CS180 - Lecture 5

Note Title 9/1/2009

Announcements

- Lab tomorrow
- HW1 due Friday
- HW2 - due Thursday

- Read section 1.5 of text

Last time

Different types of variables

1. Value
2. Reference
3. Pointer

② Reference

```
int  a(3);
int& c(a);
```

Creates alias for a variable.

Why?

Use mainly to avoid recreating/copying every input parameter to a fcn.

↳ Changes inside function persist. (unless const)

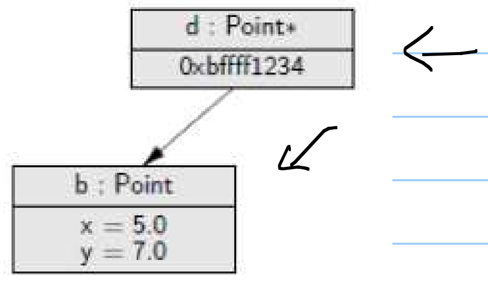
3 Pointer variables

Syntax : `Point *d;      // d is a pointer variable`

d is created as a variable that stores a memory address.

So: `d = &b;` ↑ memory address of b

gives



But d is <u>not</u> a Point! can't say d = b

Using pointer variables

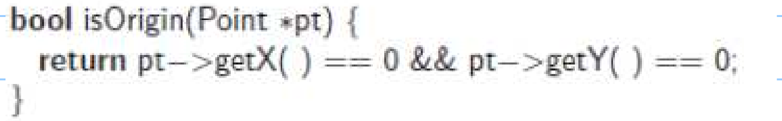
2 options:

```
    (*d).getY();            &(*d);


    d -> getY();
```

Passing by Pointer

Point *pt = NULL



```
bool isOrigin(Point *pt) {
  return pt->getX( ) == 0 && pt->getY( ) == 0;
}
```

This is similar to passing by reference but allows you to also pass a null pointer.

Destructors:

If your class opens files or allocates memory, then can't just use delete.

Must create a <u>destructor</u>.

~ClassName() - no arguements, no return type

~Point()

(garbage collection - automatic in Python, not in C++)

Copy Constructors:

~~Previously:~~

```
~~Point a;~~
~~Point b(a);~~
```

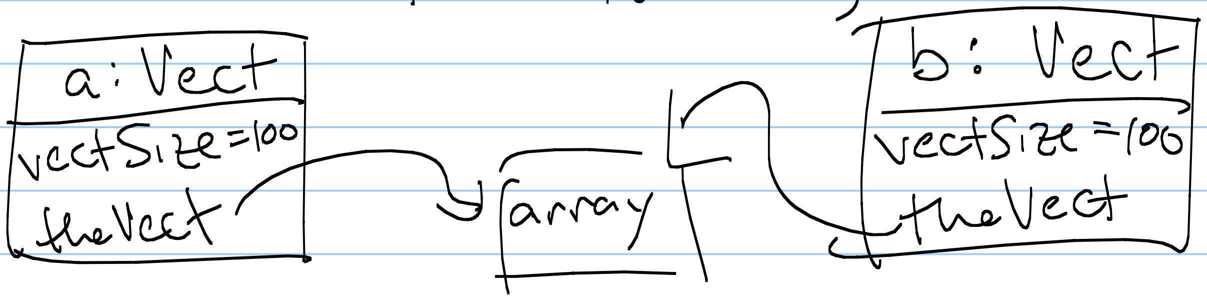
Consider the following:

```
Vect a(100);
Vect b(a);
```

What does this do? shallow copy!

Copies each element of a to b!

```
vectSize = a.vectSize;
theVect = a.theVect;
```



To fix, write our own copy constructor:

```
Vect b(a);

//copy constructor
Vect (const Vect &a) {
    vectSize = a.vectSize;   //copy size
theVect = new
  int[vectSize];
    for (int i = 0; i < VectSize; i++) {
        theVect[i] = a.theVect[i];
    }
}
```

Another problem:

```
Vect a(100);
 Vect c;
  c=a;
   ↑
```

What does this do? shallow copy
by default, copies each parameter:

```
c.vectSize = a. rectSize ;
c. theVect = a. theVect;
```

Write operator = to make deep copy of data.

Example Program - Credit Card Class

Stores what? (private/public?)

number - String
name of owner
exp. date
security code

limit
current balance
company name
interest rate

Methods?

accessors for all above (sec code?)
Charge (money)
payments
add fees to balance
⋮