

// Trace the following code using the applicable Person, Student & APStudent classes.  
// Print any output that is produced to the right of the line of code that produces  
// it. Explain any compile or run-time errors next to the applicable line of code and  
// then ignore the error and continue tracing the program.

```
public class APStudentTest
{
    public static void main(String[] args)
    {
        APStudent apJoe = new APStudent();
        apJoe.studyForExam();
        System.out.println(apJoe.getAPEXamScore()); // 4
        System.out.println(apJoe.toString());
        System.out.println(apJoe);
        apJoe.saySomething();
        System.out.println(apJoe.getGrade());
        apJoe.passExams();
        System.out.println(apJoe.getGrade());
        apJoe.haveBirthday();
        System.out.println(apJoe.getAge());

        Student studentJane = new Student();
        studentJane.passExams();
        System.out.println(studentJane.myGrade);
        System.out.println(studentJane.getGrade());
        System.out.println(studentJane.getAPEXamScore());
        studentJane.saySomething();

        Person personMary = new Person();
        personMary.setAge(16);
        personMary.setGrade(10);
        personMary.haveBirthday();
        System.out.println(personMary.getAge());

        Person personBob = new APStudent();
        personBob.setAPEXamScore(5);
        ((APStudent) personBob).setAPEXamScore(5);
        System.out.println(personBob.getAge());
        personBob.saySomething();
    }
}
////////////////////////////////////
public class Person
{
    private int myAge;

    public Person()
    {
        myAge = 0;
    }

    public void setAge(int age)
    {
        myAge = age;
    }

    public int getAge()
    {
        return myAge;
    }

    public void haveBirthday()
    {
        myAge++;
    }

    public void saySomething()
    {
        System.out.println("I am a person");
    }
}
```

```

////////////////////////////////////
public class Student extends Person
{
    private int myGrade;

    public Student()
    {
        myGrade = 9;
    }

    public void setGrade(int grade)
    {
        myGrade = grade;
    }

    public int getGrade()
    {
        return myGrade;
    }

    public void passExams()
    {
        myGrade++;
    }

    public void saySomething()
    {
        System.out.println("I am a student");
    }
}

////////////////////////////////////
public class APStudent extends Student implements Comparable
{
    private int myAPExamScore;

    public APStudent()
    {
        myAPExamScore = 3;
    }
    public void setAPExamScore(int apExamScore)
    {
        myAPExamScore = apExamScore;
    }
    public int getAPExamScore()
    {
        return myAPExamScore;
    }
    public void studyForExam()
    {
        if (myAPExamScore < 5)
            myAPExamScore++;
    }
    public void saySomething()
    {
        System.out.println("I am an AP student");
    }
    public int compareTo(Object other)
    {
        return getAPExamScore() - ((APStudent) other).getAPExamScore();
    }
    public String toString()
    {
        return "myAPExamScore = " + myAPExamScore;
    }
    public boolean equals(Object other)
    {
        if (myAPExamScore == ((APStudent) other).myAPExamScore)
            return true;
        return false;
    }
}

```