

## TUTORIAL 5: Objects and methods

### Task 1

Look at these Java classes and answer the questions:

```
public class A
{
    private int a;

    public A(int a)
    {
        this.a = a;
    }

    public void print()
    {
        System.out.println(
            "The result is " + square());
    }

    public int square()
    {
        return a*a;
    }
}

public class TestClass
{
    public static void main(String[] args)
    {
        A a1 = new A(8);
        a1.print();
    }
}
```

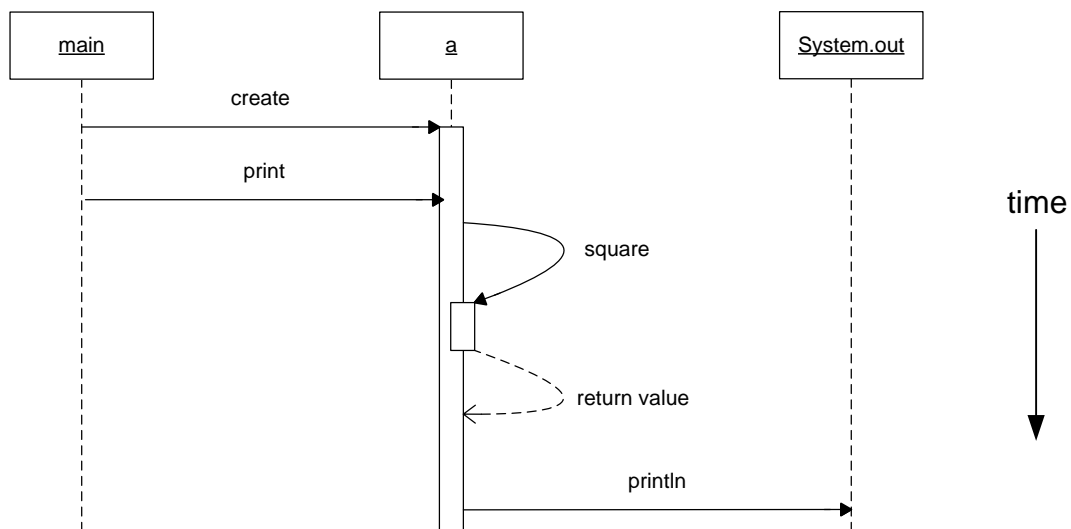
1. What method is the entry point for running this code?
2. What kind of object is created when this method runs?
3. What does the **constructor** of class A do?
4. What does the **square method** in class A do?
5. What does the **print method** in class A do?
6. What will the output be when this code runs?

Answers:

1. **main** (in TestClass)
2. **an instance of A**

3. sets the value of its instance variable **a** to the value of the constructor parameter
4. calculates the square of the instance variable **a** and returns this value
5. calls the **square** method and prints a message which includes the result
6. the output is: **The result is 64**

Sequence of method calls:



## Task 2

Look at these Java classes and answer the questions:

```
public class A
{
    private B b;

    public A(int value)
    {
        this.b = new B(value);
    }

    public void print()
    {
        System.out.println(b.test());
    }
}

public class B
{
    private int x;

    public B(int x)
    {
        this.x = x;
    }

    public int test()
    {
        return x*5;
    }
}

public class TestClass
{
    public static void main(String[] args)
    {
        A a = new A(6);
        a.print();
    }
}
```

1. What does the **constructor** of class *A* do?
2. What does the **constructor** of class *B* do?
3. What **objects** are created when the *main* method executes?
4. Describe the instance variables of these objects.
5. Describe the relationship between these objects.
6. What does the **test method** in class *B* do?
7. What does the **print method** in class *A* do?
8. What will the output be when this code runs?

## Answers:

1. sets its instance variable **b** to a new instance of class **B**, passing the constructor parameter to the constructor of **B**
2. sets the value of its instance variable **x** to the value of the constructor parameter
3. an instance of **A** and an instance of **B** (which is created by the **A** instance)
4. **A** - has an instance variable of type **B**, which is a reference to an instance of **B**  
**B** - has an integer instance variable
5. "has-a" - **A** has a **B**
6. multiplies the value of its instance variable by 5 and returns the result
7. calls the **test** method of its instance variable (which is an instance of **B**) and prints a message which includes the result
8. the output is: **30**

## Sequence of method calls:

