AP Computer Science — Project 2b
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The purpose of this project is to begin to use Java variables and methods. There are four kinds of variables: static, instance, local, and parameter. We explore each of these, first using only the main method, then using methods as functions.

Use the directory `Geometry` to hold all of the source files for this project.

We are now ready to see the final kind of variable, the instance variable. These occur in objects which are instantiated in a separate program.

Program 7. Create the class `Circle`, stored in the source file `Circle.java`.

```
public class Circle
{
    private static float PI = 3.14159f;

    private float r = 0;

    public Circle()
    {}

    public Circle(float r)
    {
        this.r = r;
    }

    public float radius()
    {
        return r;
    }

    public float circumference()
    {
        return 2 * PI * r;
    }

    public float area()
    {
        return PI * r * r;
    }
}
```

Notice that this class does NOT contain a `main` method. It is not intended to be run; it is intended to be used by another program. Type and compile this program.

Program 8. In order to test our `Circle` class, we create a testing program, sometimes known as a "test harness". Following the convention of the programming language C#, we call this class `Program`, and store it in the source file `Program.java`.

```
public class Program
{
    public static void main(String[] args)
    {
        float D = 6;
        float h = 5;
        testCircle(D/2);
        testSphere(D/2);
        testCone(D/2,h);
    }

    public static void testCircle(float r)
    {
        Circle circle = new Circle(r);

        System.out.println("Circle: " + circle);
        System.out.println("Radius: " + circle.radius());
        System.out.println("Circumference: " + circle.circumference());
        System.out.println("Area: " + circle.area());
    }

    public static void testSphere(float r)
    { }

    public static void testCone(float r, float h)
    { }
}
```

Type, compile, and run this program.

Program 9. Create an analogous `Sphere` class. Modify the `Program` class to test the `Sphere` class. Type, compile, and run this program.

Program 10. Create an analogous `Cone` class. Modify the `Program` class to test the `Cone` class. Type, compile, and run this program.