

Homework One

Q1 Write a Java program that reads 10 integers from the keyboard and outputs all the pairs whose sum is 30.

Q2 Write a Java program that takes two arrays a and b of length n storing int values, and returns the dot product of a and b. That is, it returns an array c of length n such that $c[i] = a[i] * b[i]$.

Q3 Explain why the Java dynamic dispatch algorithm, which looks for the method to invoke for a call o.a(), will never get into an infinite loop.

Q4 Consider the following code segment, taken from some package:

```
public class Maryland extends State { Maryland() { /* null constructor */ }
    public void printMe() { System.out.println("Read it."); }
    public static void main(String[] args) {
        Region mid = new State();
        State md = new Maryland();
        Object obj = new Place();
        Place usa = new Region();
        md.printMe();
        mid.printMe();
        ((Place) obj).printMe();
        obj = md;
        ((Maryland) obj).printMe();
        obj = usa;
        ((Place) obj).printMe();
        usa = md;
        ((Place) usa).printMe();
    }
}

class State extends Region {
    State() { /* null constructor */ }
    public void printMe() { System.out.println("Ship it."); }
}

class Region extends Place {
    Region() { /* null constructor */ }
    public void printMe() { System.out.println("Box it."); }
}

class Place extends Object {
    Place() { /* null constructor */ }
    public void printMe() { System.out.println("Buy it."); }
}
```

What is the output from calling the main() method of Maryland class?

Q5 Write a program that consists of three classes , A, B, and C, such that B extend A and C extends B. Each class should define an instance variable named "x" (that is , each has its own variable named x). Describe a way for a method in C to access and set A's version of x to a given value, without changing B or C's version.