Example 1

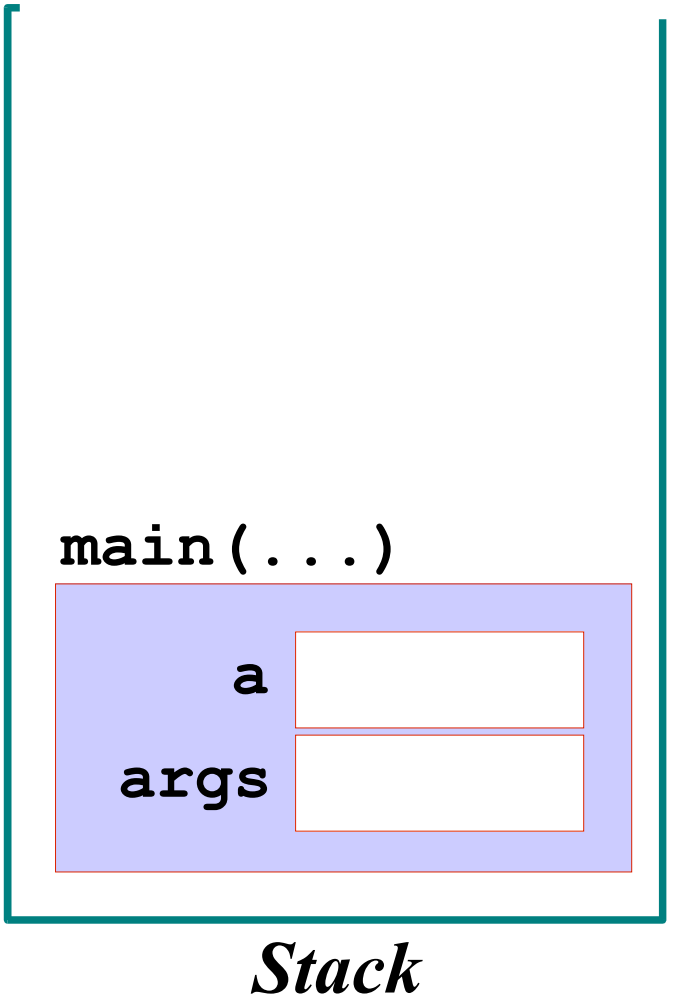
Managing Memory on Stack

```
public class Test1 {
   public static void f(int x) {
      int y = 1;
      y = x + y;
      int z = 10;
      x = y * z;
   }

   public static void main(String[] args) {
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```

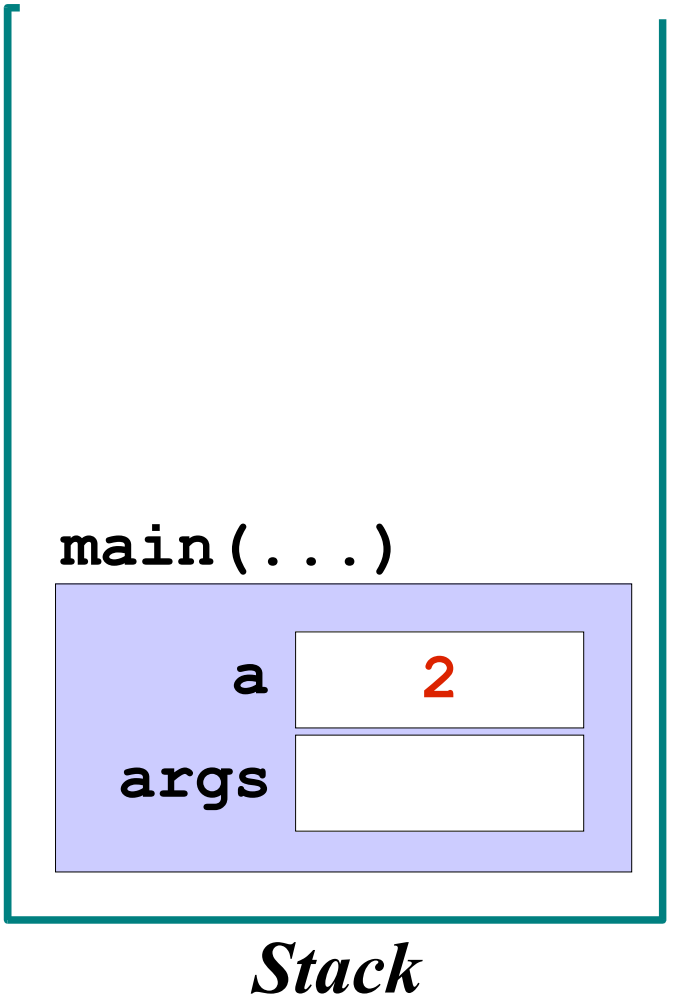
```
public class Test1 {
   public static void f(int x) {
      int y = 1;
      y = x + y;
      int z = 10;
      x = y * z;
   }

   public static void main(...) {
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```



```
public class Test1 {
   public static void f(int x) {
      int y = 1;
      y = x + y;
      int z = 10;
      x = y * z;
   }

   public static void main(...) {
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```



Stack

```
public class Test1 {
   public static void f(int x) {
      int y = 1;
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      int z = 10;
      x = y * z;
   }

   public static void main(...) {
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```

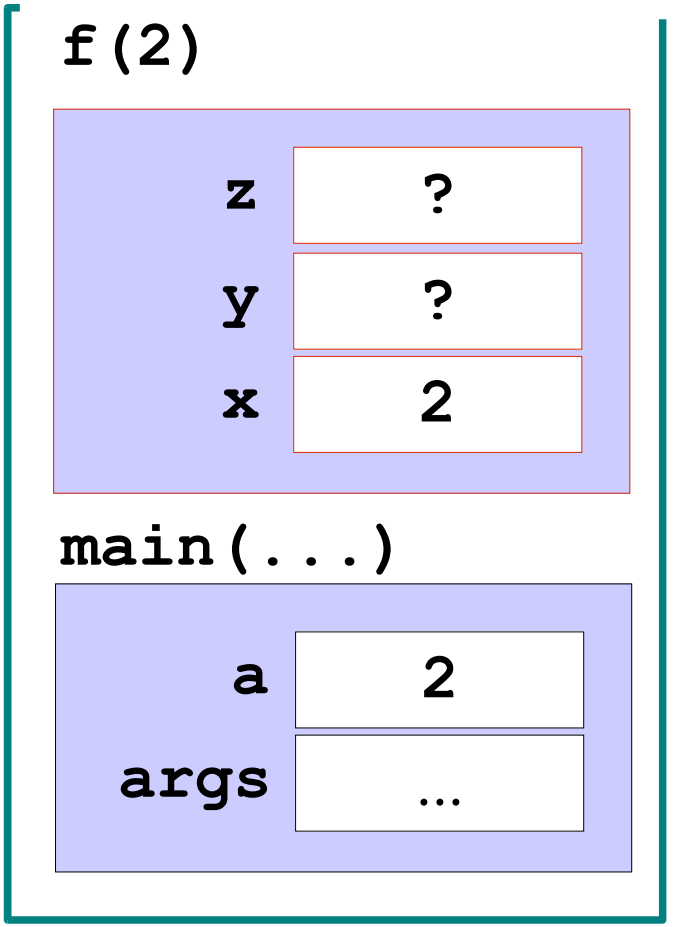

Stack

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public class Test1 {
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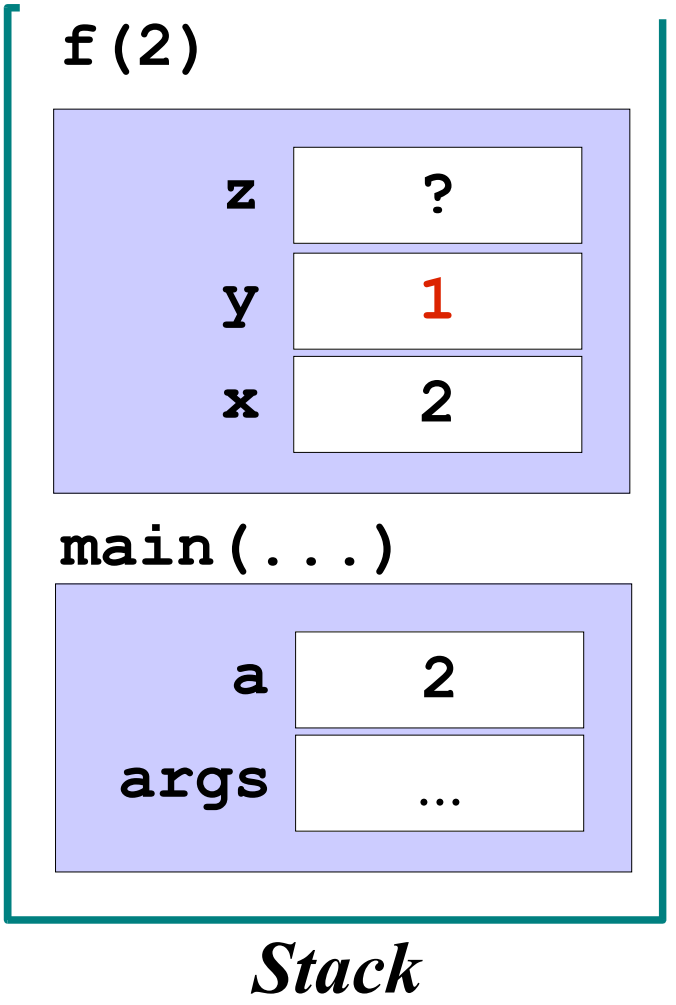
      int z = 10;
      x = y * z;
   }

   public static void main(...) {
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```



Stack

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public class Test1 {
   public static void f(int x) {
      int y = 1;
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      int z = 10;
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   }

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      int a = 2;
      f(a);
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   }
}
```

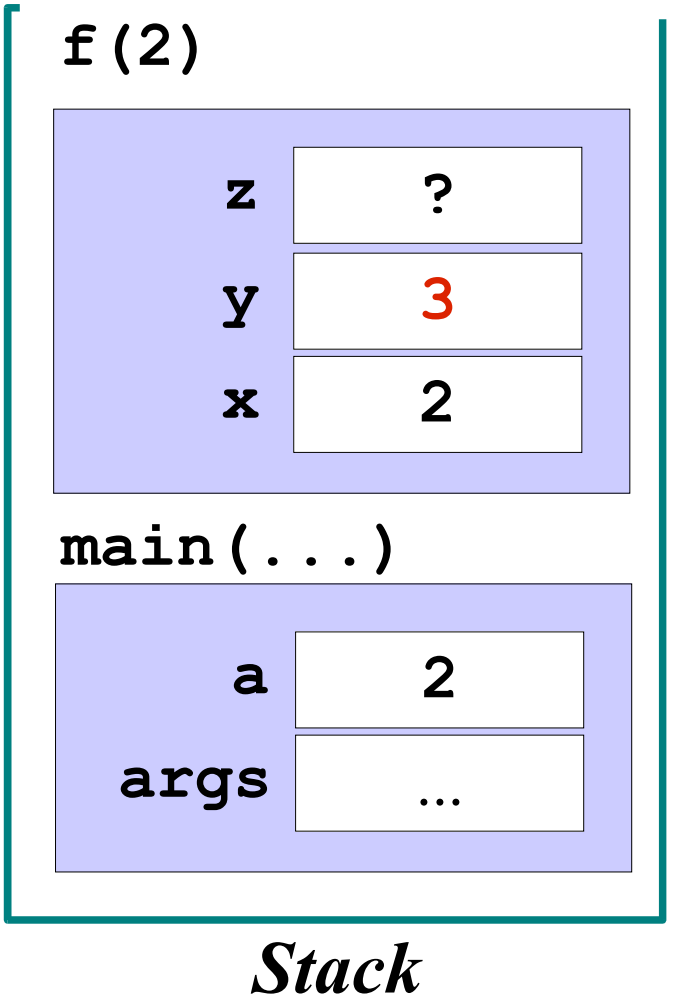

```
public class Test1 {
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   }

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   }
}
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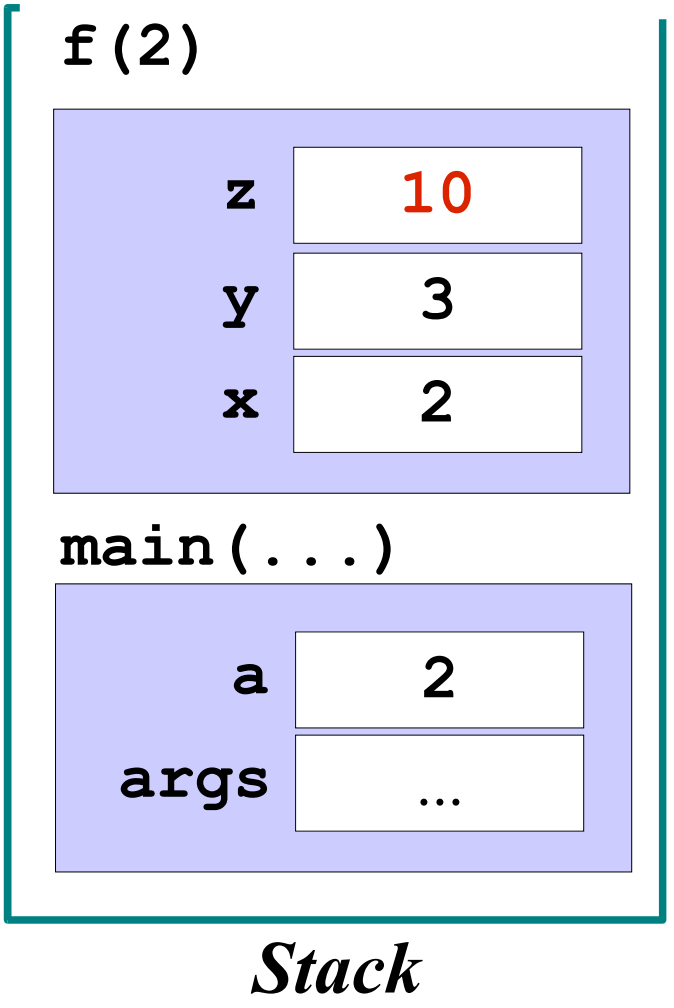

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public class Test1 {
   public static void f(int x) {
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      y = x + y;
      int z = 10;
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   }

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      int a = 2;
      f(a);
      System.out.println(a);
   }
}
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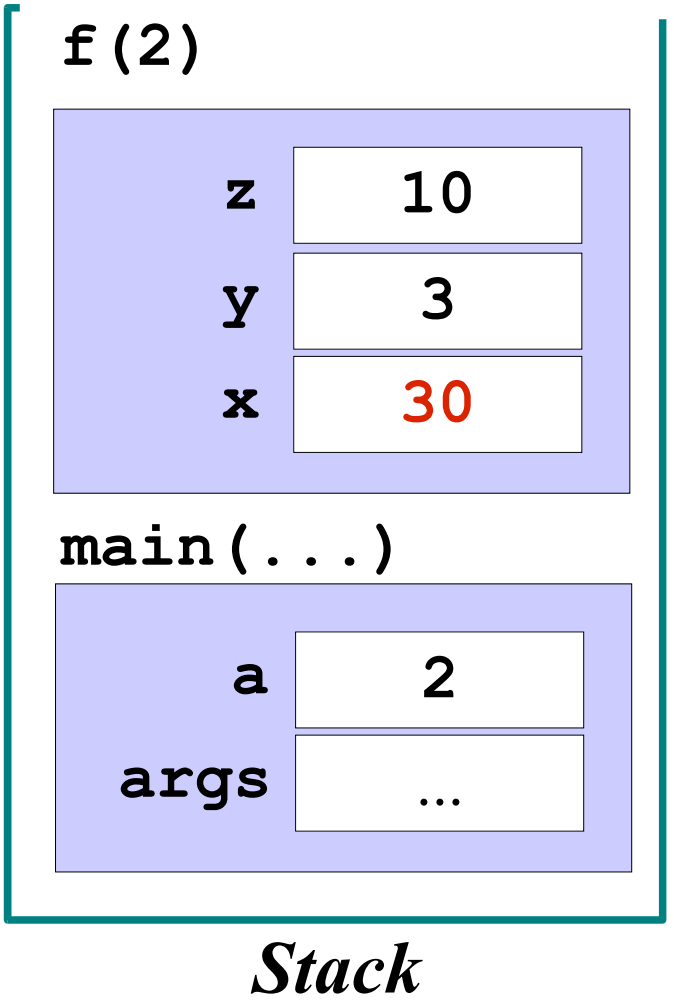

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public class Test1 {
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      y = x + y;
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      x = y * z;
   }

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      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```

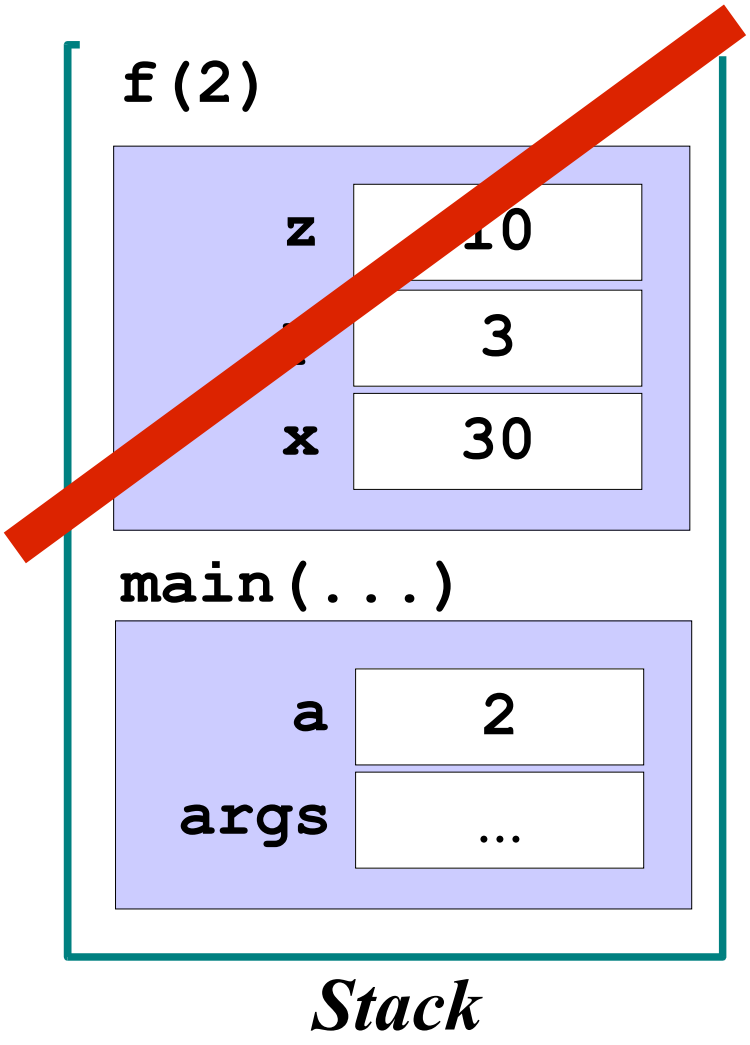

Stack

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   }

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      int a = 2;
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      System.out.println(a);
   }
}
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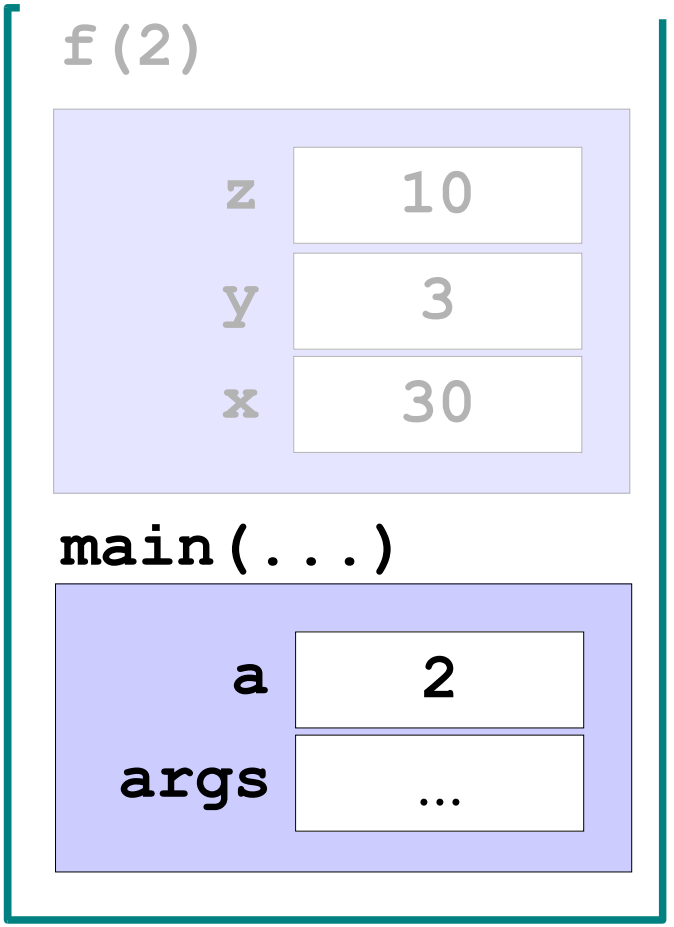

Stack

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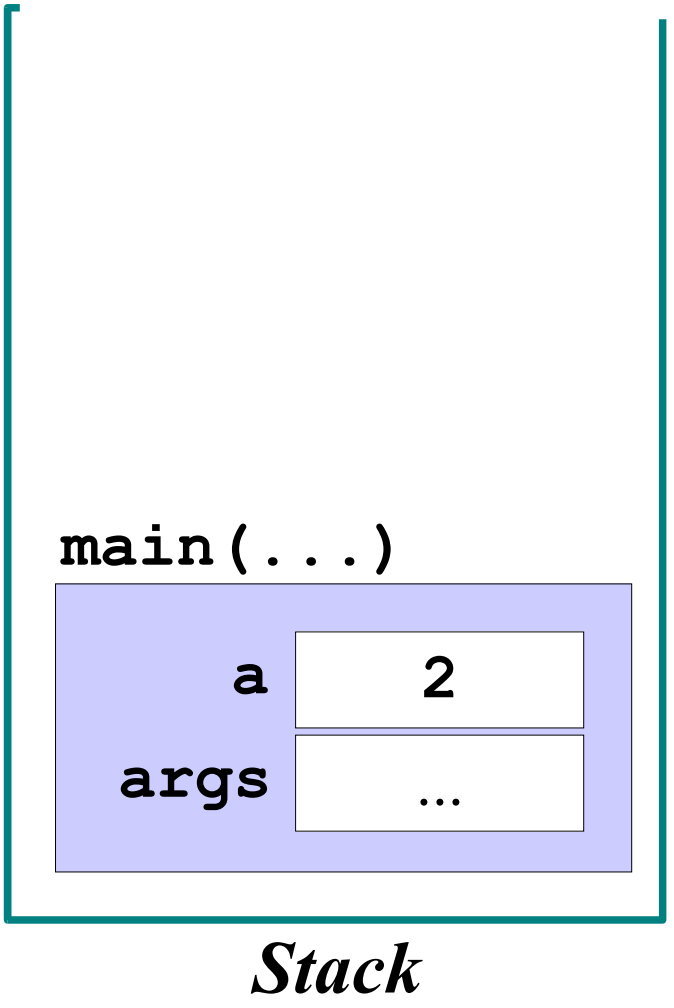
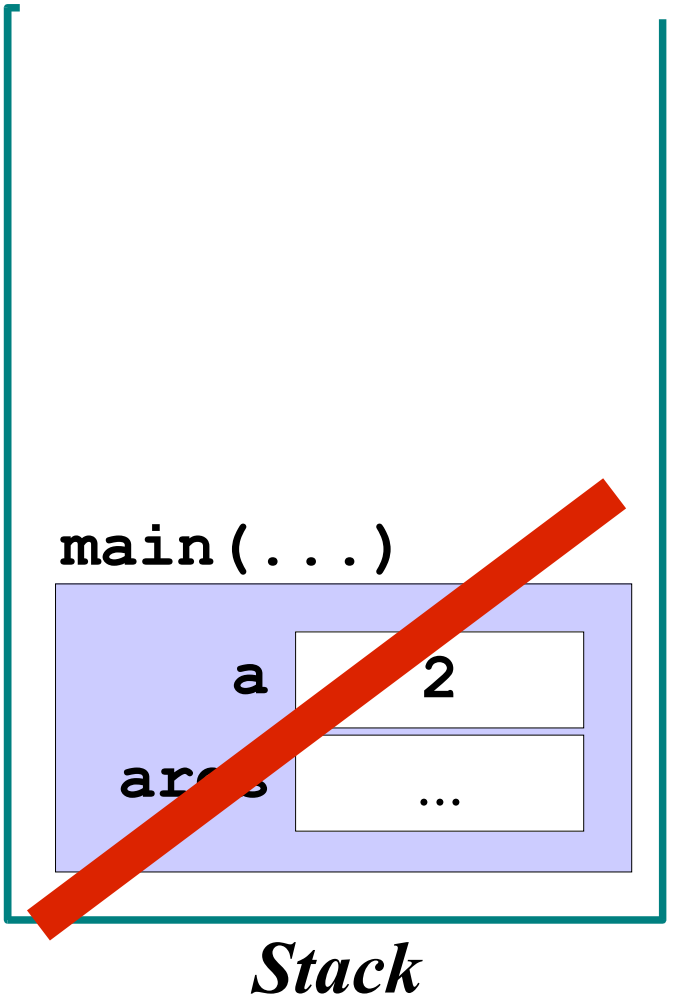
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```



```
public class Test1 {
   public static void f(int x) {
      int y = 1;
      y = x + y;
      int z = 10;
      x = y * z;
   }

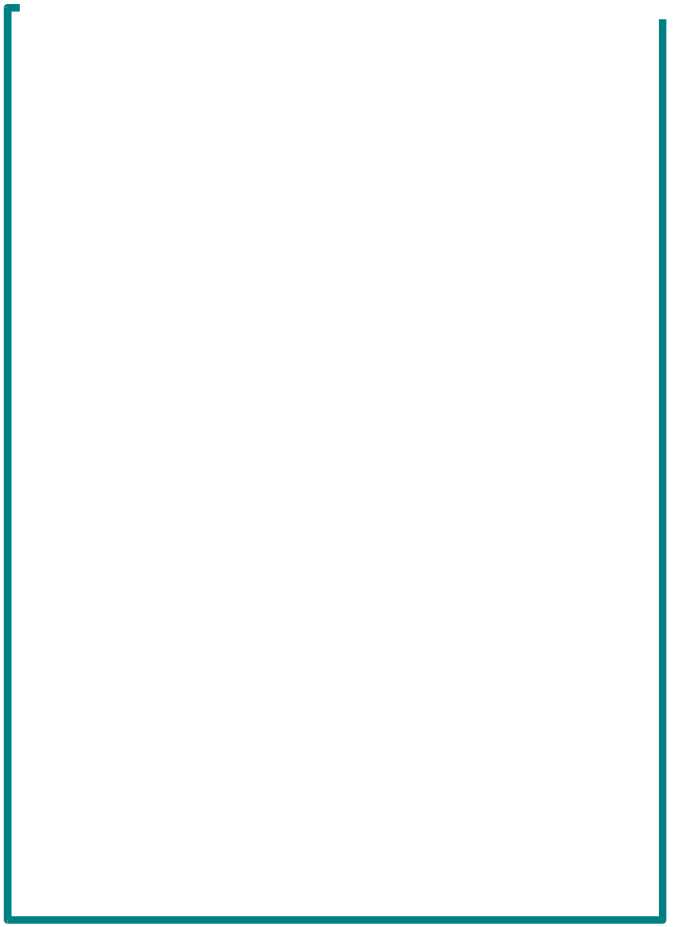
   public static void main(...) {
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```



Stack

```
public class Test1 {
   public static void f(int x) {
      int y = 1;
      y = x + y;
      int z = 10;
      x = y * z;
   }

   public static void main(...) {
      int a = 2;
      f(a);
      System.out.println(a);
   }
}
```

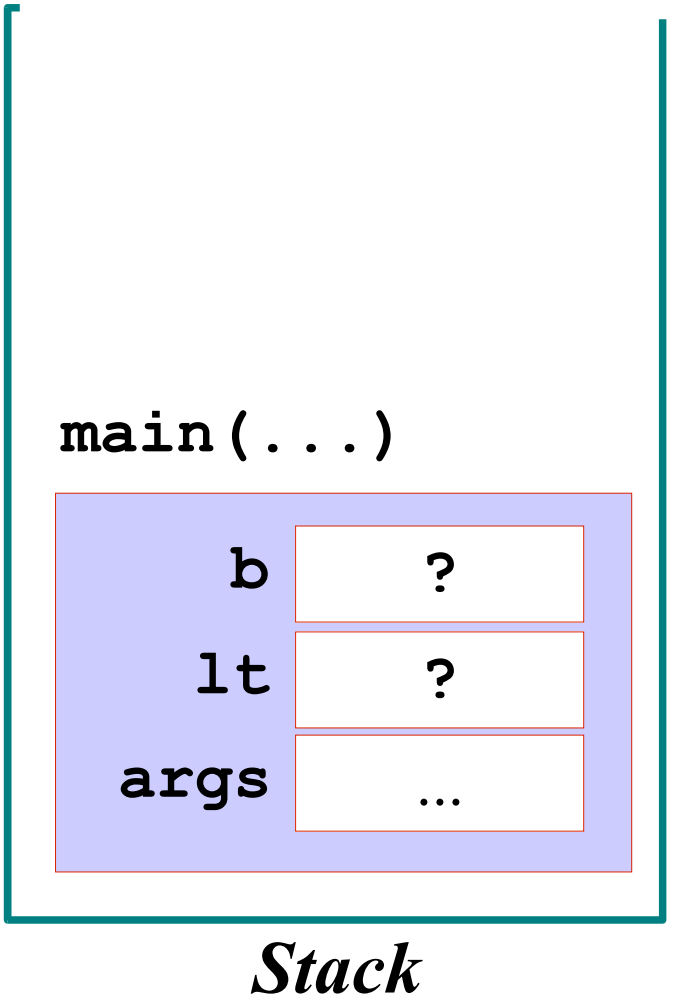


Stack

Example 2

Managing Memory in Heap

```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      boolean b;
      b = lt.isOn();
      System.out.println(b);
   }
}
```



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public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      boolean b;
      b = lt.isOn();
      System.out.println(b);
   }
}
```

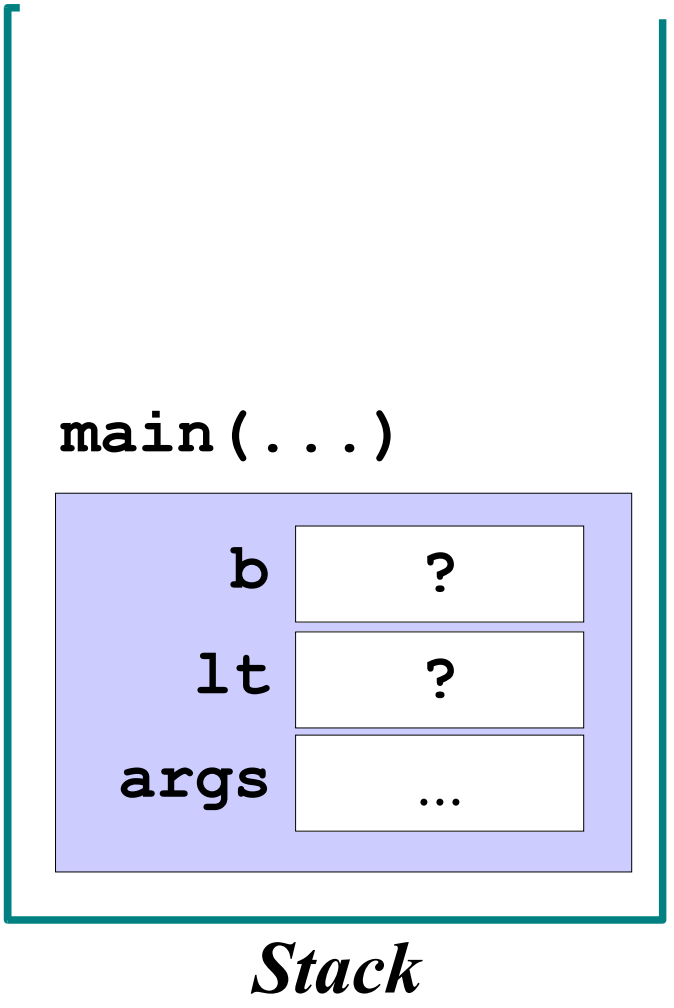

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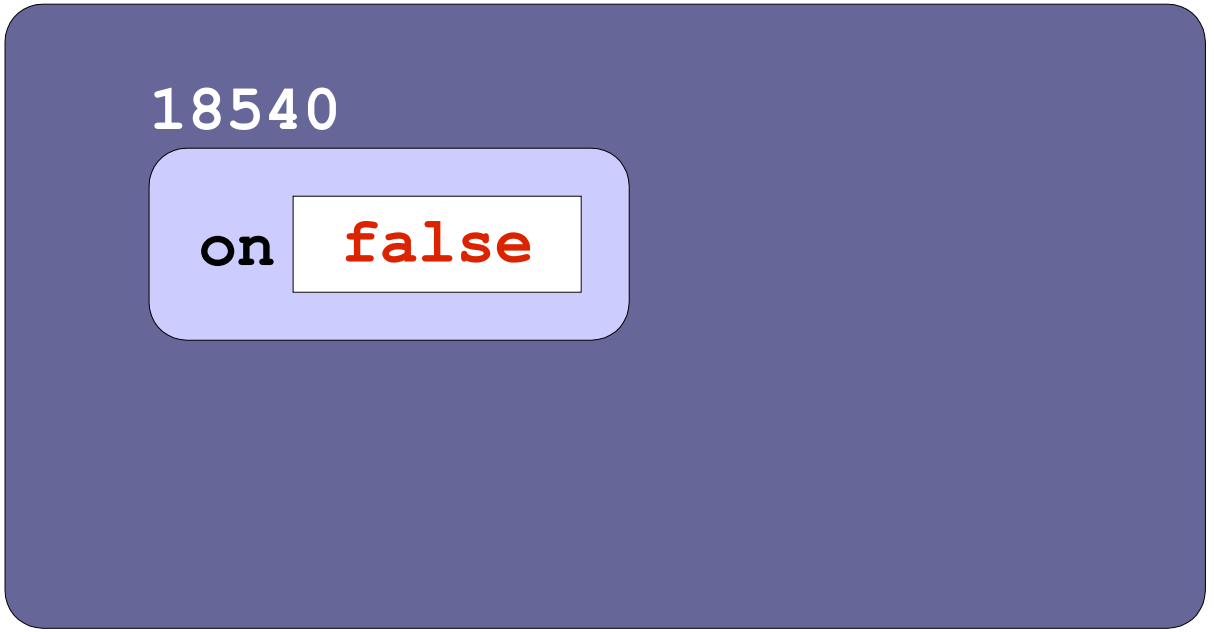
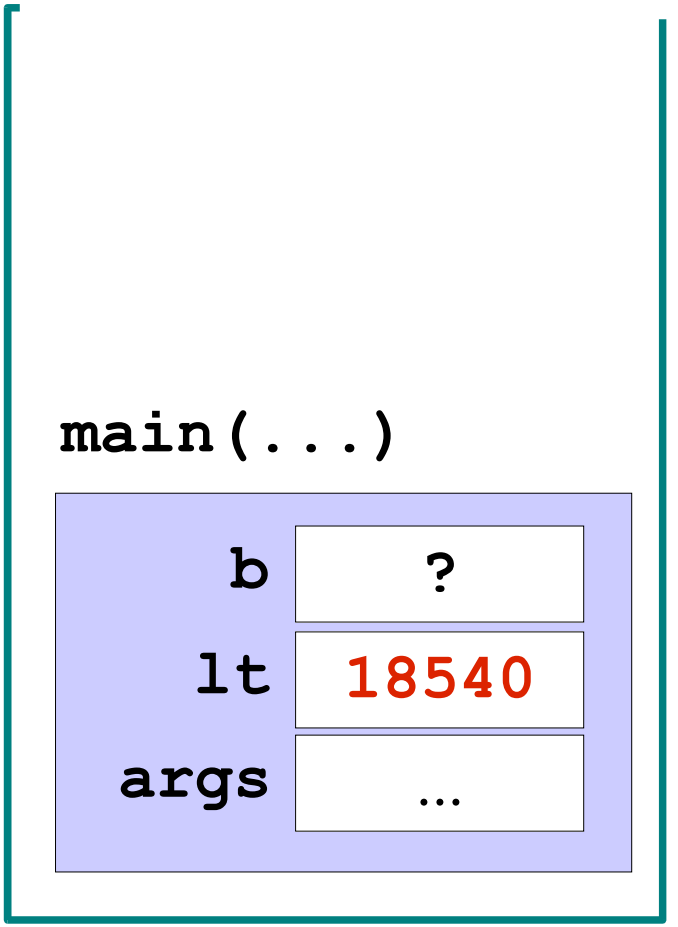
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      boolean b;
      b = lt.isOn();
      System.out.println(b);
   }
}
```

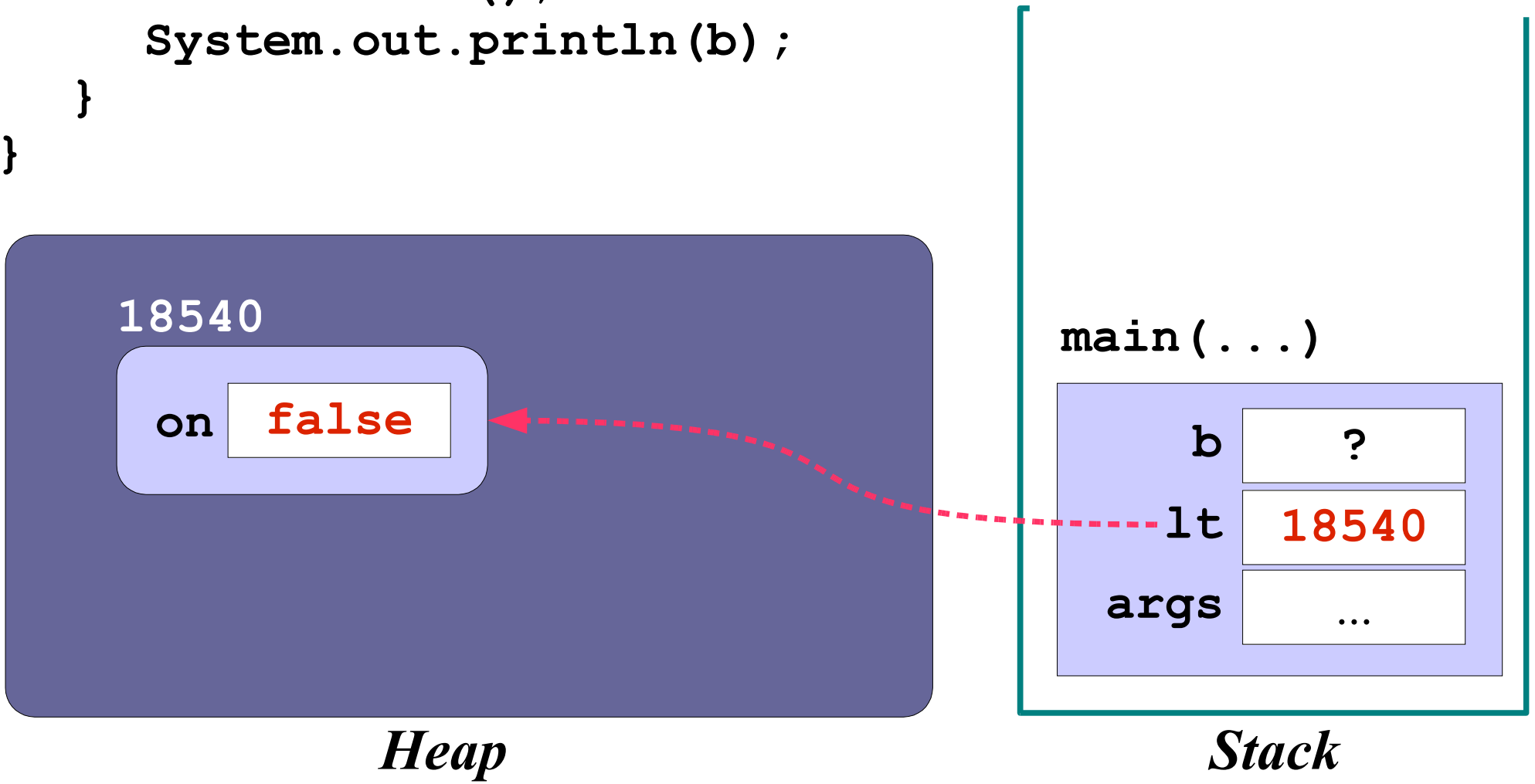


Heap



Stack

```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      boolean b;
      b = lt.isOn();
      System.out.println(b);
   }
}
```



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   public static void main(...) {
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      lt.switchOn();
      boolean b;
      b = lt.isOn();
      System.out.println(b);
   }
}
```
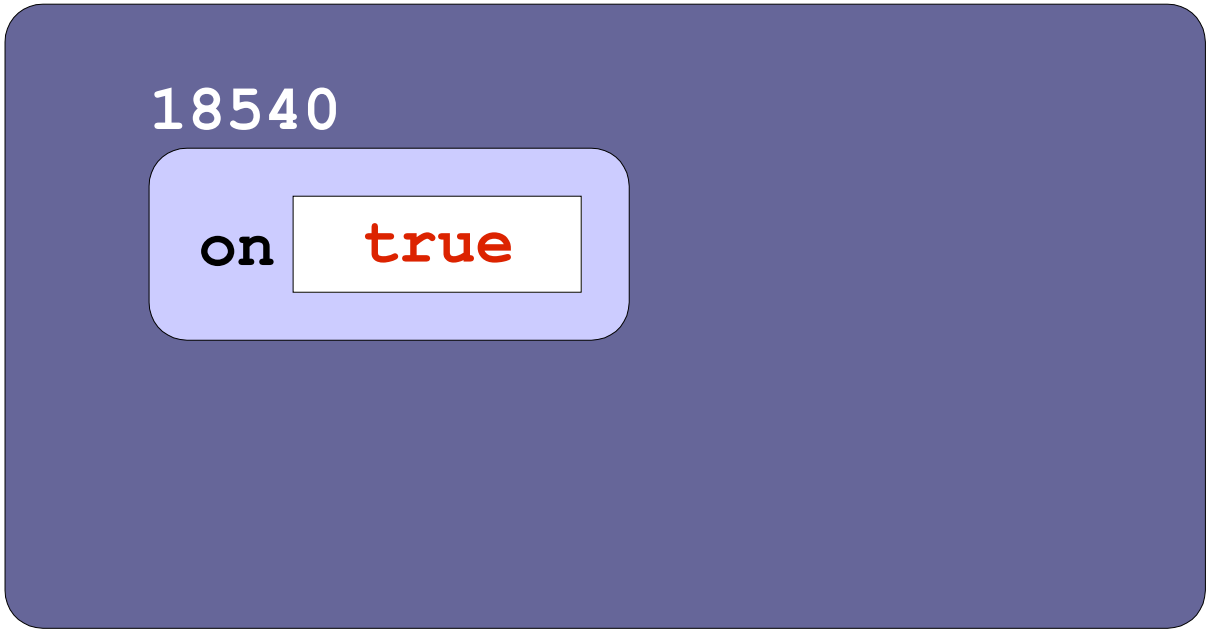
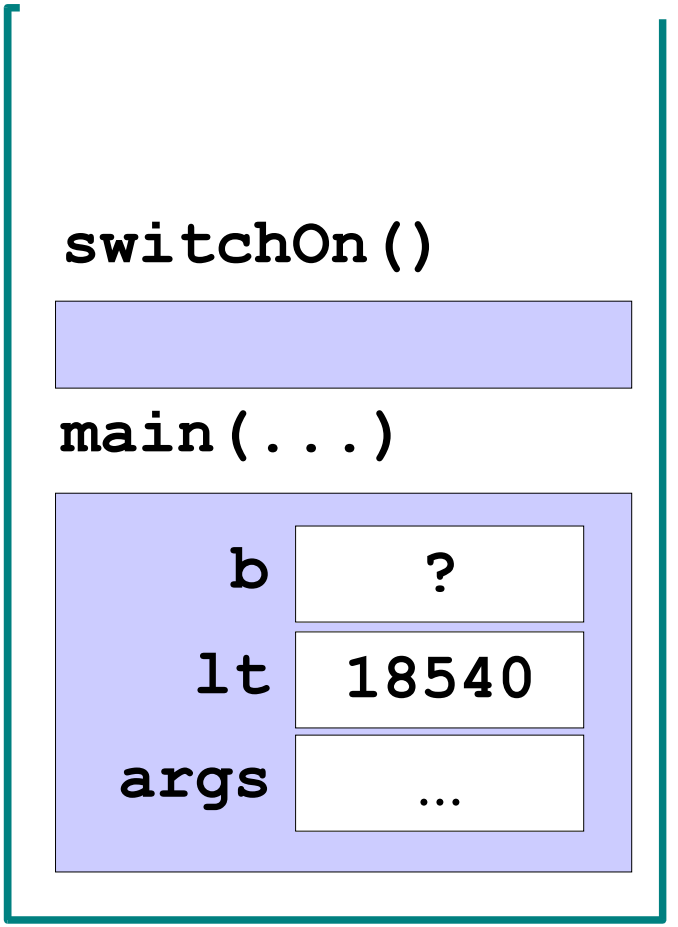



Heap



Stack

```
public class LightProg {
   public static void main(...) {
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      lt = new Light();
      lt.switchOn();
      boolean b;
      b = lt.isOn();
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}
```
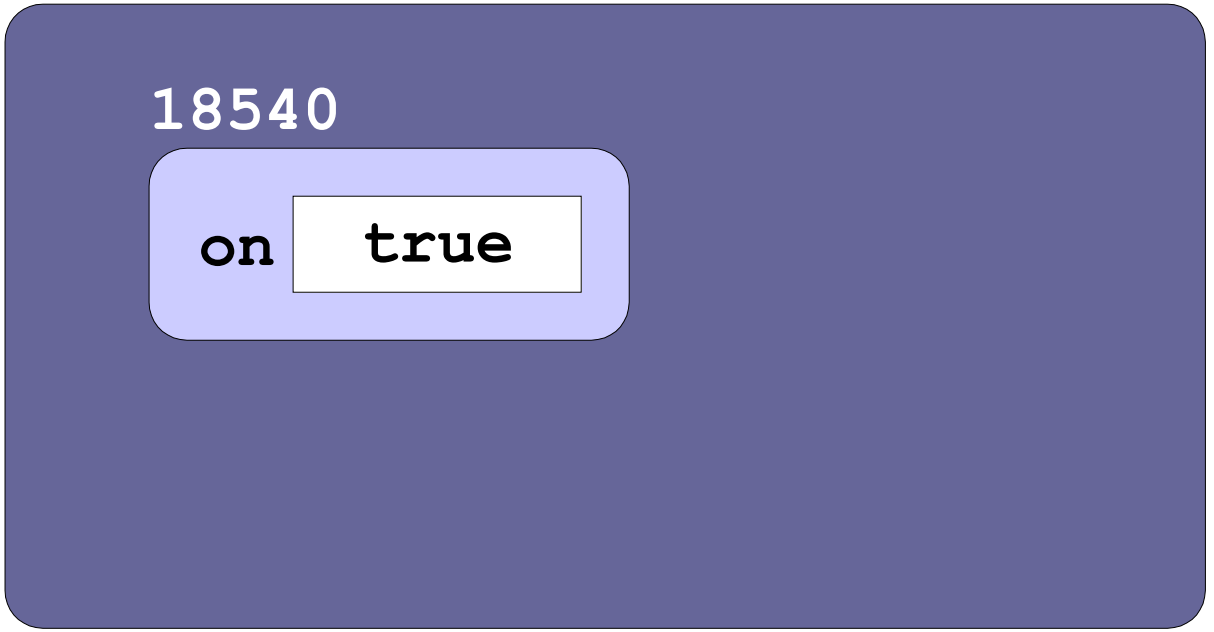
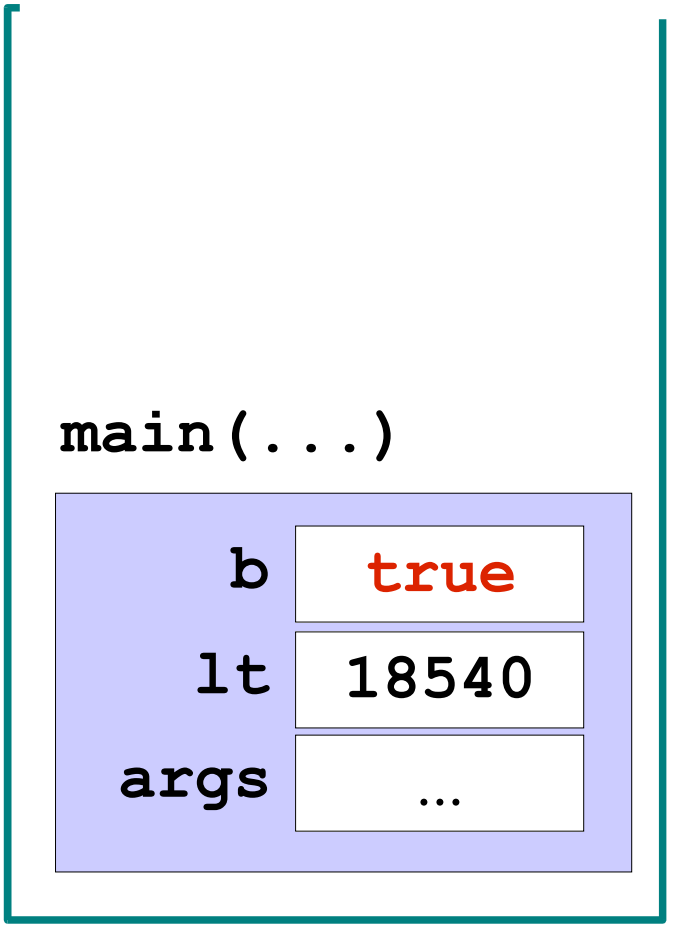



Heap

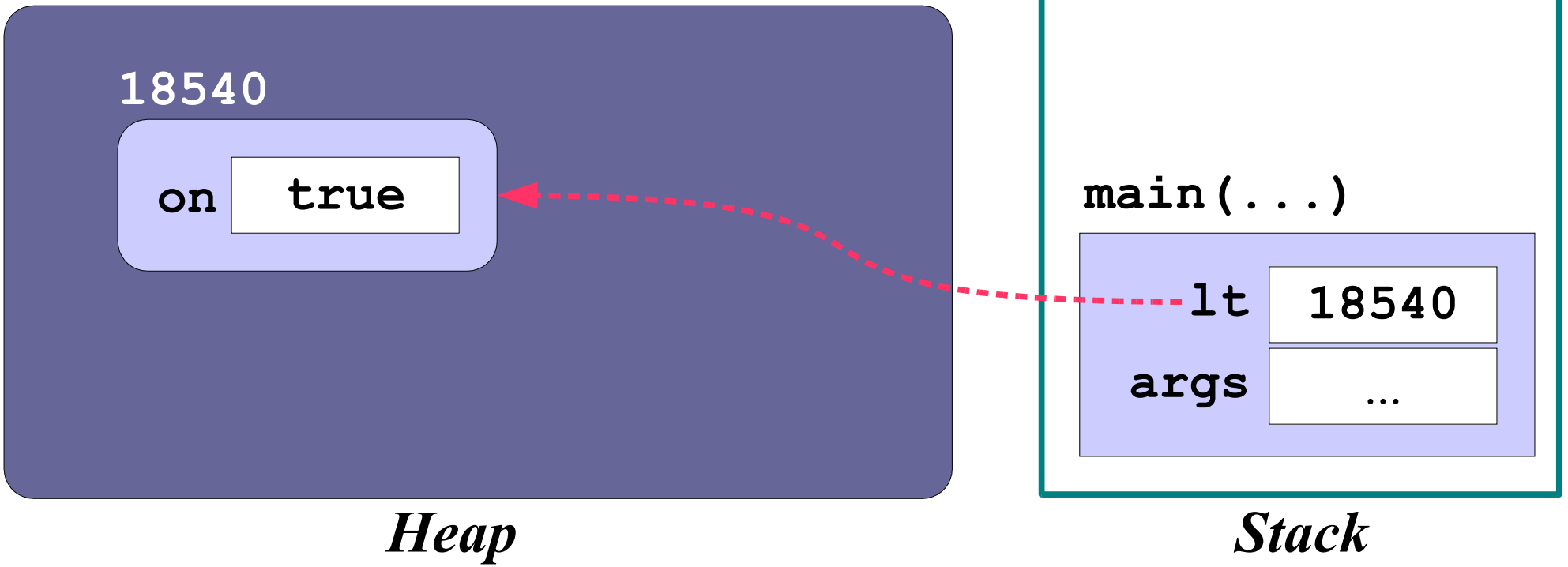


Stack

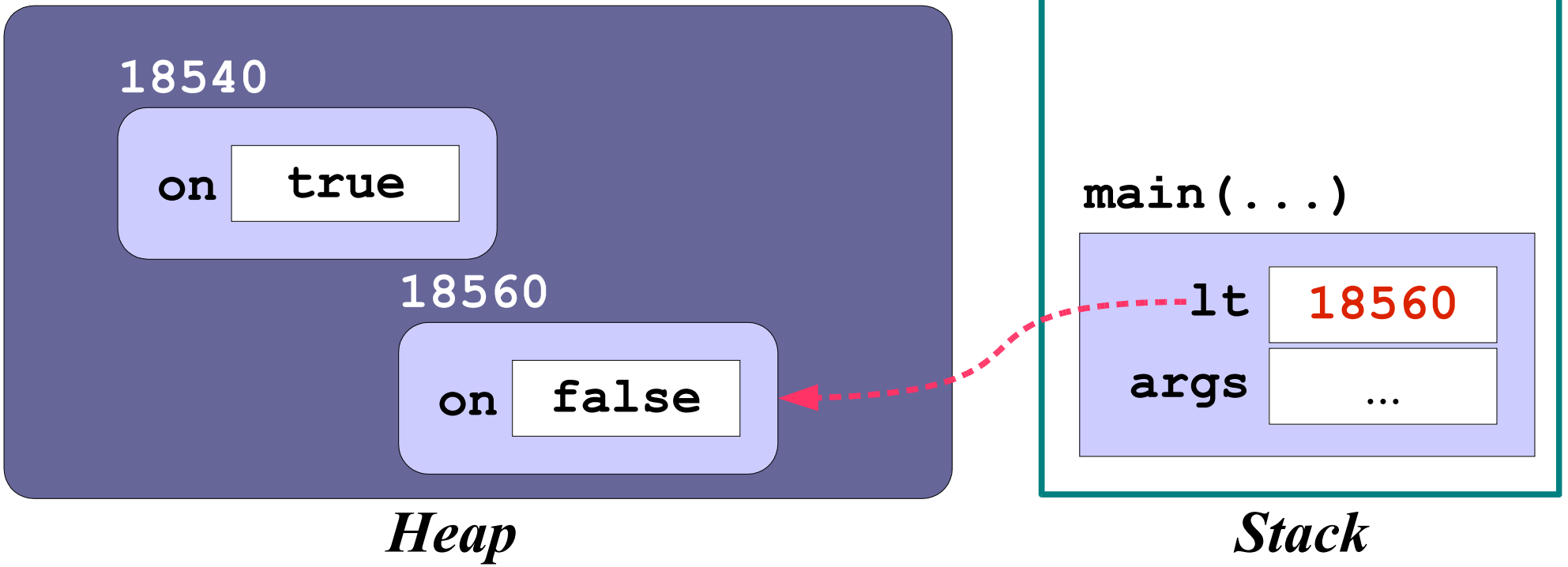
Example 3

Generating Garbage

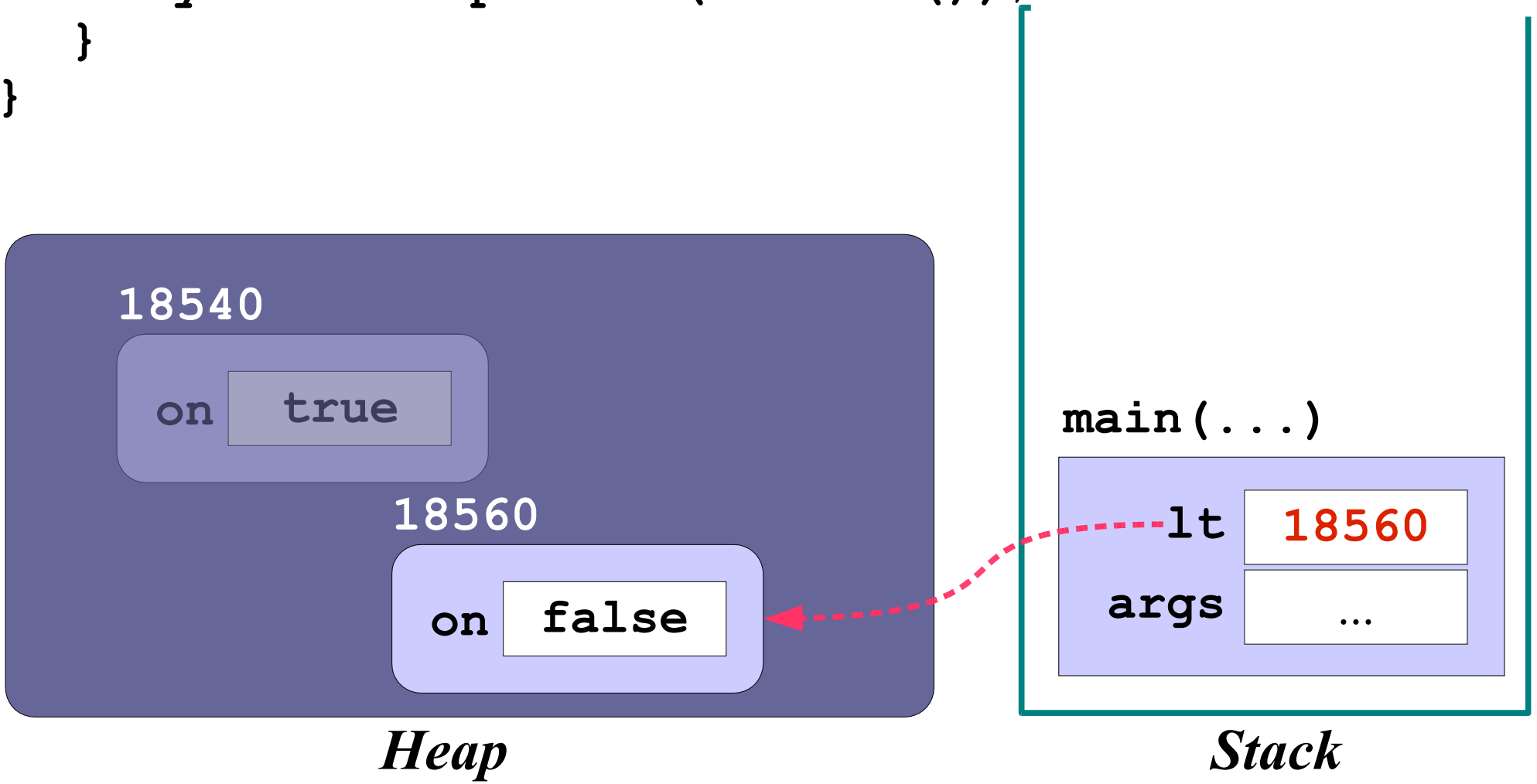
```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      lt = new Light();
      System.out.println(lt.isOn());
   }
}
```



```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      lt = new Light();
      System.out.println(lt.isOn());
   }
}
```



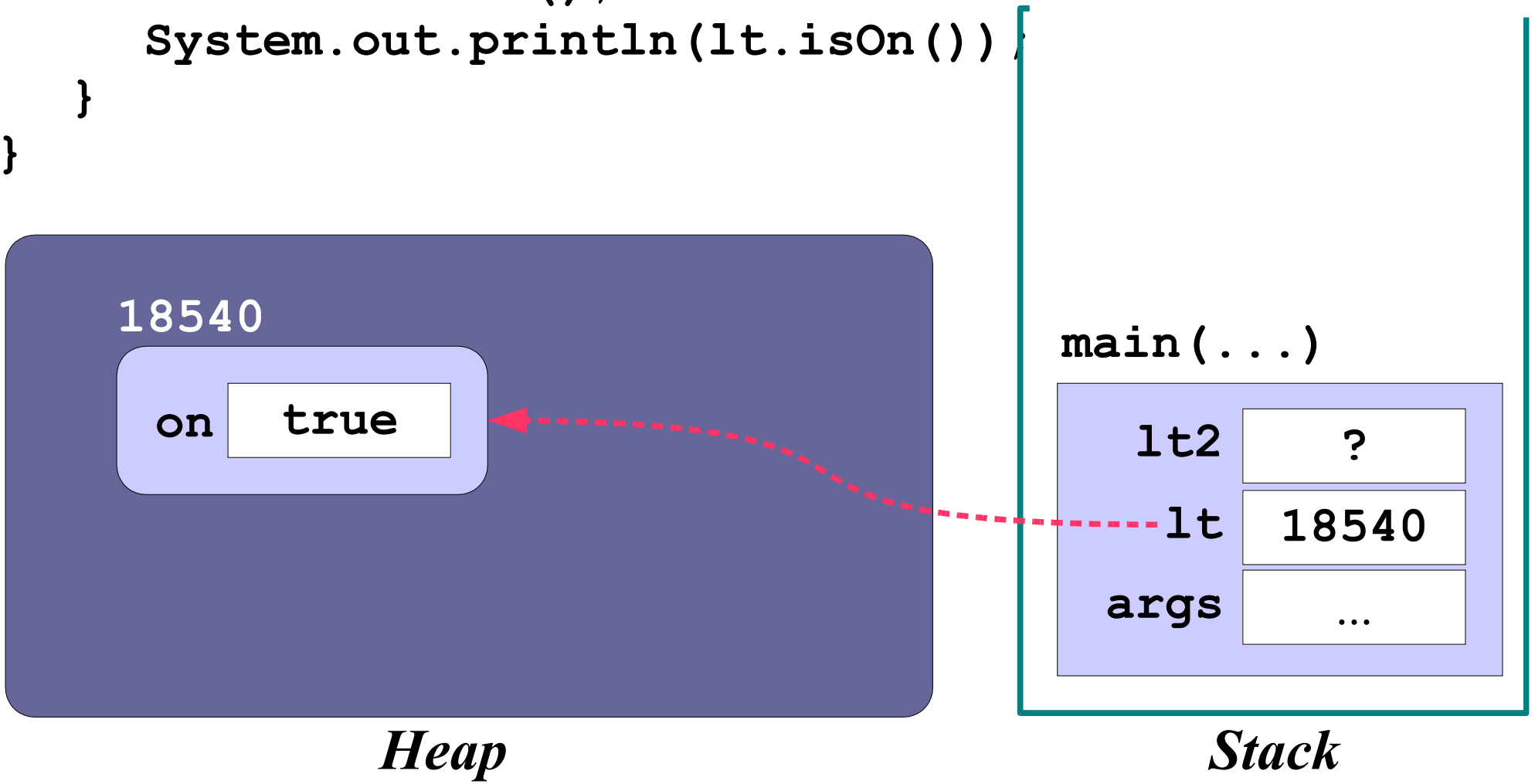
```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      lt = new Light();
      System.out.println(lt.isOn());
   }
}
```



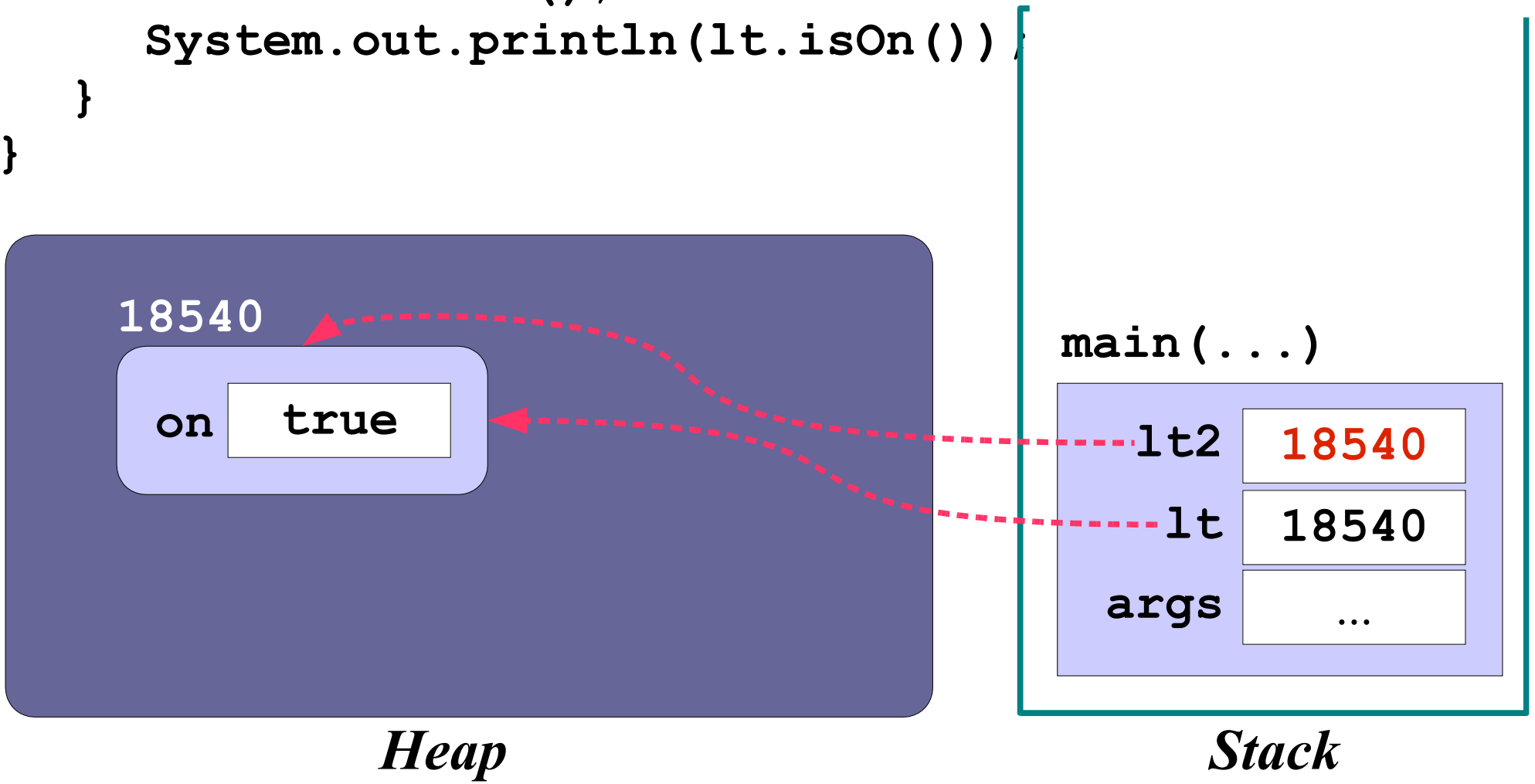
Example 4

Aliasing

```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      Light lt2 = lt;
      lt2.switchOff();
      System.out.println(lt.isOn());
   }
}
```



```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      Light lt2 = lt;
      lt2.switchOff();
      System.out.println(lt.isOn());
   }
}
```



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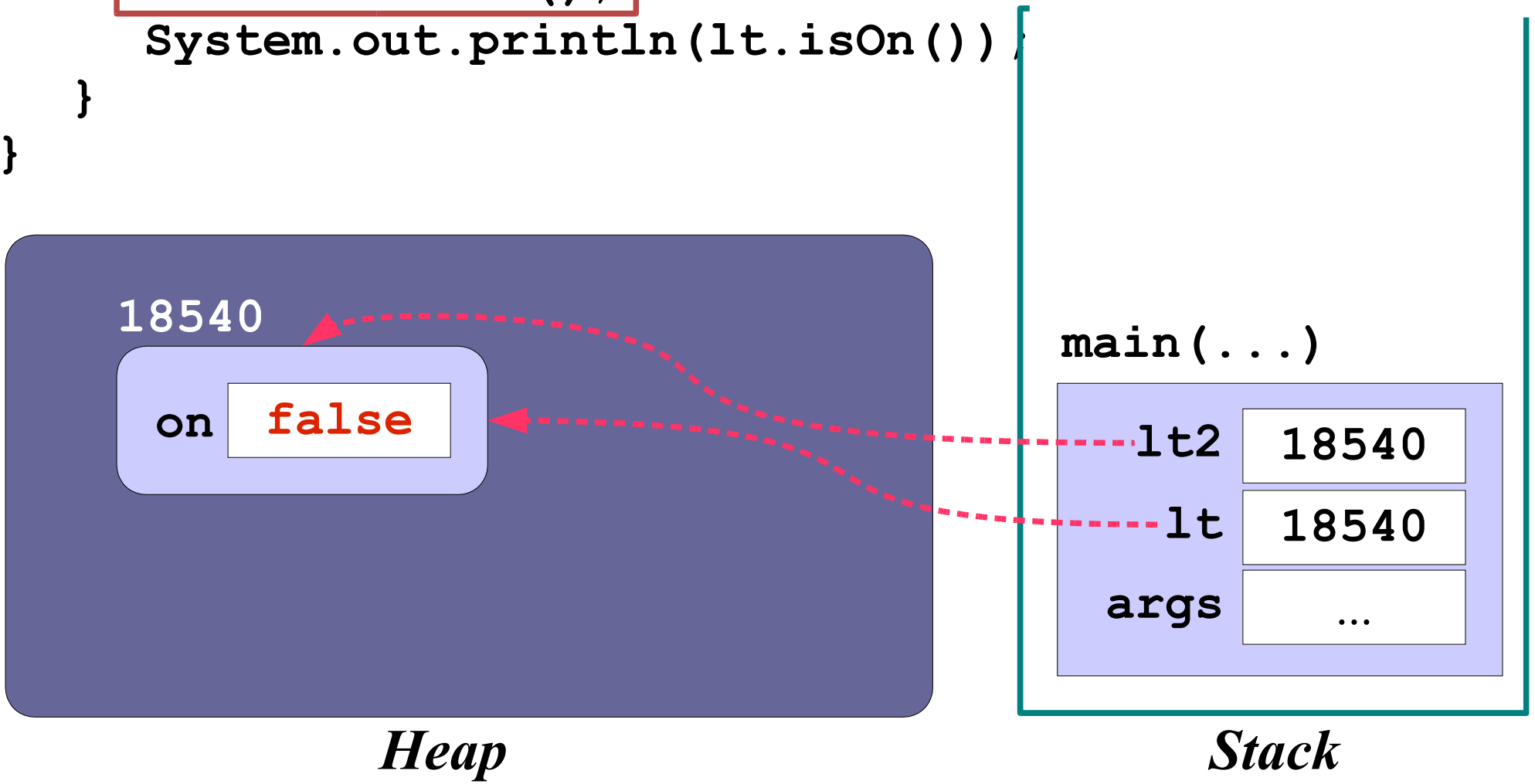
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      Light lt2 = lt;
      lt2.switchOff();
      System.out.println(lt.isOn());
   }
}
```



```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      Light lt2 = lt;
      lt2.switchOff();
      System.out.println(lt.isOn());
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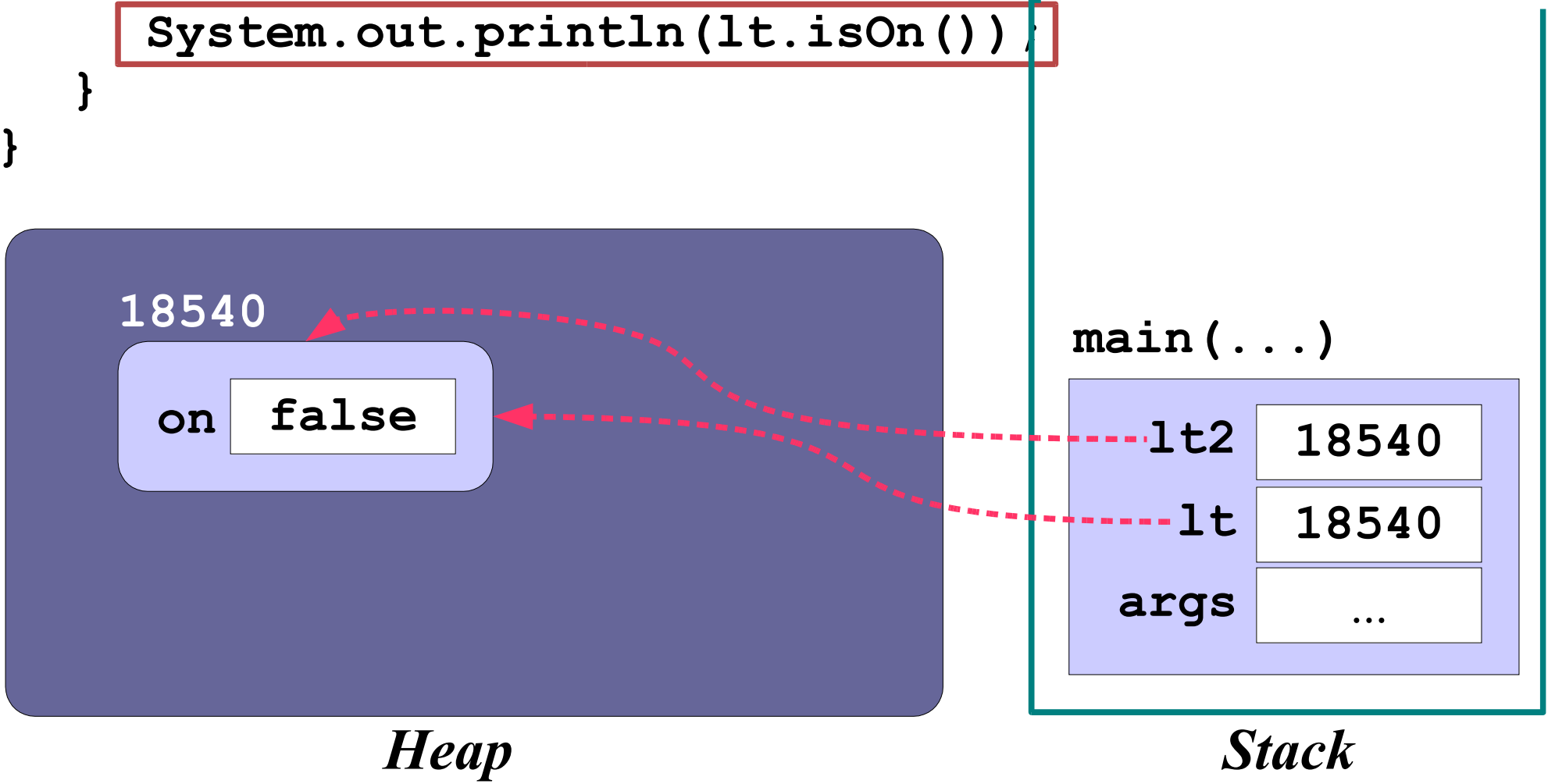
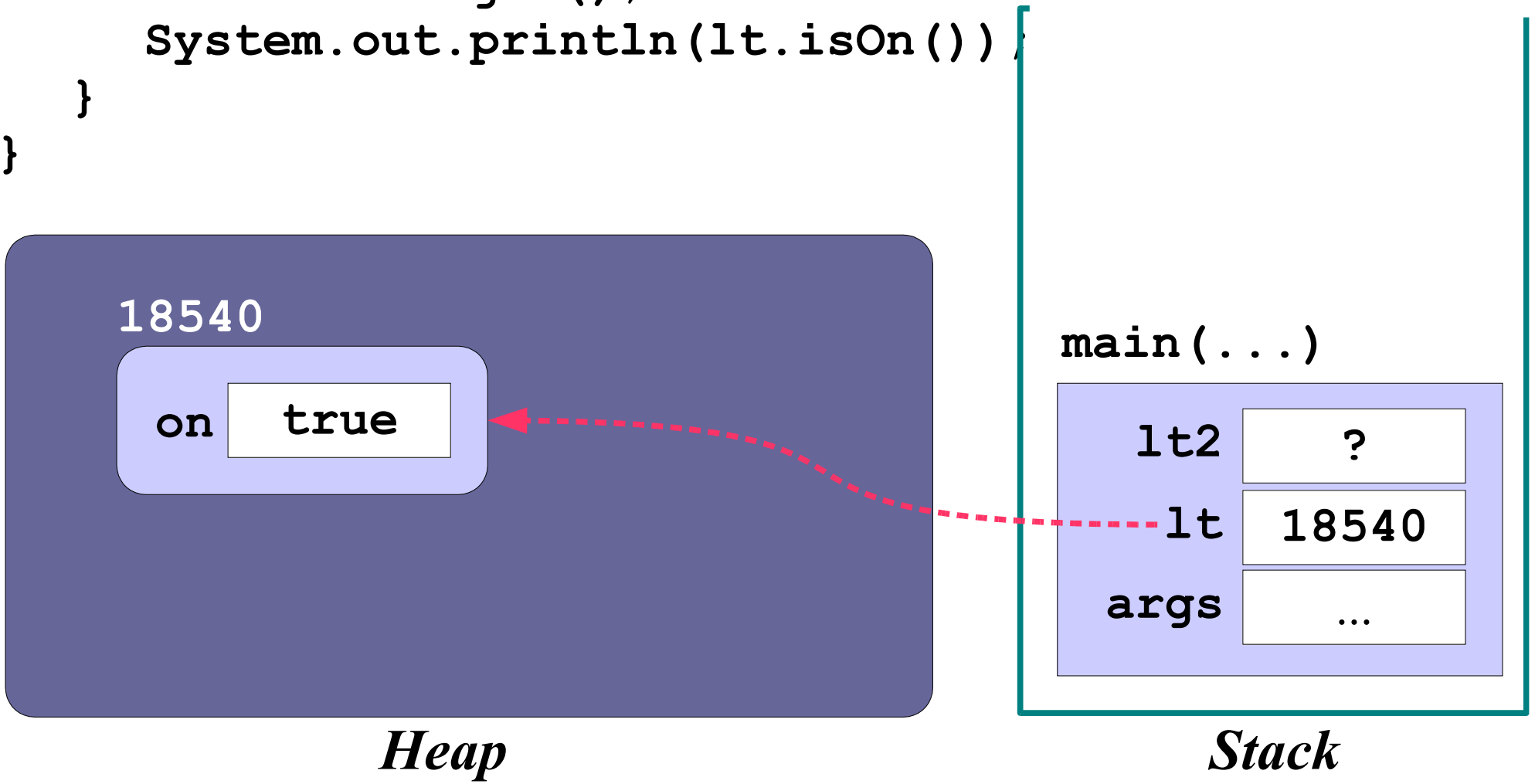
}
```



Example 5

Avoiding Garbage

```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      Light lt2 = lt;
      lt = new Light();
      System.out.println(lt.isOn());
   }
}
```



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public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      Light lt2 = lt;
      lt = new Light();
      System.out.println(lt.isOn());
   }
}
```
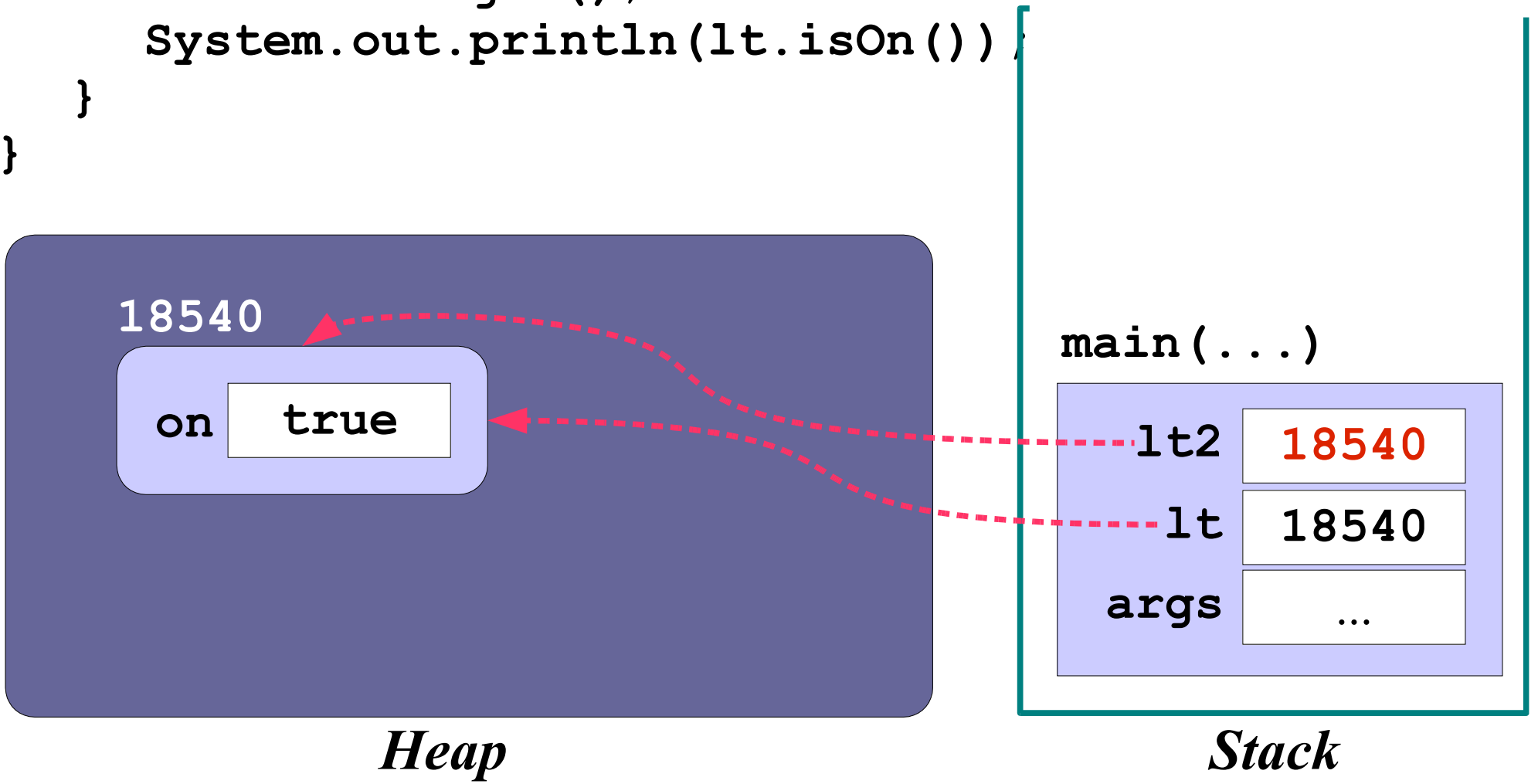
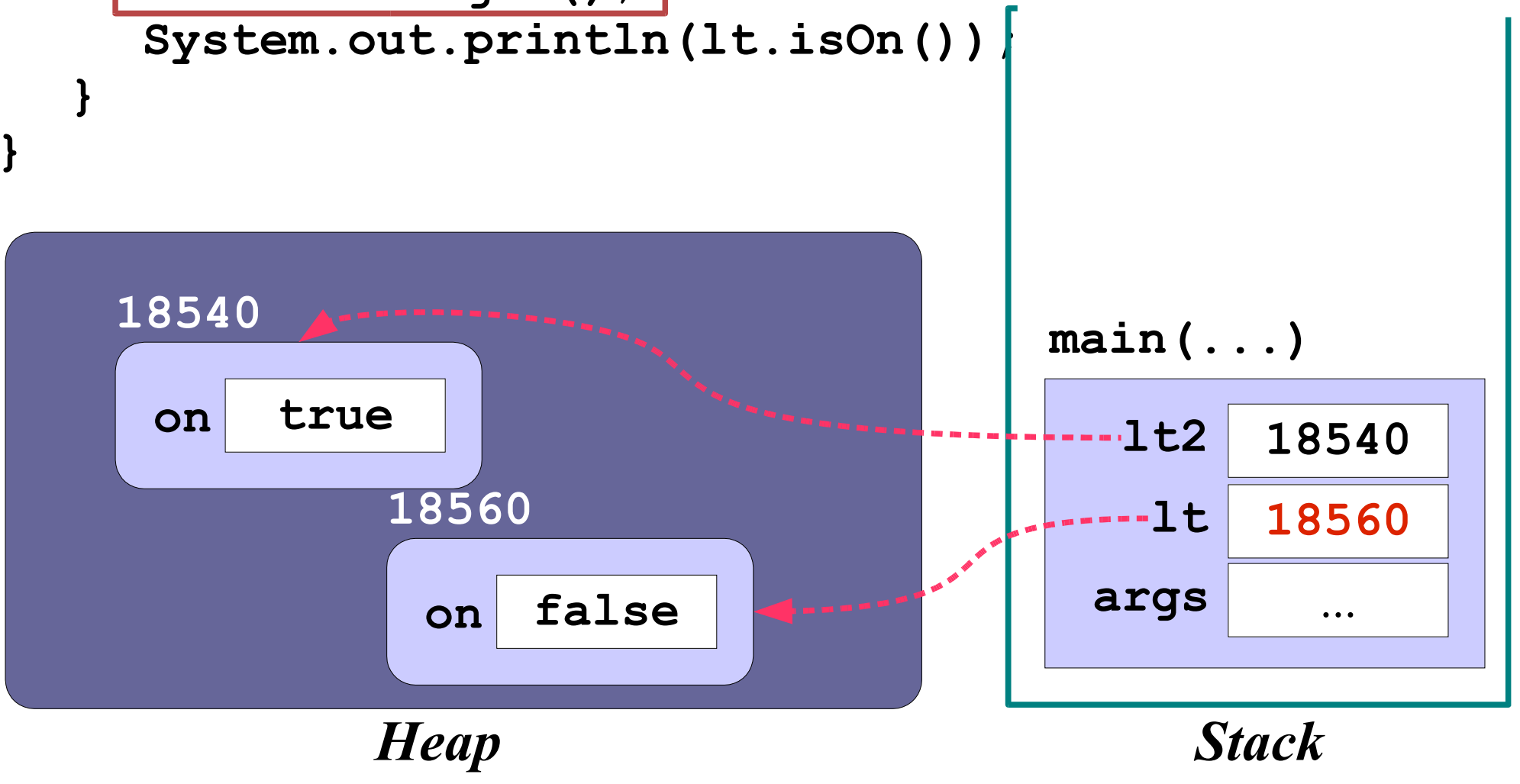



```
public class LightProg {
   public static void main(...) {
      Light lt;
      lt = new Light();
      lt.switchOn();
      Light lt2 = lt;
      lt = new Light();
      System.out.println(lt.isOn());
   }
}
```

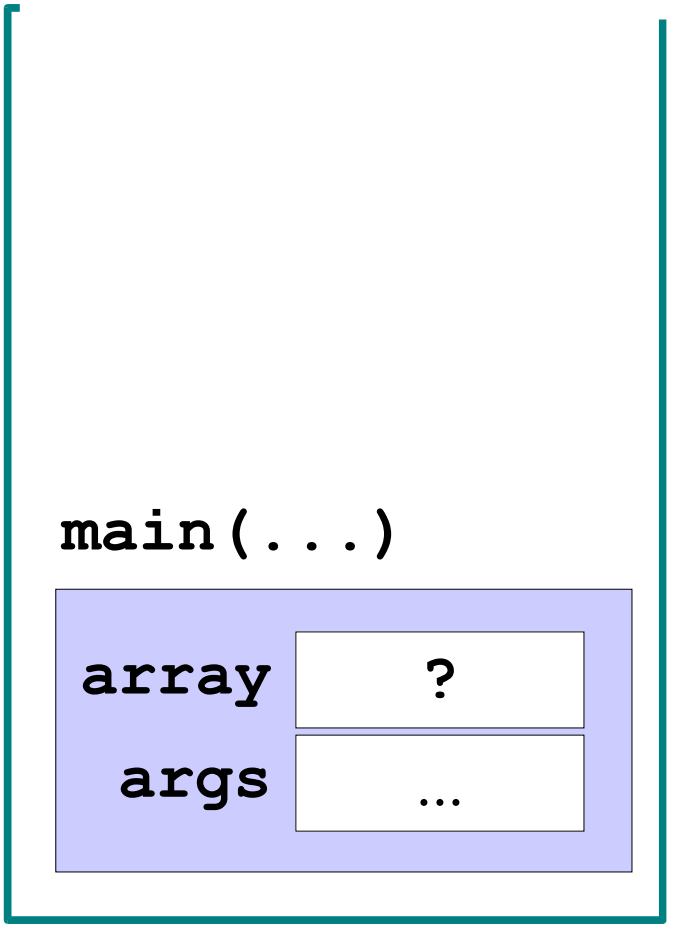


Example 6

Allocating Arrays

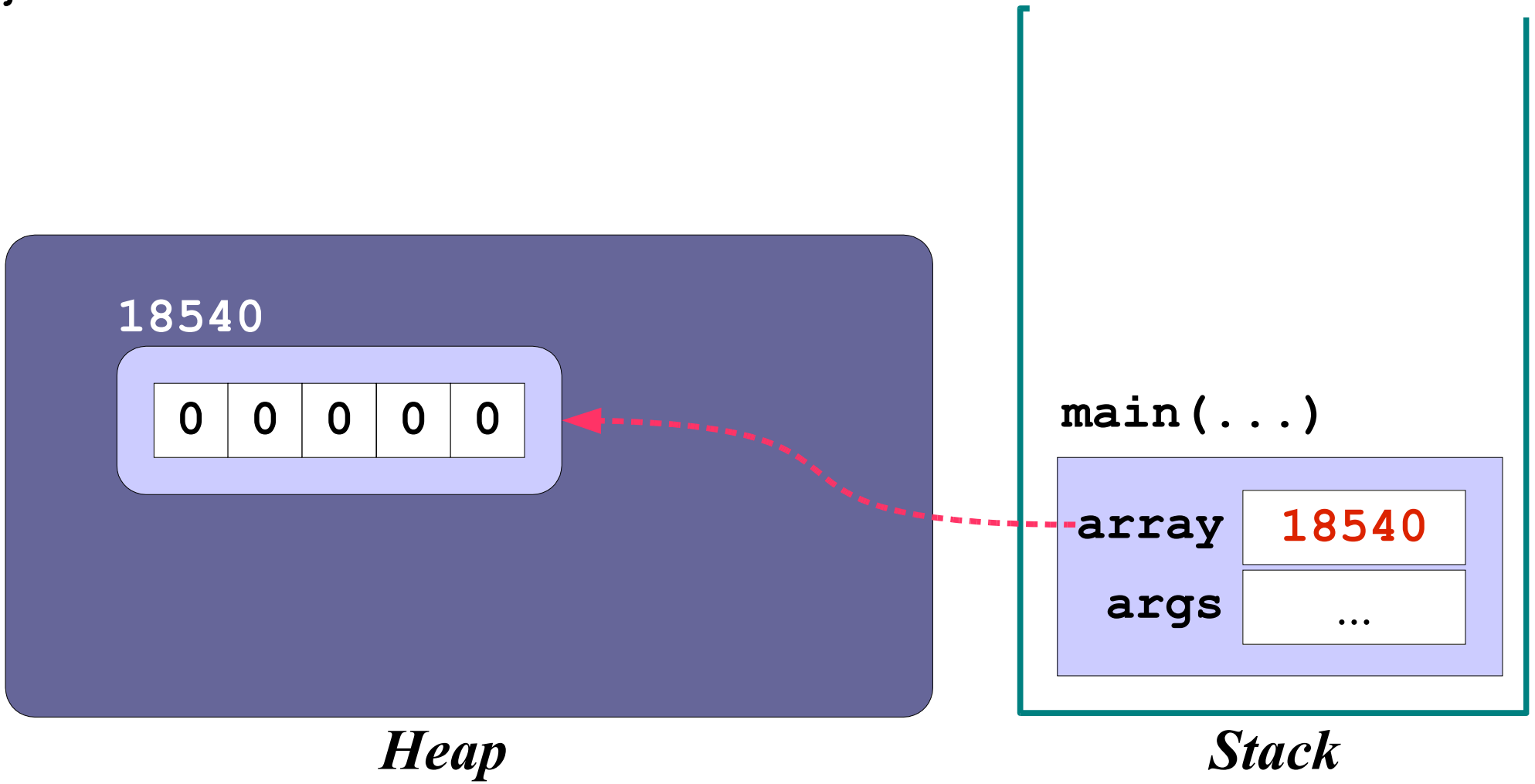
```
public class ArrayTest {
   public static void main(...) {
      int[] array;
      array = new int[5];
      array[1] = 12;
   }
}
```

Heap



Stack

```
public class ArrayTest {
   public static void main(...) {
      int[] array;
      array = new int[5];
      array[1] = 8;
   }
}
```



```
public class ArrayTest {
   public static void main(...) {
      int[] array;
      array = new int[5];
      array[1] = 8;
   }
}
```