1. Suppose we have the following Java declarations:

```java
double d1, d2;
float f1, f2;
int i1, i2;
short s1, s2;
```

Consider the following Java statements. Which are legal, and which give compile-time errors? Which will cause Java to insert a coercion?

```java
i1 = i2+30;
i1 = s1+30;
s1 = i1+50;
d1 = s1;
d1 = d2+100.0;
s1 = d1;
f1 = d1+3.14;
d1 = f1;
```

2. Consider the following program in an Algol-like language.

```algol
begin
integer n;
procedure p(k: integer);
begin
  n := n+100;
p(k);
end;
n := 0;
p(n);
end;
```

What is printed if n is passed by value? By reference?
3. Consider the following Java classes.

class Octopus {
    public static void main(String[] args) {
        int i = 42;
        int[] a = new int[3];
        int k;
        k = test(i,a);
    }

    public int test(int m, int[] n) {
        n[0] = m;
        return 100;
    }
}

Draw a picture of Java’s memory structure when main is invoked, and then when test is invoked. Include both the stack and the heap.

4. Do the same thing for these classes:

class IntHolder {
    public int myint;
    public String description;
}

class Octopus {
    public static void main(String[] args) {
        Octopus o = new Octopus();
        IntHolder t;
        t = o.create_holder(28,"a perfect number");
    }

    public IntHolder create_holder(int n, String s) {
        IntHolder h = new IntHolder();
        h.myint = 28;
        h.description = s;
        return h;
    }
}