```
public class Test {
   int sum;
   public int y;
   public void methodA() {
      int x = 0, y = 0;
      y = y + 7;
      x = y + 11;
      sum = x + y;
      System.out.println(x + " " + y + " " + sum);
   }
   public void methodB() {
      int x = 0;
      y = y + 11;
      x = x + 33 + y;
      sum = sum + x + y;
      System.out.println(x + " " + y + " " + sum);
   }

   // Trace the outputs
   public static void main(String[] args) {
      Test t = new Test();
      t.methodA();
      t.methodB();
   }
}
```

method A()

states	local x	local y	instance sum
initial	0	0	0
y = y+7	0	7	0
x = y+11	18	7	0
sum = x+y	18	7	25
print	18 7 25		

method B()

states	local x	instance y	instance sum
initial	0	0	25
y = y+11	0	11	25
x = x+33+y	44	11	25
sum = sum+x+y	44	11	80
Print	44 11 80		

```
public class Q3 {
   public static void main(String[] args) {
      String test = "";
      int i = 5, j = 0, k = 15;
      while (i < 10) {
         k -= 1;
         j = k;
         while (j > 10) {
            if (j % 2 == 0) {
               test = "<--";
               test = test + i + 2 + "-->" + (j / 2);
            } else {
               test = "-->";
               test = "-->" + (i / 2) + test + j;
            }
            System.out.println(test);
            --j;
         }
         i++;
      }
   }
}
```

states	i	j	k
initial	5	0	15

states	i	j	k
while	7	12	12
while		12	
if	j even		
Print	<--72--> 6		
while		11	
else	j odd		
print	-->3--> 11		

states	i	j	k
while	5	14	14
while		14	
if	j even		
Print	<--52--> 7		
while		13	
else	j odd		
Print	-->2--> 13		
while		12	
if	j even		
Print	<--52--> 6		
While		11	
else	j odd		
Print	-->2--> 11		

states	i	j	k
While	6	13	13
while		13	
else	j odd		
Print	-->3--> 13		
while		12	
if	j even		
print	<--62--> 6		
while		11	
else	j odd		
print	-->3--> 11		

states	i	j	k
while	8	11	11
while		11	
else	j odd		
print	-->4--> 11		

states	i	j	k
while	9	10	10
While	10		
End of program			

Test3

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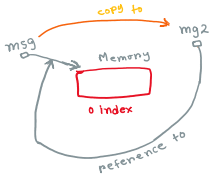
```
public class Test3 {
1 public int sum;
   public int y;
   public void methodA() {
      int x = 2, y = 3;
      int[] msg = new int[1];
      msg[0] = 3;
2     y = this.y + msg[0];
      methodB(msg, msg[0]);
6     x = this.y + msg[0];
7     sum = x + y + msg[0];
9     System.out.println(x + " " + y + " " + sum);
   }
   private void methodB(int[] mg2, int mg1) {
      int x = 0;
3     y = this.y + mg2[0];
      x = x + 33 + mg1;
4     sum = sum + x + y;
      mg2[0] = y + mg1;
      mg1 = mg1 + x + 2;
5     System.out.println(x + " " + y + " " + sum);
   }

   // Tracing the outputs
   public static void main(String[] args) {
      Test3 t = new Test3();
      for (int i = 0; i < 5; ++i) {
         t.methodA();
      }
   }
}
```



1

states	sum	y	x	y	msg[0]	mg2[0]	mg1	x
1	0	0	2	3	3			
2				2	→ 3		3	0
3		3						36
4	39				6 ← 6		41	
5	Print = 36 3 39							
6			9					
7	18							
8	Print = 9 3 18							

2

states	sum	y	x	y	msg[0]	mg2[0]	mg1	x
1	18	3	2	3	3			
2				6	→ 3		3	0
3		6						36
4	60				9 ← 9			
5	Print = 36 6 60							
6			16					
7	30							
8	Print = 16 6 30							

3

states	sum	y	x	y	msg[0]	mg2[0]	mg1	x
1	30	6	2	3	3			
2				9	→ 3		3	0
3		9						36
4	75				12 ← 12			
5	Print = 36 9 75							
6			21					
7	42							
8	Print = 21 9 42							

4

states	sum	y	x	y	msg[0]	mg2[0]	mg1	x
1	42	9	2	3	3			
2				12	→ 3		3	0
3		12						36
4	90				15 ← 15			
5	Print = 36 12 90							
6			27					
7	54							
8	Print = 27 12 54							

5

states	sum	y	x	y	msg[0]	mg2[0]	mg1	x
1	54	12	2	3	3			
2				15	→ 3		3	0
3		15						36
4	105				18 ← 18			
5	Print = 36 15 105							
6			33					
7	66							
8	Print = 33 18 66							

Test4

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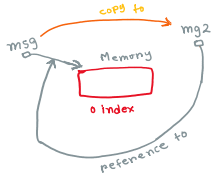
```java
public class Test4 {
    public int sum;
    public int y;
    public void methodA() {
        int x = 0, y = 0;
        int[] msg = new int[1];
        msg[0] = 5;
        y = y + methodB(msg[0]);
        x = y + methodB(msg, msg[0]);
        sum = x + y + msg[0];
        System.out.println(x + " " + y + " " + sum);
    }
    private int methodB(int mg2[], int mg1) {
        int x = 0;
        y = y + mg2[0];
        x = x + 33 + mg1;
        sum = sum + x + y;
        mg2[0] = y + mg1;
        mg1 = mg1 + x + 2;
        System.out.println(x + " " + y + " " + sum);
        return sum;
    }
    private int methodB(int mg1) {
        int x = 0;
        int y = 0;
        y = y + mg1;
        x = x + 33 + mg1;
        sum = sum + x + y;
        this.y = mg1 + x + 2;
        System.out.println(x + " " + y + " " + sum);
        return y;
    }

    // Tracing the outputs
    public static void main(String[] args) {
        Test4 t = new Test4();
        for (int i = 0; i < 5; ++i) {
            t.methodA();
        }
    }
}
```



1

	instance				methodA()		methodB()		methodB()		
states	sum	y	x	y	msg[0]	mg2[0]	mg1	x	mg1	x	y
1	0	0	0	0	5						
2									5	0	0
3										38	5
4	43	45									
5	Print = 38 5 43										
6				5							
7						→ 5	5	0			
8		50						38			
9	131				55 ← 55						
10							45				
11	Print = 38 50 131										
12			136								
13	196										
14	Print = 136 5 196										

2

	instance		methodA()			methodB()			methodB()		
states	sum	y	x	y	msg[0]	mg2[0]	mg1	x	mg1	x	y
1	196	50	0	0	5						
2									5	0	0
3										38	5
4	239	95									
5	Print = 38 5 239										
6				5							
7						→ 5	5	0			
8		50						38			
9	327				55 ← 55						
10							45				
11	Print = 38 50 327										
12		332									
13	392										
14	Print = 332 5 392										

3

	instance		methodA()			methodB()			methodB()		
states	sum	y	x	y	msg[0]	mg2[0]	mg1	x	mg1	x	y
1	392	50	0	0	5						
2									5	0	0
3										38	5
4	435	95									
5	Print = 38 5 435										
6				5							
7						→ 5	5	0			
8		50						38			
9	523				55 ← 55						
10							45				
11	Print = 38 50 523										
12			528								
13	588										
14	Print = 528 5 588										

4

	instance		methodA()			methodB()			methodB()		
states	sum	y	x	y	msg[0]	mg2[0]	mg1	x	mg1	x	y
1	588	50	0	0	5						
2									5	0	0
3										38	5
4	631	95									
5	Print = 38 5 631										
6				5							
7						→ 5	5	0			
8		50						38			
9	719				55 ← 55						
10							45				
11	Print = 38 50										
12			724								
13	784										
14	Print = 724 5 784										

5

	instance		methodA()			methodB()			methodB()		
states	sum	y	x	y	msg[0]	mg2[0]	mg1	x	mg1	x	y
1	784	50	0	0	5						
2									5	0	0
3										38	5
4	827	95									
5	Print = 38 5 827										
6				5							
7						→ 5	5	0			
8		50						38			
9	915				55 ← 55						
10							45				
11	Print = 38 50 915										
12			928								
13	980										
14	Print = 920 5 980										

Test04

20 April 2025 11:01

```
public class Test04 {
    public int sum;
    public int y;
    public void methodA() {
        int x = 0;
        int z = 0;
        while (z < 5) {
            y = y + sum;
            x = y + 1;
            System.out.println(x + " " + y + " " + sum);
            sum = sum + methodB(x, y);
            z++;
        }
    }
    public int methodB(int m, int n) {
        int x = 0;
        int sum = 0;
        y = y + m;
        x = n - 4;
        sum = sum + y;
        System.out.println(x + " " + y + " " + sum);
        return sum;
    }

    // Tracing the outputs
    public static void main(String[] args) {
        Test04 t = new Test04();
        t.methodA();
    }
}
```

FinalT3A

20 April 2025 11:01

```
public class FinalT3A {
    public int sum;
    public int y;
    public void methodA() {
        int x = 0, y = 0, j = 0;
        while (j < 2) {
            y = y + j;
            x = j + methodB(y, j);
            sum = x + y;
            System.out.println(x + " " + y + " " + sum);
            j++;
        }
    }
    public int methodB(int p, int k) {
        int x = 0;
        y = y + k + 1;
        x = x + 3 - p;
        sum = sum + x + y;
        System.out.println(x + " " + y + " " + sum);
        return sum;
    }

    // Tracing the outputs
    public static void main(String[] args) {
        FinalT3A fT3A = new FinalT3A();
        fT3A.methodA();
        fT3A.methodB(6,8);
    }
}
```

j = 0

states	instance sum	y	methodA x	y	j	methodB p	k	x
1	0	0	0	0	0			
2				0				
3						0	0	0
4		1						3
5	4							
6	Print = 3 1 4							
7			4					
8	4							
9	Print = 4 0 4							
10					1			

j = 1

states	instance sum	y	methodA x	y	j	methodB p	k	x
1	4	1	4	0	1			
2				1				
3						1	1	0
4		3						2
5	9							
6	Print = 2 3 9							
7			10					
8	11							
9	Print = 10 1 11							
10					2			

states	instance sum	y	methodA x	y	j	methodB p	k	x
1	11	3						
2						6	8	0
3	12							-3
4	20							
5	print = -3 12 20							