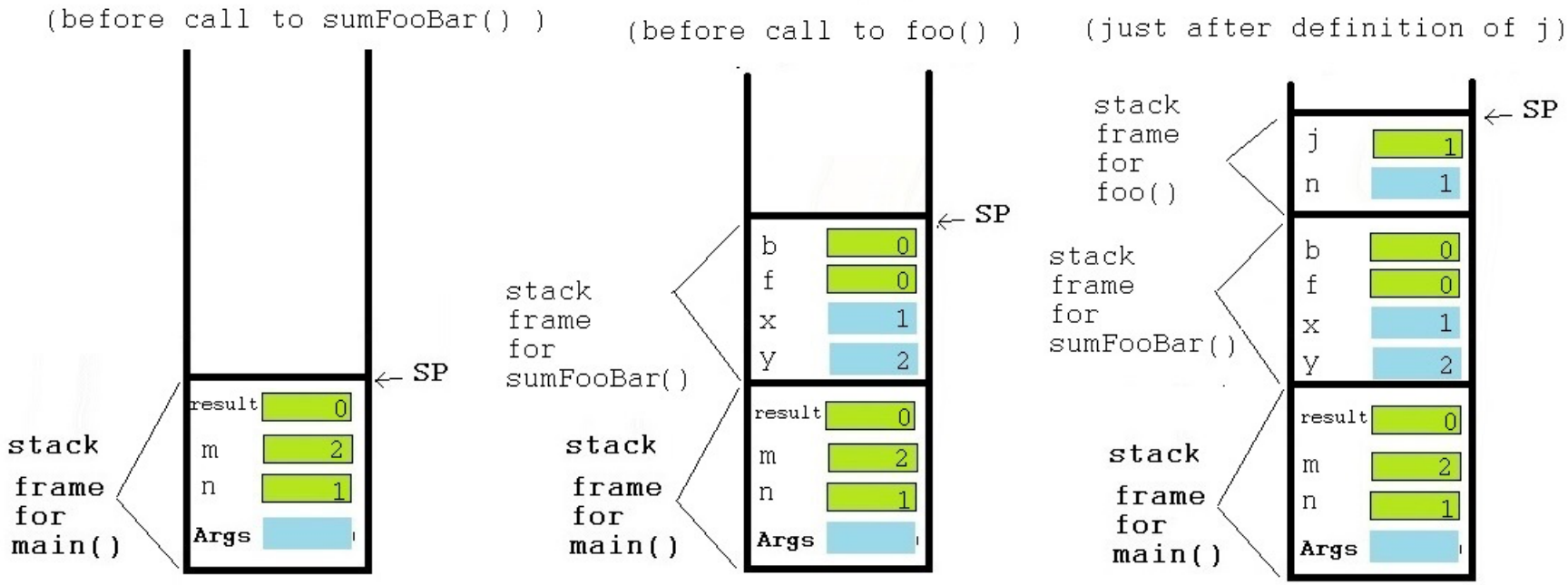
```
public class Declare {
…
   public static void main (String[] args) {
      int i;
      i = 2;
      int j = 3;

      int k;
      k = i * j;
      System.out.println("sum is: " + i + j + k);
      int s = 2;
      i = mul(i, s + k);
      j = mul(s, s);
      System.out.println("sum is: " + i + j + s);
   }
}
```




```
public static int mul(int n, int factor) {
      int i = n;
      int j = factor;
      n = i + j;
      factor = n + n;
      return n + factor;
   }
```

Stack (1)

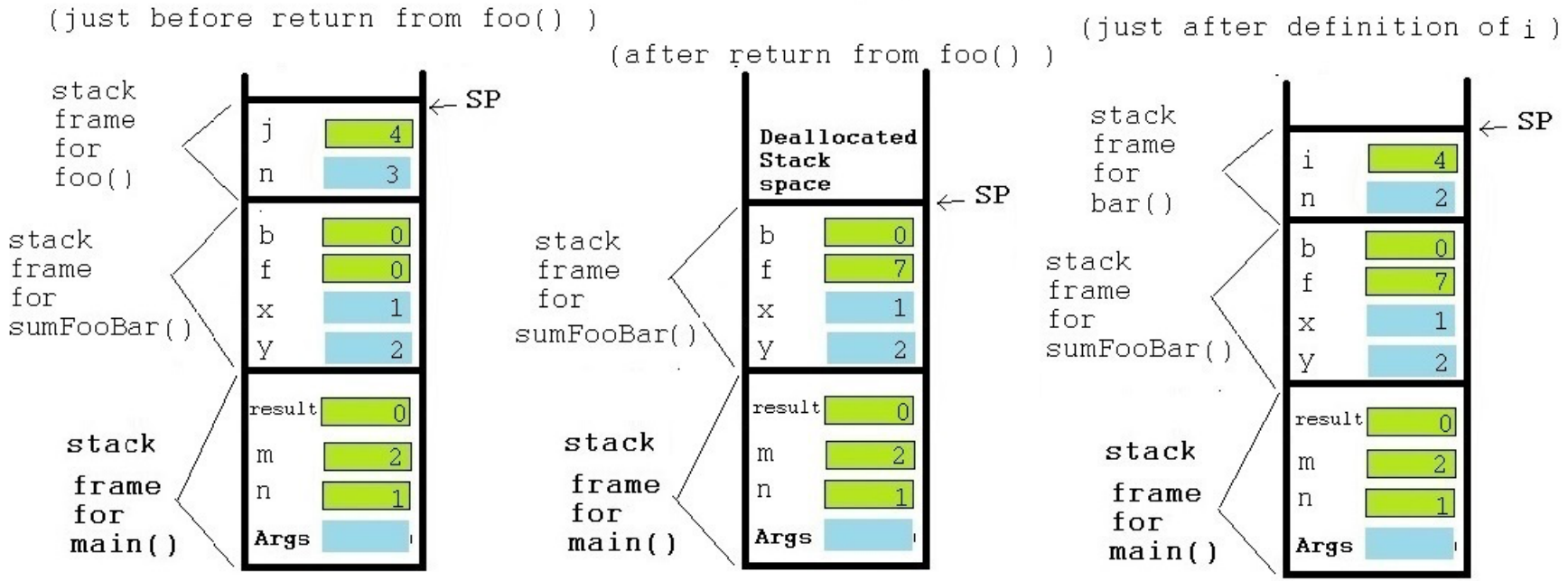
```
public class Stack {
   public static int foo (int n) {
      int j = n;
      n = n + 2;
      j = j + 3;
      return j + n;
   }
   public static int bar (int n) {
      int i = n * n;
      i = i * n;
      n = i;
      return n + n;
   }
...
}
```




```
public static int sumFooBar (int x, int y) {
   int f = foo(x);
   int b = bar(y);
   return f + b;
}
public static void main (String[] args) {
   int n = 1;
   int m = 2;
   int result = sumFooBar(n, m);
   System.out.println(n + ", " + m + ", " + result);
}
```

Stack (2)

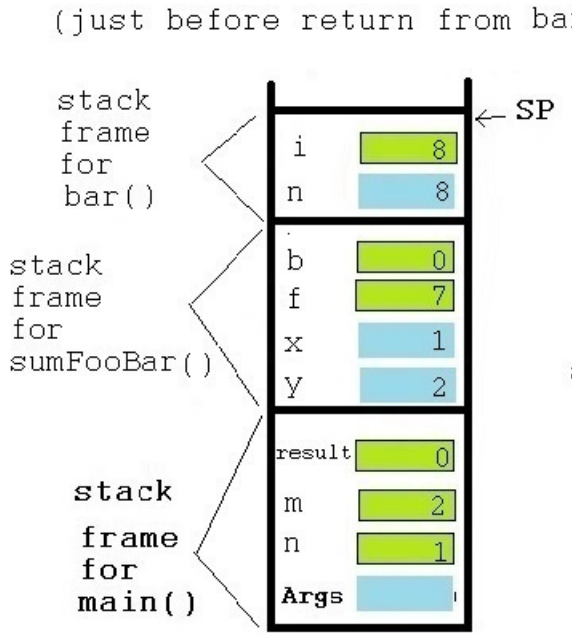
```
public class Stack {
   public static int foo (int n) {
      int j = n;
      n = n + 2;
      j = j + 3;
      return j + n;
   }
   public static int bar (int n) {
      int i = n * n;
      i = i * n;
      n = i;
      return n + n;
   }
...
}
```

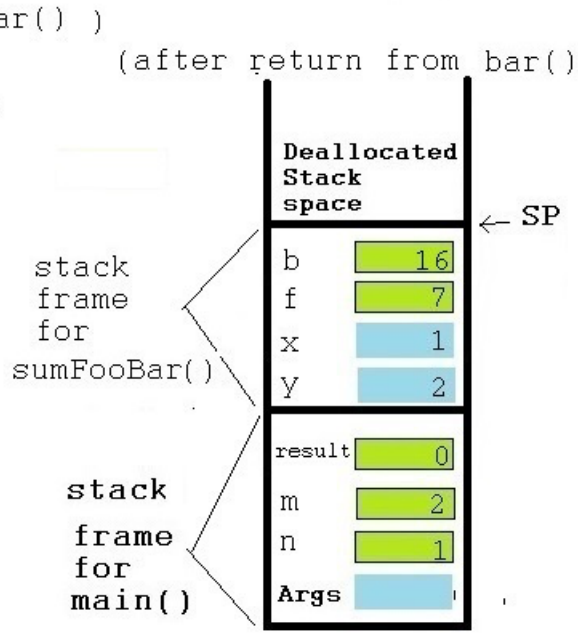


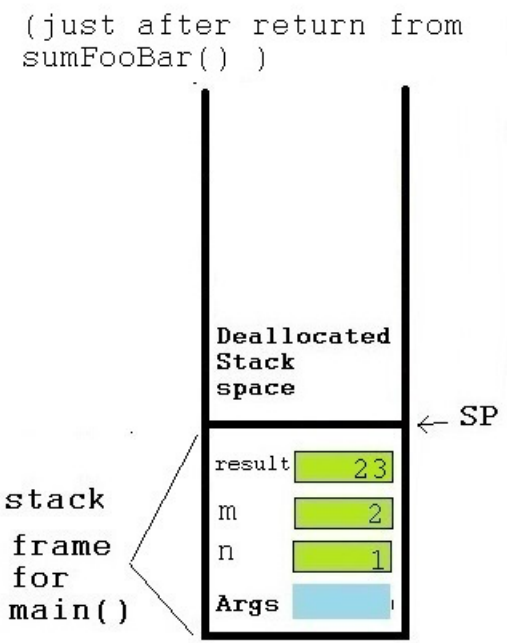

```
public static int sumFooBar (int x, int y) {
   int f = foo(x);
   int b = bar(y);
   return f + b;
}
public static void main (String[] args) {
   int n = 1;
   int m = 2;
   int result = sumFooBar(n, m);
   System.out.println(n + ", " + m + ", " + result);
}
```

Stack (3)

```
public class Stack {
   public static int foo (int n) {
      int j = n;
      n = n + 2;
      j = j + 3;
      return j + n;
   }
   public static int bar (int n) {
      int i = n * n;
      i = i * n;
      n = i;
      return n + n;
   }
...
}
```



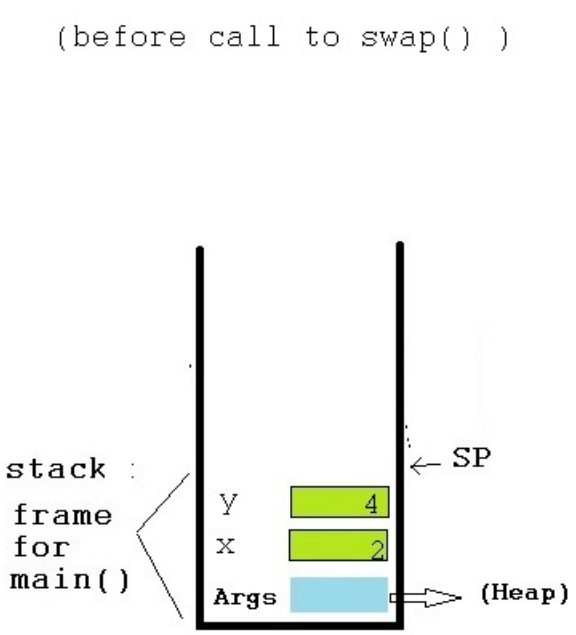


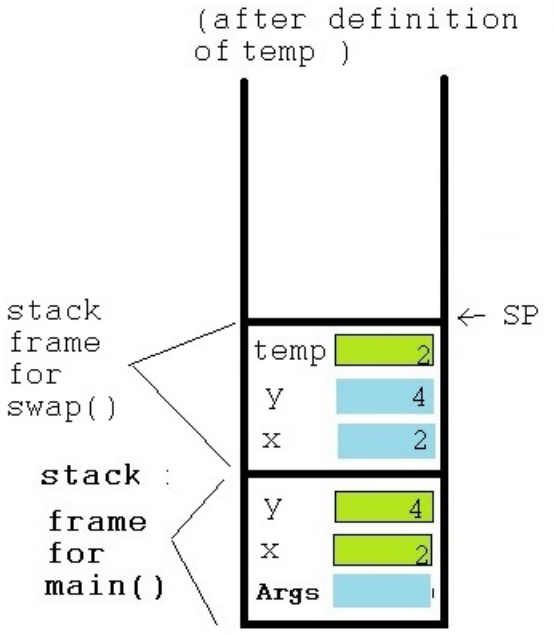


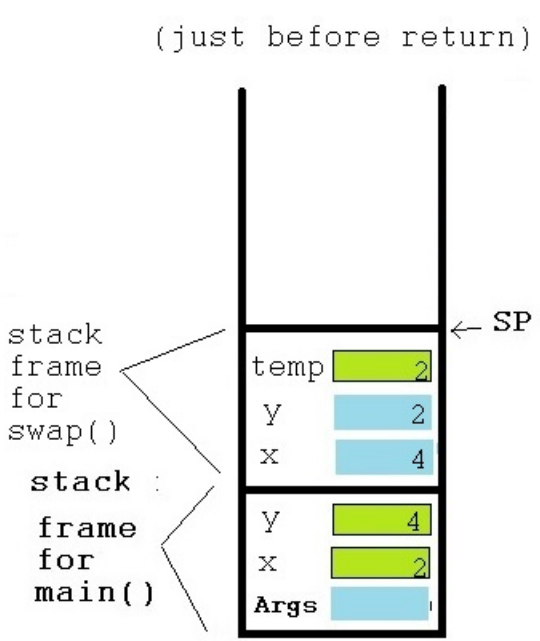

```
public static int sumFooBar (int x, int y) {
   int f = foo(x);
   int b = bar(y);
   return f + b;
}
public static void main (String[] args) {
   int n = 1;
   int m = 2;
   int result = sumFooBar(n, m);
   System.out.println(n + ", " + m + ", " + result);
}
```

Parameter(1)

```
public class Parameter {

   public static void swap (int x, int y) {
      int temp = x;
      x = y;
      y = temp;
   }

   public static void main (String[] args) {
      int x = 2;
      int y = 4;

      swap(x, y);
      System.out.println(x + ", " +  y);
   }

}
```



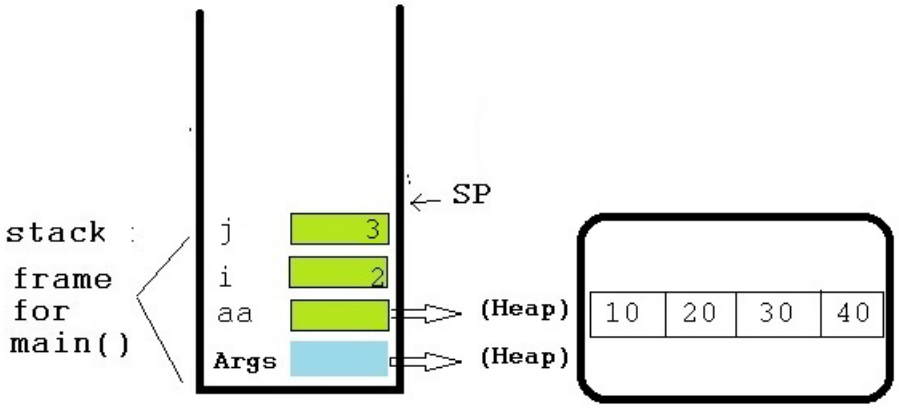




Memory(1)

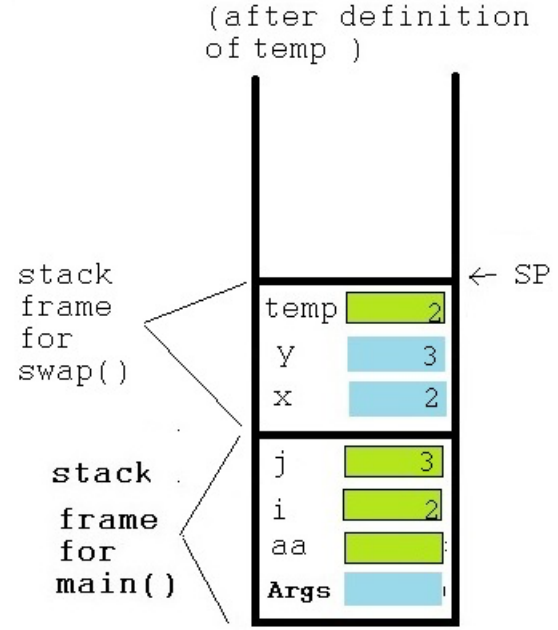
```
public class Memory {
   public static void swap (int x, int y) {
      int temp = x;
      x = y;
      y = temp;
   }
   public static void swap2 (int[] arr, int i, int j) {
      int temp = arr[i];
      arr[i] = arr[j];
      arr[j] = temp;
   }
   public static void print (int[] aa) {
…
   }
…
}
```

(after definitions in main( ))

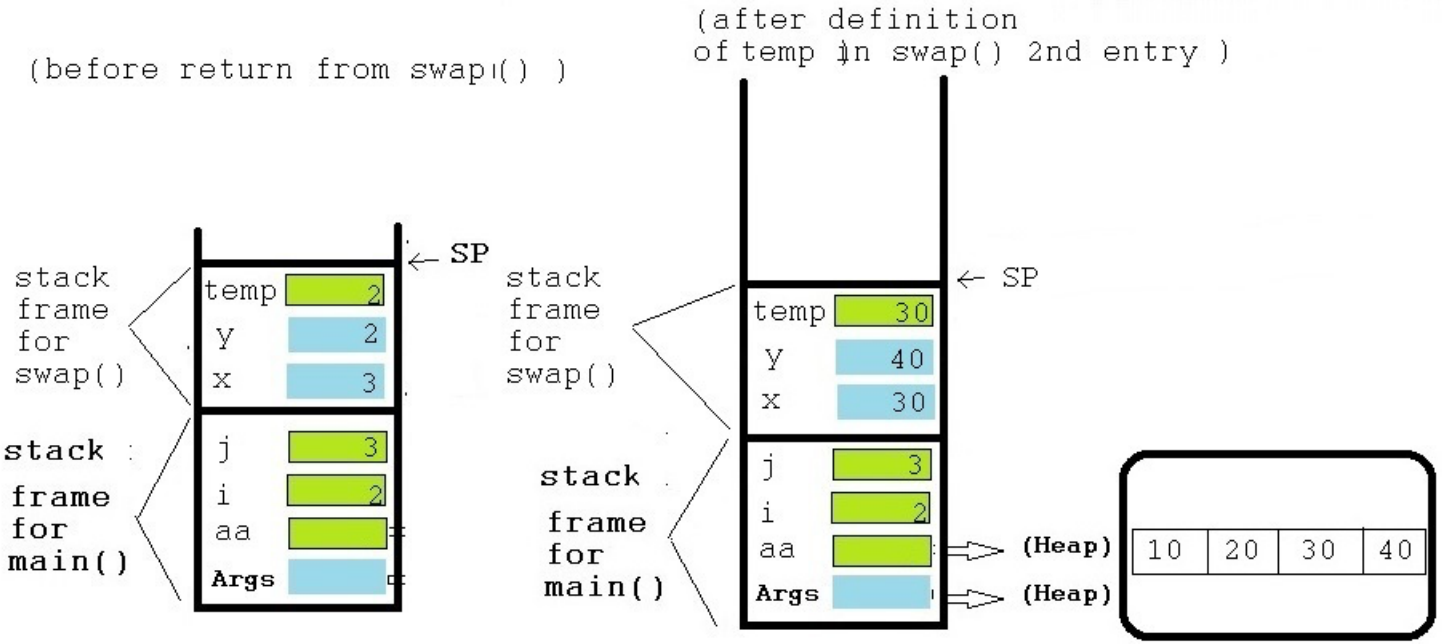



```
public static void main (String[] args) {
      int i = 2;
      int j = 3;
      int[] aa = {10, 20, 30, 40};
      System.out.println("i = " + i + " j = " + j);
      swap(i, j);
      System.out.println("i = " + i + " j = " + j);
      print(aa);
      swap(aa[2], aa[3]);
      print(aa);
      swap2(aa, 2, 3);
      print(aa);
   }
```

(after definition of temp)



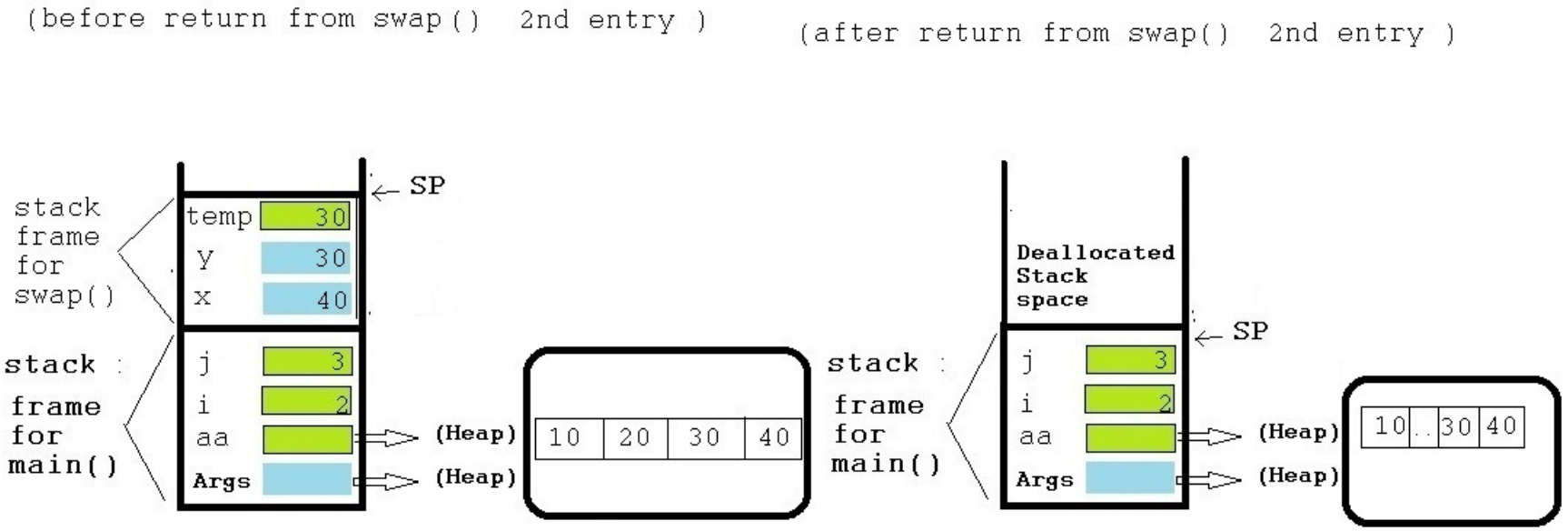
Memory(2)




```
public class Memory {
   public static void swap (int x, int y) {
      int temp = x;
      x = y;
      y = temp;
   }
   public static void swap2 (int[] arr, int i, int j) {
      int temp = arr[i];
      arr[i] = arr[j];
      arr[j] = temp;
   }
   public static void print (int[] aa) {
...
   }
...
}
```

```
public static void main (String[] args) {
      int i = 2;
      int j = 3;
      int[] aa = {10, 20, 30, 40};
      System.out.println("i = " + i + " j = " + j);
      swap(i, j);
      System.out.println("i = " + i + " j = " + j);
      print(aa);
      swap(aa[2], aa[3]);
      print(aa);
      swap2(aa, 2, 3);
      print(aa);
   }
```

Memory(3)

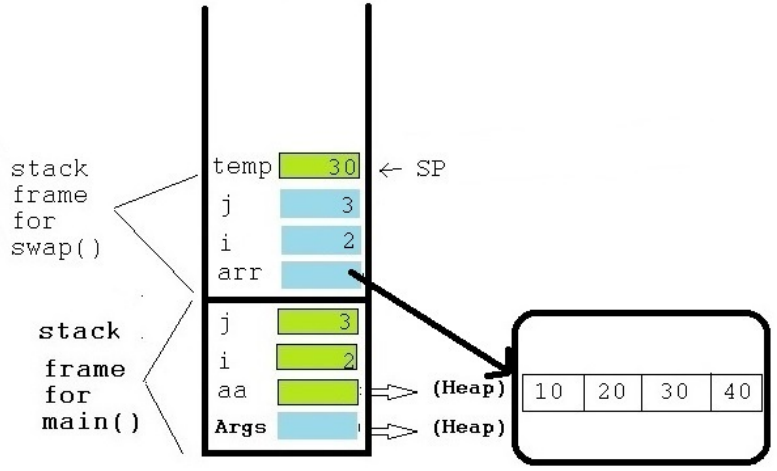



```
public class Memory {
   public static void swap (int x, int y) {
      int temp = x;
      x = y;
      y = temp;
   }
   public static void swap2 (int[] arr, int i, int j) {
      int temp = arr[i];
      arr[i] = arr[j];
      arr[j] = temp;
   }
   public static void print (int[] aa) {
...
   }
...
}
```

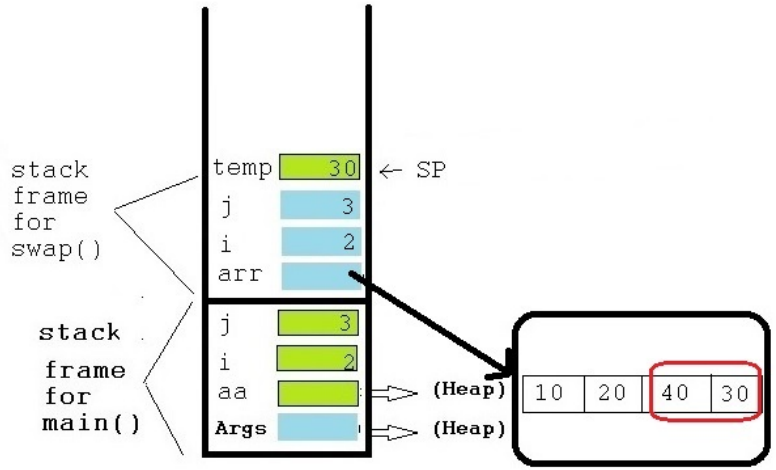
```
public static void main (String[] args) {
      int i = 2;
      int j = 3;
      int[] aa = {10, 20, 30, 40};
      System.out.println("i = " + i + " j = " + j);
      swap(i, j);
      System.out.println("i = " + i + " j = " + j);
      print(aa);
      swap(aa[2], aa[3]);
      print(aa);
      swap2(aa, 2, 3);
      print(aa);
   }
```

Memory(4)

(after definition of temp in swap2())



(before return from swap2())




```
public class Memory {
   public static void swap (int x, int y) {
      int temp = x;
      x = y;
      y = temp;
   }
   public static void swap2 (int[] arr, int i, int j) {
      int temp = arr[i];
      arr[i] = arr[j];
      arr[j] = temp;
   }
   public static void print (int[] aa) {
...
   }
...
}
```

```
public static void main (String[] args) {
      int i = 2;
      int j = 3;
      int[] aa = {10, 20, 30, 40};
      System.out.println("i = " + i + " j = " + j);
      swap(i, j);
      System.out.println("i = " + i + " j = " + j);
      print(aa);
      swap(aa[2], aa[3]);
      print(aa);
      swap2(aa, 2, 3);
      print(aa);
   }
```

Questions?